



*The*  
*Heritage Foundation*

# 2020 INDEX OF U.S. MILITARY STRENGTH

WITH ESSAYS ON GREAT POWER COMPETITION

*edited by*  
Dakota L. Wood



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We are honored to dedicate the  
*2020 Index of U.S. Military Strength*  
to Victor Davis Hanson.





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Any views presented in or reflecting the results of any prepublication review of this document by an officer or employee of the United States are rendered in his or her individual capacity and do not necessarily represent the views of the United States or any agency thereof.

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James Di Pane, Research Associate in the Center for National Defense, assumed the major task of shepherding production of the *2020 Index of U.S. Military Strength*. He worked with the authors, editors, and graphics and production professionals to make this *Index* a reality, both in print and on the web. In particular, he brought together authors and our graphics team in a series of sessions to think through ways to keep the *Index* vibrant and informative beyond the ability of a purely text-based document to do so.

Special thanks go to Jeff Smith, Research Fellow for South Asia, and Robin Simcox, Margaret Thatcher Fellow, who spearheaded a redesign of the assessment chapter on “Threats to Vital U.S. Interests,” shifting the presentation from one organized by U.S. security interest to one focused on major threat-actors. This seems to us a more natural and coherent way to discuss threats to U.S. interests.

Senior Editor William T. Poole admirably sustained his instrumental role in maintaining a consistent tone throughout this multi-author document—a challenging feat all its own—and checking every reference to ensure accuracy of reporting and coherence throughout the *Index* while also updating text that, though still current, can become stale when carried from one year to the next. He was aided again this year

by Research Editor Kathleen McCann Scaturro, who reviewed four of the five topical essays, as well as the nuclear capability assessment, with a keen eye for editorial nuance and detail. Data Graphics Services Manager John Fleming, ably assisted by Data Graphics Specialist and Editorial Associate Luke Karnick, once again gave visual life to text and statistics to convey a message with maximum impact, working with the authors to explore more creative ways to convey important information. Senior Designer of Research Projects Jay Simon and Digital Strategy Director Maria Sousa ensured that the presentation of *Index* materials was fine-tuned to account for changes in content delivery as our world becomes increasingly digital, portable, and driven by social media. Finally, Director of Research Editors Therese Pennefather was critical in guiding and coordinating these efforts to create a cohesive, finished product.

We believe that this *Index* helps to provide a better-informed understanding and wider appreciation of America’s ability to “provide for the common defence”—an ability that undergirds The Heritage Foundation’s vision of “an America where freedom, opportunity, prosperity, and civil society flourish.” Judging by the reception the *Index* received during this past year—the work cited and referenced by Congress, the executive branch, officials within the Department of Defense, supporting government agencies, the media, academia, and policy institutes, as well as among the public—we are encouraged that so many Americans are similarly concerned about the state of affairs in and the multitude of factors affecting our country.

The Heritage Foundation seeks a better life for Americans, which requires a stronger economy, a stronger society, and a stronger defense. To help measure the state of the economy, our Institute for Economic Freedom and Opportunity publishes the annual *Index of Economic Freedom*; to help guide Congress in its constitutional exercise of the power of the purse, our Institute for Economic Freedom publishes the *Blueprint for Balance*; and to help Americans everywhere more fully understand the state of our defenses, our Kathryn and Shelby Culom Davis Institute for National Security and

Foreign Policy is publishing this sixth annual edition of the *Index of U.S. Military Strength*.

In addition to acknowledging all of those who helped to prepare this edition, very special recognition is due to the Heritage members and donors whose continued support has made this *2020 Index of U.S. Military Strength* possible.

Finally, as always, The Heritage Foundation also expresses its profound appreciation to the members of the U.S. armed forces who continue to protect the liberty of the American people in an increasingly challenging world.

# Preface

Kay Coles James

The Heritage Foundation's *Index of U.S. Military Strength* is the only nongovernmental and only annual assessment of U.S. military strength. This 2020 edition marks the sixth anniversary of this publication.

Last year saw the first positive trends since publication of the first edition of the *Index* in 2015, as all military branches, especially the Army, have seen vast improvements in readiness. The good news is that there is room for optimism again this year as these trends continue.

Unfortunately, we are not able to declare victory just yet. We have yet to see a change in size and capability large enough to ensure the ability of our military to meet the growing threats from around the world. Our ships, tanks, and planes remain largely carryovers from the buildup in the 1980s under President Ronald Reagan, and many of them are on the verge of retirement.

For many years following the end of the Cold War, the military was reduced in size and, in many ways, ignored. Its prowess was taken for granted by lawmakers eager to cash a so-called peace dividend that they believed resulted from the collapse of the Soviet Union and spend it on other priorities.

When America was rocked by the terrorist attacks of 9/11, America's military was quickly called into action. It has been "in action" ever since.

Since 2017, Congress and the Administration have stabilized military budgets and provided resources for the military to improve its

condition, and this has led to improvements in readiness for all military branches. However, although that funding has aided America's military recovery, the defense budget is artificially capped for the next two years at well below historical averages (and well below what is actually needed). Additionally, future funding levels will remain uncertain through changing Administrations and shifts in the makeup of Congress.

Moreover, a few years of solid investment in our armed forces during the Trump Administration are not enough to undo the damage caused by years of neglect and constant use. It is also insufficient to get our military in position to compete against the growing threats from nations such as Russia, China, and Iran, as well as from terrorism.

Increased and sustained investment is absolutely critical in this period of renewed military competition among nations. The United States faces potential adversaries with growing militaries that desire to use them to reshape the world to suit their needs at the expense of others.

For the first time since the end of the Cold War, the U.S. faces threats from nations that may soon match or surpass our military power. Russia and China are investing significantly in the most modern forms of combat power and technology with the express intention of challenging U.S. military dominance. We cannot afford to allow our military to fall behind.

As George Washington said so eloquently in his first annual address to Congress, "To be

prepared for war is the most effectual means of preserving peace.” A strategy centered on this concept of peace through strength is the best way to ensure our safety, freedom, and prosperity at home. Maintaining American military dominance also ensures a safer and more peaceful world, as it reassures our allies and deters potential adversaries.

Over the coming years, sustained investment will be necessary if we are serious about strengthening our military. This *Index*, backed by an irrefutable body of research, points out exactly what investments are needed and

where so that the American people, both today and in generations yet to come, will have a military that is capable of defending them.

Peace through strength and funding a military that is actually capable of fulfilling its constitutional mandate of providing for the common defense should be a nonpartisan issue and a top priority for all members of Congress and the Administration.

Kay Coles James, President  
The Heritage Foundation  
October 2019



# Introduction

The United States maintains a military force primarily to protect the homeland from attack and to protect its interests abroad. There are secondary uses—such as assisting civil authorities in times of emergency or deterring enemies—that amplify other elements of national power such as diplomacy or economic initiatives, but America’s armed forces exist above all else so that the U.S. can physically impose its will on an enemy and change the conditions of a threatening situation by force or the threat of force.

Each year, The Heritage Foundation’s *Index of U.S. Military Strength* gauges the ability of the U.S. military to perform its missions in today’s world and assesses how the condition of the military has changed during the preceding year.

The United States prefers to lead through “soft” elements of national power: diplomacy, economic incentives, and cultural exchanges. When soft approaches like diplomacy work, their success often owes much to the knowledge of all involved that U.S. “hard power” stands ready, however silently, in the diplomatic background. Soft approaches cost less in manpower and treasure than military action costs and do not carry the same risk of damage and loss of life, but when confronted by physical threats to U.S. national security interests, soft power cannot substitute for raw military power. In fact, the absence of military power or the perception that one’s hard power is insufficient to protect one’s interests will frequently—and predictably—invite challenges that soft power is ill-equipped to address. Thus, hard power and soft power are complementary and mutually reinforcing.

The decline of America’s military hard power, historically shown to be critical to defending against major military powers and to sustaining operations over time against lesser powers or in multiple instances simultaneously, is thoroughly documented and quantified in this *Index*. It is harder to quantify the growing threats to the U.S. and its allies that are engendered by the perception of American weakness abroad and doubts about America’s resolve to act when its interests are threatened.

The anecdotal evidence is consistent with direct conversations between Heritage scholars and high-level diplomatic and military officials from countries around the world: The perception of American weakness—in the aging and shrinking of America’s military forces and in their reduced presence in key regions since the end of the Cold War—is contributing to destabilization in many parts of the world and prompting old friends to question their reliance on America’s assurances. For decades, the perception of American strength and resolve has helped to deter adventurous bad actors and tyrannical dictators. Regrettably, both that perception and, as a consequence, its deterrent effect are eroding. The result is an increasingly dangerous world threatening a significantly weaker America.

This can seem odd to many observers because U.S. forces have dominated on the battlefield in tactical engagements with enemy forces over the past 30 years. Not surprisingly, the forces built to battle those of the Soviet Union have handily defeated the forces of third-world dictators and terrorist organizations. These successes, however, have masked

the deteriorating condition of the military, which has been able to undertake such operations only by “cashing in” on investments made in the 1980s and 1990s. Unseen by the American public, the rate of consumption of military readiness has not been matched by corresponding investments sufficient to replace the equipment, resources, and capacity used up since September 11, 2001.

It is therefore critical that we understand the condition of the United States military with respect to America’s vital national security interests, the threats to those interests, and the context within which the U.S. might have to use hard power. It is likewise important to know how these three areas—operating environments, threats, and the posture of the U.S. military—change over time, given that such changes can have substantial implications for defense policies and investments.

In the opening paragraph of the U.S. Constitution, “We the People” stated that among their handful of purposes in establishing the Constitution was to “provide for the common defence.” The Constitution’s enumeration of limited powers for the federal government includes the powers of Congress “To declare War;” “To raise and support Armies,” “To provide and maintain a Navy,” “To provide for calling forth the Militia,” and “To provide for organizing, arming, and disciplining, the Militia” and the power of the President as “Commander in Chief of the Army and Navy of the United States, and of the Militia of the several States, when called into the actual Service of the United States.”

With such constitutional priority given to defense of the nation and its vital interests, one might expect the federal government to produce a standardized, consistent reference work on the state of the nation’s security. Yet no such single volume exists, especially in the public domain, to allow comparisons from year to year. Recently, the Department of Defense has moved to restrict reporting of force readiness even further. Thus, the American people and even the government itself are prevented from understanding whether investments made in defense are achieving their desired results.

What is needed is a publicly accessible reference document that uses a consistent, methodical, and repeatable approach to assessing defense requirements and capabilities. The Heritage Foundation’s *Index of U.S. Military Strength*, an annual assessment of the state of America’s hard power, fills this void, addressing both the geographical and functional environments relevant to the United States’ vital national interests and threats that rise to a level that puts or has the strong potential to put those interests at risk.

Any assessment of the adequacy of military power requires two primary reference points: a clear statement of U.S. vital security interests and an objective requirement for the military’s capacity for operations that serves as a benchmark against which to measure current capacity. A review of relevant top-level national security documents issued by a long string of presidential Administrations makes clear that three interests are consistently stated:

- Defense of the homeland;
- Successful conclusion of a major war that has the potential to destabilize a region of critical interest to the U.S.; and
- Preservation of freedom of movement within the global commons: the sea, air, outer-space, and cyberspace domains through which the nations of the world conduct their business.

Every President has recognized that protecting America from attack is one of the U.S. military’s fundamental reasons for being. While going to war has always been controversial, the decision to do so has been based consistently on the conclusion that one or more vital U.S. interests are at stake.

This *Index* embraces the “two-war requirement”—the ability to handle two major wars or two major regional contingencies (MRCs) successfully at the same time or in closely overlapping time frames—as the most compelling rationale for sizing U.S. military forces. Dr.

Daniel Gouré provided a detailed defense of this approach in his essay, “Building the Right Military for a New Era: The Need for an Enduring Analytic Framework,” in the *2015 Index*, and it is further elaborated in the military capabilities section. The basic argument, however, is this: The nation should have the ability to engage and defeat one opponent and still have the ability to guard against competitor opportunism (that is, to prevent someone from exploiting the perceived opportunity to move against U.S. interests while America is engaged elsewhere).

The *Index* is descriptive, not prescriptive, reviewing the current condition of its subjects within the assessed year and describing how conditions have changed during the previous year, informed by the baseline condition established by the inaugural *2015 Index*. In short, the *Index* answers the question, “Have conditions improved or worsened during the assessed year?”

This study also assesses the U.S. military against the two-war benchmark and various metrics explained further in the military capabilities section. Importantly, the *Index* measures the hard power needed to win conventional wars rather than the general utility of the military relative to the breadth of tasks it might be (and usually is) assigned in order to advance U.S. interests short of war.

### **Assessing the World and the Need for Hard Power**

The assessment portion of the *Index* is composed of three major sections that address the aforementioned areas of primary interest: America’s military power, the operating environments within or through which it must operate, and threats to U.S. vital national interests. For each of these areas, the *Index* provides context, explaining why a given topic is addressed and how it relates to understanding the nature of America’s hard-power requirements.

The authors of this study used a five-category scoring system that ranged from “very poor” to “excellent” or “very weak” to “very strong” as appropriate to each topic. This approach

was selected as the best way to capture meaningful gradations while avoiding the appearance that a high level of precision was possible given the nature of the issues and the information that was publicly available.

Some factors are quantitative and lend themselves to discrete measurement; others are very qualitative in nature and can be assessed only through an informed understanding of the material that leads to an informed judgment call.

By themselves, purely quantitative measures tell only part of the story when it comes to the relevance, utility, and effectiveness of hard power. Assessing military power or the nature of an operating environment using only quantitative metrics can lead to misinformed conclusions. For example, the mere existence of a large fleet of very modern tanks has little to do with the effectiveness of the armored force in actual battle if the employment concept is irrelevant to modern armored warfare. (Imagine, for example, a battle in rugged mountains.) Also, experience and demonstrated proficiency are often so decisive in war that numerically smaller or qualitatively inferior but well-trained and experienced forces can defeat a larger or qualitatively superior adversary.

However digital and quantitative the world has become thanks to the explosion of advanced technologies, it is still very much a qualitative place, and judgment calls have to be made in the absence of certainty. We strive to be as objective and evenhanded as possible in our approach, and as transparent as possible in our methodology and sources of information, so that readers can understand why we reached the conclusions we reached—and perhaps reach their own as well. The result will be a more informed debate about what the United States needs in terms of military capabilities to deal with the world as it is. A detailed discussion of scoring is provided in each assessment section.

In our assessment, we begin with the operating environment because it provides the geostrategic stage upon which the U.S. attends to its interests: the various states that would play

significant roles in any regional contingency; the terrain that enables or restricts military operations; the infrastructure—ports, airfields, roads, and rail networks (or lack thereof)—on which U.S. forces would depend; and the types of linkages and relationships the U.S. has with a region and major actors within it that cause the U.S. to have interests in the area or that facilitate effective operations. Major actors within each region are identified, described, and assessed in terms of alliances, political stability, the presence of U.S. military forces and relationships, and the maturity of critical infrastructure.

Our assessment focuses on three key regions—Europe, the Middle East, and Asia—because of their importance relative to U.S. vital security interests. This does not mean that we view Latin America and Africa as unimportant. It means only that the security challenges within these regions do not currently rise to the level of direct threats to America’s vital security interests as we have defined them. We addressed their current condition in the *2015 Index* and will provide updated assessments when circumstances make such assessments necessary.

Next is a discussion of threats to U.S. vital interests. Here we identify the countries that pose the greatest current or potential threats to U.S. vital interests based on two overarching factors: their behavior and their capability. We accept the classic definition of “threat” as a combination of intent and capability, but while capability has attributes that can be quantified, intent is difficult to measure. We concluded that “observed behavior” serves as a reasonable surrogate for intent because it is the clearest manifestation of intent.

We based our selection of threat countries and non-state actors on their historical behavior and explicit policies or formal statements vis-à-vis U.S. interests, scoring them in two areas: the degree of provocative behavior that they exhibited during the year and their ability to pose a credible threat to U.S. interests irrespective of intent. For example, a state full of bluster but with only a moderate ability to act accordingly poses a lesser threat, and a state

that has great capabilities and a pattern of bellicose behavior that is opposed to U.S. interests still warrants attention even if it is relatively quiet in a given year.

Finally, we address the status of U.S. military power in three areas: capability (or modernity), capacity, and readiness. Do U.S. forces possess operational capabilities that are relevant to modern warfare? Can they defeat the military forces of an opposing country? Do they have a sufficient amount of such capabilities? Is the force sufficiently trained and its equipment materially ready to win in combat? All of these are fundamental to success even if they are not de facto determinants of success (something we explain further in the section). We also address the condition of the United States’ nuclear weapons capability, assessing it in areas that are unique to this military component and critical to understanding its real-world viability and effectiveness as a strategic deterrent, and provide a descriptive overview of current U.S. ballistic missile defense capabilities and challenges.

### Topical Essays

In January 2018, then-Secretary of Defense James N. Mattis released the 2018 National Defense Strategy (NDS), his direction to the Department of Defense on how it would execute its portion of the National Security Strategy. Driving all aspects of the NDS was a single theme: a return to great-power competition. Secretary Mattis noted that a quarter of a century after the collapse of the Soviet Union and 17 years after the terrorist attacks of September 11, 2001, world events had brought the United States back into direct, long-term competition with major powers, China and Russia in particular. This context provides the theme for the essays in this edition of the *Index*.

Our essayists address great-power competition and its implications for the United States from various perspectives.

- There are profound implications for the military if it is to prepare for conflict with one or more major competitors. Combat

operations of any sort against China or Russia, for example, would be far different from those to which the U.S. military has become accustomed against non-state or irregular forces over the past several years. Dr. Thomas Ehrhard kicks off this year's *Index* with such an assessment in "Treating the Pathologies of Victory: Hardening the Nation for Strategic Competition."

- In "Being Realistic About Strategy," Major General Bill Hix, U.S. Army (Ret.), addresses the challenge of crafting strategy that is relevant and pragmatic, that clearly defines the objectives to be achieved, prioritizes the use of resources, or recasts objectives when means are limited and options for their use are few. Clear-eyed assessments are exceedingly important when the stakes are high, as in the case of great-power competition.
- Dr. Rebecca Grant, in "Pragmatism, Populism, and How Americans Think About Investing in Defense," effectively raises the tough question: How serious and realistic are Americans about funding a military that aligns with their stated national security interests? It is one thing to say the U.S. is in a strategic competition with the likes of China and Russia. It is quite another thing to put real money toward having a military that is commensurate with that objective.
- In "The Economic Dimension of Great-Power Competition and the Role of Cyber as a Key Strategic Weapon," Dr. Samantha Ravich and Annie Fixler explain how modern warfare has evolved beyond the conventional tools of tanks, ships, and aircraft. It now includes cyber weapons and related tactics that blur the line between war as a realm preserved for military forces and a "field of battle" in which opponents use cyber capabilities to attack the U.S. economic infrastructure and steal sensitive technology and

weapons-relevant intellectual property in order to undermine America's ability to project and sustain military power.

- Dr. Kathleen McInnis completes this set of essays with one that addresses perhaps the oldest and most enduring truism of war: Going to war in the company of allies is far better than going to war alone. In "The Competitive Advantages and Risks of Alliances," Dr. McInnis explains how U.S. alliances and partnerships, if properly managed, could be the single most important advantage possessed by America in its unfolding competition with Russia and China.

### Scoring U.S. Military Strength Relative to Vital National Interests

The purpose of this *Index* is to make the national debate about defense capabilities better informed by assessing the U.S. military's ability to defend against current threats to U.S. vital national interests within the context of the world as it is. Each of the elements can change from year to year: the stability of regions and access to them by America's military forces; the various threats as they improve or lose capabilities and change their behavior; and the United States' armed forces themselves as they adjust to evolving fiscal realities and attempt to balance readiness, capacity (size and quantity), and capability (how modern they are) in ways that enable them to carry out their assigned missions successfully.

Each region of the world has its own set of characteristics that include terrain; man-made infrastructure (roads, rail lines, ports, airfields, power grids, etc.); and states with which the United States has relationships. In each case, these factors combine to create an environment that is either favorable or problematic when it comes to the ability of U.S. forces to operate against threats in the region.

Various states and non-state actors within these regions possess the ability to threaten—and have consistently behaved in ways that threaten—America's interests. Fortunately for the U.S., these major threat actors are

currently few in number and continue to be confined to three regions—Europe, the Middle East, and Asia—thus enabling the U.S. (if it will do so) to focus its resources and efforts accordingly.

As for the condition of America’s military services, they continue to be beset by aging equipment, shrinking numbers, rising costs, and problematic funding. These four elements interact in ways that are difficult to measure in concrete terms and impossible to forecast with any certainty. Nevertheless, the exercise of describing them and characterizing their general condition is worthwhile because it informs debates about defense policies and the allocation of resources that are necessary for the U.S. military to carry out its assigned duties. Further, as seen in this *2020 Index*, noting how conditions have changed during the preceding year helps to shed light on the effect that policies, decisions, and actions have on security affairs that involve the interests of the United States, its allies and friends, and its enemies.

It should be borne in mind that each annual *Index* assesses conditions as they are for the assessed year. This *2020 Index of U.S. Military Strength* describes changes that occurred during the preceding year, with updates current as of mid-September 2019.

Assessments for U.S. Military Power, Global Operating Environment, and Threats to Vital U.S. Interests are shown in the Executive Summary. Factors that would push things toward “bad” (the left side of the scale) tend to move more quickly than those that improve one’s situation, especially when it comes to the material condition of the U.S. military.

Of the three areas measured—U.S. Military Power, Global Operating Environment, and Threats to Vital U.S. Interests—the U.S. can directly control only one: its own military. The condition of the U.S. military can influence the other two because a weakened America arguably emboldens challenges to its interests and loses potential allies, while a militarily strong America deters opportunism and draws partners to its side from across the globe.

## Conclusion

During the decades since the end of the Second World War, the United States has underwritten and taken the lead in maintaining a global order that has benefited more people in more ways than at any other period in history. Now, however, that American-led order is under stress, and some have wondered whether it will break apart entirely as fiscal and economic burdens continue to plague nations, violent extremist ideologies threaten the stability of entire regions, state and non-state opportunists seek to exploit upheavals; and major states compete to establish dominant positions in their respective regions.

America’s leadership role remains in question, and its security interests are under significant pressure. Challenges are growing, old allies are not what they once were, and the U.S. is increasingly bedeviled by debt that constrains its ability to sustain its forces commensurate with its interests.

Informed deliberations on the status of the United States’ military power are therefore desperately needed. It is our hope that this *Index of U.S. Military Strength* will help to facilitate those informed deliberations.

# Executive Summary

*“As currently postured, the U.S. military is only marginally able to meet the demands of defending America’s vital national interests.”*

The United States maintains a military force primarily to protect the homeland from attack and to protect its interests abroad. There are secondary uses—for example, to assist civil authorities in times of emergency or to deter enemies—but this force’s primary purpose is to make possible the physical imposition of will on an enemy when necessary.

Understanding the condition of the United States military with respect to America’s vital national security interests, any threats to those interests, and the context within which the U.S. might have to use “hard power” is therefore of critical importance. Knowing how these three areas—operating environments, threats, and the posture of the U.S. military—change over time, given that such changes can have substantial implications for defense policies and investment, is likewise important.

Each year, The Heritage Foundation’s *Index of U.S. Military Strength* employs a standardized, consistent set of criteria, accessible both to government officials and to the American public, to gauge the U.S. military’s ability to perform its missions in today’s world. The inaugural 2015 edition established a baseline assessment on which each annual edition builds, assessing the state of affairs for its respective year and measuring how key factors have changed from the previous year.

## What the Index Assesses

The *Index of U.S. Military Strength* assesses the ease or difficulty of operating in key regions based on existing alliances, regional political stability, the presence of U.S. military forces, and the condition of key infrastructure. Threats are assessed based on the behavior and physical capabilities of actors that pose challenges to U.S. vital national interests. The condition of America’s military power is measured in terms of its capability or modernity, capacity for operations, and readiness to handle assigned missions successfully. This framework provides a single-source reference for policymakers and other Americans who seek to know whether our military power is up to the task of defending our national interests.

Any discussion of the aggregate capacity and breadth of the military power needed to protect U.S. security interests requires a clear understanding of precisely what interests must be defended. Over the past few decades, three vital interests have been specified consistently and in various ways by a string of Administrations:

- **Defense** of the homeland;
- **Successful conclusion** of a major war that has the potential to destabilize a region of critical interest to the United States; and
- **Preservation** of freedom of movement within the global commons (the sea, air, outer-space, and cyberspace domains) through which the world conducts its business.

To defend these interests effectively on a global scale, the United States needs a military force of sufficient size, or what is known in the Pentagon as capacity. The many factors involved make determining how big the military should be a complex exercise, but successive Administrations, Congresses, and Department of Defense (DOD) staffs have managed to arrive at a surprisingly consistent force-sizing rationale: an ability to handle two major wars or major regional contingencies (MRCs) simultaneously or in closely overlapping time frames.

At its root, the current National Defense Strategy (NDS) implies the same force requirement. Its emphasis on a return to long-term competition with major powers, explicitly naming Russia and China as primary competitors,<sup>1</sup> reemphasizes the need for the United States to have:

- Sufficient military capacity to deter or win against large conventional powers in geographically distant regions;
- The ability to conduct sustained operations against lesser threats; and
- The ability to work with allies and maintain a U.S. presence in regions of key importance that is sufficient to deter behavior that threatens U.S. interests.

No matter how much America desires the world to be a simpler, less threatening place, more inclined to beneficial economic interactions than it is to violence-laden friction, the patterns of history show that competing powers consistently emerge and that the U.S. must be able to defend its interests in more than one region at a time. Consequently, this *Index* embraces the two-war or two-MRC requirement.

Since World War II, the U.S. has found itself involved in a major “hot” war every 15–20 years while simultaneously maintaining substantial combat forces in Europe and several other regions. The size of the total force has roughly approximated the two-MRC model, which has the inherent ability to meet multiple

security obligations to which the U.S. has committed while also modernizing, training, educating, and maintaining the force. Accordingly, our assessment of the adequacy of today’s U.S. military is based on the ability of America’s armed forces to engage and defeat two major competitors at roughly the same time.

We acknowledge that unless a dramatic change in circumstances occurs, such as the onset of a major conflict, a multitude of competing interests that evolve during extended periods of peace and prosperity will lead Administrations and Congresses to deemphasize investing in defense and instead to favor domestic programs. Consequently, garnering sufficient support to increase defense spending for a two-war-capacity force is problematic. However, this political condition does not change the patterns of history, the behavior of competitors, or the reality of what it takes to defend America’s interests in an actual war.

This *Index*’s benchmark for a two-MRC force is derived from a review of the forces used for each major war that the U.S. has undertaken since World War II and the major defense studies completed by the federal government over the past 30 years. We concluded that a standing (Active Duty component) two-MRC-capable Joint Force would consist of:

- **Army:** 50 brigade combat teams (BCTs);
- **Navy:** 400 battle force ships and 624 strike aircraft;
- **Air Force:** 1,200 fighter/ground-attack aircraft; and
- **Marine Corps:** 36 battalions.

This recommended force does not account for homeland defense missions that would accompany a period of major conflict and are generally handled by Reserve and National Guard forces. Nor does it constitute the total of the Joint Force, which includes the array of supporting and combat-enabling functions essential to the conduct of any military



operation: logistics; transportation (land, sea, and air); health services; communications and data handling; and force generation (recruiting, training, and education), to name only a few. Rather, these are combat forces that are the most recognizable elements of America's hard power but that also can be viewed as surrogate measures for the size and capability of the larger Joint Force.

## The Global Operating Environment

Looking at the world as an environment in which U.S. forces would operate to protect America's interests, the *Index* focused on three regions—Europe, the Middle East, and Asia—because of the intersection of our vital interests and actors able to challenge them.

**Europe.** Overall, the European region remains a stable, mature, and friendly operating environment. Russia remains the preeminent military threat to the region, both conventionally and unconventionally. America's closest and oldest allies are located in Europe, and the region is incredibly important to the U.S. for economic, military, and political reasons.

Perhaps most important, the U.S. has treaty obligations through NATO to defend the European members of that alliance. If the U.S. needs to act in the European region or nearby, there is a history of interoperability with allies and access to key logistical infrastructure that makes the operating environment in Europe more favorable than the environment in other regions in which U.S. forces might have to operate.

The past year saw continued U.S. reengagement with the continent, both militarily and politically, along with modest increases in European allies' defense budgets and capability investment. Despite allies' initial concerns, the U.S. has increased its investment in Europe, and its military position on the continent is the strongest it has been for some time.

NATO's renewed focus on collective defense has resulted in a focus on logistics, newly established commands that reflect a changed geopolitical reality, and a robust set of exercises. NATO's biggest challenges derive from capability and readiness gaps for many European

nations, continuing improvements and exercises in the realm of logistics, a tempestuous Turkey, disparate threat perceptions within the alliance, and the need to establish the ability to mount a robust response to both linear and nonlinear forms of aggression.

For Europe, scores this year remained steady, as they did in 2018 (assessed in the *2019 Index*), with no substantial changes in any individual categories or average scores. The *2020 Index* again assesses the European Operating Environment as "favorable."

**The Middle East.** For the foreseeable future, the Middle East region will remain a key focus for U.S. military planners because of the immediacy of its security challenges, even though the National Defense Strategy has called upon the DOD to reorient toward major-power competition with China and Russia. Once considered relatively stable, mainly because of the ironfisted rule of authoritarian regimes, the area is now highly unstable and a breeding ground for terrorism.

Overall, regional security has deteriorated in recent years. The Islamic State appears to have been defeated in a conventional sense, but the nature of its successor is unclear. In Iraq, future relations between Baghdad and the U.S. will remain difficult as long as a government that is sympathetic to Iran is in power. The regional dispute with Qatar has made U.S. relations in the region even more complex and difficult to manage.

In countries like Iraq, Libya, Syria, and Yemen, the supremacy of the nation-state is challenged by a multitude of non-state actors. The region's principal security and political challenges are linked to the unrealized aspirations of the Arab Spring, surging transnational terrorism, and meddling by Iran, which seeks to extend its influence in the Islamic world. All of this is made more difficult by the Arab–Israeli conflict, Sunni–Shia sectarian divides, the rise of Iran's Islamist revolutionary nationalism, and the proliferation of Sunni Islamist revolutionary groups.

America's relationships in the region are based pragmatically on shared security and

## Global Operating Environment: Summary



### Operating Environment: Europe

	VERY POOR	UNFAVORABLE	MODERATE	FAVORABLE	EXCELLENT
Alliances				✓	
Political Stability				✓	
U.S. Military Posture			✓		
Infrastructure				✓	
<b>OVERALL</b>				✓	

### Operating Environment: Middle East

	VERY POOR	UNFAVORABLE	MODERATE	FAVORABLE	EXCELLENT
Alliances			✓		
Political Stability		✓			
U.S. Military Posture			✓		
Infrastructure			✓		
<b>OVERALL</b>			✓		

### Operating Environment: Asia

	VERY POOR	UNFAVORABLE	MODERATE	FAVORABLE	EXCELLENT
Alliances				✓	
Political Stability				✓	
U.S. Military Posture				✓	
Infrastructure				✓	
<b>OVERALL</b>				✓	

### Global Operating Environment

	VERY POOR	UNFAVORABLE	MODERATE	FAVORABLE	EXCELLENT
Europe				✓	
Middle East			✓		
Asia				✓	
<b>OVERALL</b>				✓	

economic concerns. As long as these issues remain relevant to both sides, the U.S. is likely to have an open door to operate in the Middle East when its national interests require that it do so.

Though circumstances in all measured areas vary throughout the year, in general terms, the *2020 Index* assesses the Middle East Operating Environment as “moderate,” although the region’s political stability continues to be “unfavorable.”

**Asia.** The Asian strategic environment is extremely expansive, as it includes half the globe and is characterized by a variety of political relationships among states that have wildly varying capabilities. The region includes long-standing American allies with relationships dating back to the beginning of the Cold War as well as recently established states and some long-standing adversaries such as North Korea.

American conceptions of the region must therefore recognize the physical limitations imposed by the tyranny of distance. Moving forces within the region (never mind to it) will take time and require extensive strategic lift assets as well as sufficient infrastructure, such as sea and aerial ports of debarkation that can handle American strategic lift assets, and political support. At the same time, the complicated nature of intra-Asian relations, especially unresolved historical and territorial issues of the type most recently exhibited in renewed tension between South Korea and Japan, means that the United States, unlike Europe, cannot necessarily count on support from all of its regional allies in responding to any given contingency.

For Asia, we continue to assess it as “favorable” to U.S. interests in terms of alliances, overall political stability, militarily relevant infrastructure, and the presence of U.S. military forces.

Summarizing the condition of each region enables us to get a sense of how they compare in terms of the challenges the U.S. would face in projecting military power and sustaining combat operations in each one. As a whole, the global operating environment currently maintains a score of “favorable,” which means that the United States should be able to project military power anywhere in the world as necessary to defend its interests without substantial opposition or high levels of risk.

### Threats to U.S. Interests

Our selection of threat actors discounted troublesome states and non-state entities that lack the physical ability to pose a meaningful threat to vital U.S. security interests. This reduced the population of all potential threats to a half-dozen that possess the means to threaten U.S. vital interests and exhibit a pattern of provocative behavior that should draw the focus of U.S. defense planning. This *Index* characterizes their behavior and military capabilities on five-point, descending scales.

All of the six threat actors selected—Russia, China, Iran, North Korea, and terrorist groups in the Middle East and Afghanistan—remained actual or potential threats to U.S. interests over the past year. All amply demonstrated a commitment to expanding their capabilities to pursue their respective interests that directly challenged those of the U.S.

Compiling the assessments of threat sources, the *2020 Index* again rates the overall global threat environment as “aggressive” and “gathering” in the areas of threat-actor behavior and material ability to harm U.S. security interests, respectively, leading to an aggregated threat score of “high.”

Just as there are American interests that are not covered by this *Index*, there may be additional threats to American interests that are

## Threats to U.S. Vital Interests: Summary



## Behavior of Threats

	HOSTILE	AGGRESSIVE	TESTING	ASSERTIVE	BENIGN
Russia		✓			
Iran		✓			
Middle East Terrorism		✓			
Af-Pak Terrorism			✓		
China		✓			
North Korea			✓		
<b>OVERALL</b>		✓			

## Capability of Threats

	FORMIDABLE	GATHERING	CAPABLE	ASPIRATIONAL	MARGINAL
Russia	✓				
Iran		✓			
Middle East Terrorism			✓		
Af-Pak Terrorism			✓		
China	✓				
North Korea		✓			
<b>OVERALL</b>		✓			

## Threats to U.S. Vital Interests

	SEVERE	HIGH	ELEVATED	GUARDED	LOW
Russia		✓			
Iran		✓			
Middle East Terrorism		✓			
Af-Pak Terrorism			✓		
China		✓			
North Korea		✓			
<b>OVERALL</b>		✓			

not identified here. The *Index* focuses on the more apparent sources of risk and those that appear to pose the greatest threat.

**Russia** remains the primary threat to American interests in Europe and is the most pressing threat to the United States. Moscow

continues to engage in massive pro-Russia propaganda campaigns in Ukraine and other Eastern European countries, actively supports separatist forces in Ukraine, regularly performs provocative military exercises and training missions, and continues to sell and export arms to

countries that are hostile to U.S. interests. It also has increased its investment in modernizing its military and has gained significant combat experience while continuing to sabotage U.S. and Western policy in Syria and Ukraine.

The *2020 Index* again assesses the threat emanating from Russia as “aggressive” in its behavior and “formidable” (the highest category on the scale) in its growing capabilities.

**China**, the most comprehensive threat the U.S. faces, remained “aggressive” in the scope of its provocative behavior and earns the score of “formidable” for its capability because of its ongoing military modernization and buildup. The People’s Liberation Army continues to extend its reach and military activity beyond its immediate region and engages in larger and more comprehensive exercises, including live-fire exercises in the East China Sea near Taiwan. It also has continued to conduct probes of the South Korean and Japanese air defense identification zones, drawing rebukes from both Seoul and Tokyo. In addition, there is little evidence that Chinese cyber espionage and computer network exploitation have abated.

**Iran** remains the state actor that is most hostile to American interests in the Middle East. The *2020 Index* assesses Iran’s behavior as “aggressive” and its capability as “gathering.”

In the years since publication of the *2015 Index*, Iran has methodically moved closer to becoming a nuclear power, and it continues to enhance its ICBM, missile defense, and unmanned systems capabilities. Iran also continues to perpetuate and exploit instability to expand its influence in the region, both in its direct involvement in regional engagements and through its proxies, particularly in Syria. This year also saw aggressive activity in the Strait of Hormuz, including the downing of a U.S. drone in international airspace and attacks on merchant shipping.

**North Korea’s** level of behavior remained “testing” in the *2020 Index*. North Korea’s capability level has also remained at “gathering” as Pyongyang continues to develop and refine its missile technology, especially in the area of submarine-launched ballistic missiles. With its

ICBM program, North Korea remains both a threat to U.S. allies and assets in the region and an ongoing threat to the U.S. homeland.

**The terrorist threats** emanating from the Afghanistan–Pakistan region remained “testing” in the *2020 Index*. Fatalities attributed to terrorism inside Pakistan continue to fall as various terrorist groups within the region find themselves in competition with each other for recruits, territory, and resources.

A broad array of terrorist groups remain the most hostile of any of the threats to America examined in the *Index*. As of mid-2018, the Islamic State had been decimated, having lost more than 98 percent of its previously held territory, and its further reduction continued in 2019. However, it has not been completely eliminated and has made efforts to reassert itself in the region. Fortunately, Middle East terrorist groups are the least capable of the threats facing the U.S.

Our combined score for threats to U.S. vital interests is “high,” the fourth on a five-level scale, just below “severe.”

## The Status of U.S. Military Power

Finally, we assessed the military power of the United States in three areas: capability, capacity, and readiness. We approached this assessment by military service as the clearest way to link military force size; modernization programs; unit readiness; and (in general terms) the functional combat power (land, sea, and air) represented by each service. We treated the United States’ nuclear capability as a separate entity because of its truly unique characteristics and constituent elements, from the weapons themselves to the supporting infrastructure that is fundamentally different from the infrastructure that supports conventional capabilities.

These three areas of assessment (capability, capacity, and readiness) are central to the overarching questions of whether the U.S. has a sufficient quantity of appropriately modern military power and whether military units are able to conduct military operations on demand and effectively.

## U.S. Military Power: Army

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Capacity		✓			
Capability			✓		
Readiness					✓
<b>OVERALL</b>			✓		

## U.S. Military Power: Navy

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Capacity		✓			
Capability			✓		
Readiness			✓		
<b>OVERALL</b>			✓		

## U.S. Military Power: Air Force

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Capacity			✓		
Capability			✓		
Readiness			✓		
<b>OVERALL</b>			✓		

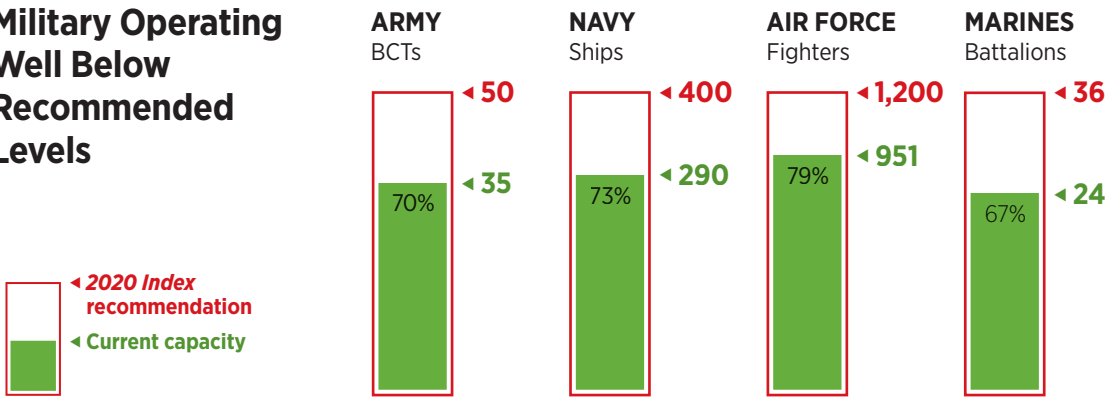
## U.S. Military Power: Marine Corps

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Capacity		✓			
Capability			✓		
Readiness			✓		
<b>OVERALL</b>			✓		

As reported in all previous editions of the *Index*, the common theme across the services and the U.S. nuclear enterprise is one of force degradation caused by many years of underinvestment, poor execution of modernization programs, and the negative effects of budget sequestration (cuts in funding) on readiness and

capacity in spite of repeated efforts by Congress to provide relief from low budget ceilings imposed by the Budget Control Act of 2011 (BCA) through two-year budget agreements that either waived the BCA caps or provided extra funding in contingency accounts not subject to BCA limits. Subsequent to new guidance provided

## Military Operating Well Below Recommended Levels



**SOURCE:** Dakota L. Wood, ed., *2020 Index of U.S. Military Strength* (Washington: The Heritage Foundation, 2020), <https://www.heritage.org/military-strength>.

heritage.org

by then-Secretary of Defense James Mattis in the 2018 NDS, the services undertook efforts to reorient from irregular warfare to large-scale combat against a peer adversary, but such shifts take time and even more resources.

While the military has been heavily engaged in operations, primarily in the Middle East but elsewhere as well, since September 11, 2001, experience in warfare is both ephemeral and context-sensitive. Valuable combat experience is lost as the servicemembers who individually gained experience leave the force, and it maintains direct relevance only for future operations of a similar type: Counterinsurgency operations in Iraq, for example, are fundamentally different from major conventional operations against a state like Iran or China.

In general, the withdrawal of U.S. military forces from Iraq in 2011 and the steady reduction of forces in Afghanistan have amplified the loss of direct combat experience across the Joint Force. Thus, although portions of the current Joint Force are experienced in some types of operations, the force as a whole lacks experience with high-end, major combat operations toward which it has only begun to redirect its training and planning. It is also still aged and shrinking in its capacity for operations even though limited quantities of new equipment

like the F-35 Lightning II fighter are gradually being introduced.

We characterized the services and the nuclear enterprise on a five-category scale ranging from “very weak” to “very strong,” benchmarked against criteria elaborated in the full report. These characterizations should not be construed as reflecting the competence of individual servicemembers or the professionalism of the services or Joint Force as a whole; nor do they speak to the U.S. military’s strength relative to the strength of other militaries around the world. Rather, they are assessments of the institutional, programmatic, and material health or viability of America’s hard military power.

Our analysis concluded with these assessments:

- **Army as “Marginal.”** The Army’s score remains “marginal” in the *2020 Index*. The Army has continued to increase its readiness, earning the score of “very strong” with 77 percent of its BCTs assessed as ready. However, it continues to struggle to rebuild end strength (attempting to grow from nearly 480,000 to 500,000) and to modernize the force for improved readiness in some units for current operations.

# U.S. Military Power: Nuclear

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Nuclear Stockpile				✓	
Delivery Platform Reliability			✓		
Warhead Modernization			✓		
Delivery Systems Modernization				✓	
Nuclear Weapons Complex			✓		
National Labs Talent			✓		
Force Readiness				✓	
Allied Assurance				✓	
Nuclear Test Readiness		✓			
<b>OVERALL</b>			✓		

- Navy as “Marginal.”** The Navy’s overall score remains “marginal” in the *2020 Index*. The Navy’s emphasis on restoring readiness and increasing its capacity signals that its overall score could improve in the near future if needed levels of funding are sustained. However, manpower presents a potential problem as does obtaining adequate funding to increase the number of ships in the fleet more rapidly. Shortfalls in funding and a general shortage of available shipyards have led to a substantial backlog in ship maintenance, placing an additional burden on those ships and crews that are available for deployment.
- Air Force as “Marginal.”** This score has trended downward over the past few years largely because of a drop in capacity that has not effectively changed (sitting at just under 80 percent of needed fighter/attack aircraft, for example) and a readiness score of “marginal,” better than its score of “weak” in the *2019 Index* but still not where it needs to be. Shortages of pilots and flying time have degraded the

ability of the Air Force to generate the air power that would be needed to meet wartime requirements.

- Marine Corps as “Marginal.”** The Corps has prioritized regaining combat readiness across the force, elevating it above expanding the size of the service. Aviation remained one of the largest challenges for the Corps in 2019, driven by sustainment challenges within its legacy fleet of aircraft and shortfalls in key maintenance support personnel. The increase in readiness among ground units and some advances in introducing new platforms, such as completion of MV-22 fielding in the active component, somewhat offset shortfalls in capacity and a “ready bench” to return the Marine Corps to an overall strength score of “marginal.”
- Nuclear Capability as “Marginal.”** The U.S. is not taking full advantage of current technologies to field modern warheads that could be designed to be safer and more secure with increased effectiveness and could give the United States better



**In the aggregate, the United States' military posture is rated "marginal" and features both positive and negative trends:** progress in bringing some new equipment into the force, filling gaps in manpower, and rebuilding some stocks of munitions and repair parts alongside worrisome trends in force readiness, declining strength in key areas like trained pilots, and continued uncertainty across the defense budget.

**The 2020 Index concludes that the current U.S. military force is likely capable of meeting the demands of a single major regional conflict** while also attending to various presence and engagement activities but that it would be very hard-pressed to do more and certainly would be ill-equipped to handle two nearly simultaneous major regional contingencies. The military services have prioritized readiness and seen improvement over the past couple of years, but modernization programs continue to suffer as resources are redirected toward current operations and sustainment of readiness levels. The services have also normalized the reduction in size and number of military units, and the forces remain well below the level needed to meet the two-MRC benchmark.

Congress and the Administration took positive steps to stabilize funding for FY 2018 and FY 2019 through the Bipartisan Budget Agreement of 2018 and managed, through the Bipartisan Budget Act of 2019, to sustain such support for funding above the caps imposed by the Budget Control Act of 2011 (BCA). While this allays the most serious concerns about a possible return to the damaging levels of the BCA, more will be needed in the years to come to ensure that the U.S. military is properly sized, equipped, trained, and ready to meet the missions that the services are called upon to fulfill.

**As currently postured, the U.S. military is only marginally able to meet the demands of defending America's vital national interests.**

options for strengthening a credible deterrent. Instead, the U.S. has elected largely to maintain aging nuclear warheads that were in the stockpile when the Cold War ended nearly 30 years ago. In addition to warheads, the U.S. nuclear enterprise has many other components, some of which also support conventional military and extended deterrence missions. Thus, assessing whether any one piece of the enterprise is sufficiently funded, focused, and effective is difficult. That said, this *Index*

assesses the nuclear complex as "marginal, trending toward strong," but this assumes that the U.S. maintains its commitment to modernization and allocates needed resources accordingly. Although bipartisan attention has led to continued progress on U.S. nuclear forces modernization and warhead sustainment, these programs remain threatened by potential future fiscal uncertainties, as are the infrastructure, testing regime, and manpower pool on which the nuclear enterprise depends.

## U.S. Military Power

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Army			✓		
Navy			✓		
Air Force			✓		
Marine Corps			✓		
Nuclear			✓		
<b>OVERALL</b>			✓		

### Endnotes

1. James Mattis, Secretary of Defense, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge*, p. 2, <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf> (accessed August 25, 2019).

# Treating the Pathologies of Victory: Hardening the Nation for Strategic Competition

Thomas P. Ehrhard, PhD

For years after the Cold War ended, it was hard to make the case in polite company that the United States should continue to focus on major-power competition in its national security strategy.<sup>1</sup> America won. The Soviet Union vanished, its republics flew apart, and its client states went their own way. The vaunted Soviet military returned home and rapidly atrophied. The Soviet Union's brutal history made it hard enough for American national security experts to imagine the Soviet Union's swift demise, let alone the relatively bloodless way it happened.

Given the fortuitous outcome, it was easy, expedient, and popular to imagine that this marked the end of history. The global alliance of representative governments had triumphed over a seemingly implacable foe, and weak authoritarian states suddenly seemed vulnerable. Events had their own way of highlighting the exceptional nature of this strategic turning point. Operation Desert Storm cemented that conclusion as America ejected Saddam Hussein's Soviet-equipped army from Kuwait using a blizzard of military technology built to prevail against the Red Army in Central Europe. It seemed entirely pessimistic, even paranoid, to insist that the U.S. military should use these events as an opportunity to configure itself to prevail against major powers in the 21st century.

In many respects, America's Cold War triumphalism was not exceptional. Winners almost always fall prey to hubris; dramatic winners always do. This is the pathology of victory.

But history exacts a price for hubris. The U.S. national security bureaucracy has been afflicted by a multitude of strategic viruses over the past 30 years, and the accompanying incremental, almost imperceptible corruptions of the U.S. military accrued after the Cold War now threaten to undermine the basic competitive advantages that caused America to prevail. Not all of these maladies are physical, and for many in the national security enterprise, they are deeply embedded and generational. It is all they know.

Normalized dysfunction infused Pentagon thinking, dialogue, and actions, resulting in a general reluctance to accept the security environment as it presented itself. As with all things, strategic pragmatists who saw the post-Cold War "unipolar moment" as anomalous were forced to swim against this bureaucratic current, absorbing derision and marginalization.<sup>2</sup> Thus, embedded ideas may be hard to dislodge in the search for strategic reawakening.

Major-power competition is back—although, of course, it never really left—but the pathologies of victory remain. For America to rise to the challenge once again, we must

understand how the end of the Cold War led the American defense bureaucracy to evolve ways of thinking that left America in a position of competitive inferiority. In this essay, we will explore some of the most damaging pathologies and recommend prescriptions to return the U.S. to a position of purposeful competitiveness.

Although there are many, four pathologies of victory stand out:

- The triumphalism of the 1990s led to the ultimately corrosive seduction of overseas engagement and constant intervention;
- After 9/11, strategic distraction delayed a more comprehensive understanding and reaction to China's rise and Russia's re-emergence as self-identified and seriously dangerous enemies;
- The analytic focus of the Cold War atomized to the point where, as a nation, we lost our ability to mobilize our brainpower for major-power competition and, as a necessary precondition, to conduct deep, strategically focused studies of our adversaries; and
- As major-power competition reemerged, a new and powerful brand of wishful thinking surfaced that actively resisted strategic reform on the scale required by the emerging security environment.

This essay explores each of these American post-Cold War pathologies, revealing their deleterious, if unintended, effect on our ability to compete with Russia and China in the coming decades. The triumphalism of the 1990s forms the foundational mindset. Its bookend, wishful thinking, infuses all of the pathologies, so it can be thought of as the key enabler. In the concluding section, six key strategic judgments about today's security environment, resisted by a bureaucracy bathed in this acquired mindset, demonstrate the deleterious effects on our contemporary

strategic dialogue that hamstringing America's competitive rebirth.

The essay focuses on the Department of Defense (DOD), for that is the center of gravity of this publication and the epicenter for some of the worst cases of pathological strategic dysfunction. To be sure, the entire national security enterprise fell prey to these afflictions, and they all deserve careful retrospective treatment, but we concentrate mostly on the Pentagon.

The reader should be aware that this essay contains challenges. It specifically calls into question deeply embedded ways of thinking that have been parroted by many national security commentators. Interestingly (and somewhat ironically), many of these themes align with propaganda coming from Russia and China, so the reader must retain a healthy skepticism, fight confirmation bias, and consider the consequences of how distortions in our collective thinking affect strategic competitiveness, all of which may lead the reader to conclude that a fundamental correction is required.

### **Pathology #1: Triumphalism**

The Cold War's decisive end virtually guaranteed triumphalism in America. Some commentators believe we overexploited our victory in foreign policy, for example, by expanding the North Atlantic Treaty Organization (NATO) into previous Warsaw Pact and even, in the case of Latvia, Lithuania, and Estonia, into formerly Soviet territories. From a broader perspective, however, history will treat America as a remarkably forgiving victor. Perhaps more important, as a matter of rediscovering competitive discipline and focus, we must gain greater awareness of and become more allergic to parroting Russian and Chinese propaganda. Externally, by any historical standard, America served as a magnanimous victor, but the internal effects of such a dramatic victory sowed seeds of dysfunction that act as a competitive anchor restricting vital strategic reform.

Bureaucratically, the remarkable end of the Cold War led to the elimination of bedrock institutions by decisions that catalyzed

a corrosion of our nuclear deterrence forces and set in motion a series of conventional force distortions in force posture, war planning, and force modernization and recapitalization that, unless challenged and reformed, will hamper our ability to compete effectively against two dedicated foes. More ominously, the 1990s served as a prime catalyst for the rise of China and Russia's resurgence.

The abandonment and subsequent neglect of our nuclear strength represents a clear example, and it happened quickly. In 1991, the George H. W. Bush Administration ordered dramatic, unilateral nuclear weapon reductions (called Presidential Nuclear Initiatives or PNIs) in which Russian reciprocity was merely "encouraged." The entire PNI process occurred in a backroom manner with little consultation or debate. Although the PNIs contained some strategic logic, such as attempting to induce a reduction of Russian tactical nuclear weapons, the Russians never reciprocated. Thus, we were left with a massive Russian superiority in tactical nuclear weapons that, together with the rise of Vladimir Putin and the volatility of his regime, presents a major threat to strategic stability.

Additionally, the PNIs affected strategic nuclear forces in a way that significantly exceeded arms control agreements, including the unilateral, accelerated retirement of the Minuteman II ICBM and the cancellation of mobile Peacekeeper and small ICBM programs. PNIs also ended Peacekeeper production; capped the B-2 stealth bomber program at a "platinum bullet" level of 20 aircraft; terminated the stealthy (nuclear) Advanced Cruise Missile; and ended production of the advanced W-88 D-5 submarine-launched ballistic missile (SLBM) warhead.<sup>3</sup> Perhaps most important, the PNIs dissolved the Air Force's venerable Strategic Air Command (SAC).

Thus, on June 1, 1992, a mere five months after the December 26, 1991, dissolution of the Soviet Union, SAC disbanded. Air Force nuclear capabilities lost their powerful advocate in Omaha and were placed under Air Combat Command, a fighter-dominated organization

in Langley, Virginia. Conventional force leaders opined that the dramatic increases in conventional military effectiveness created by the Second Offset Strategy could supplant nuclear weapons.<sup>4</sup> As a result, officers with nuclear experience gradually found their careers curtailed, and nuclear unit morale plummeted.

The dramatic anti-nuclear maneuvers of the immediate post-Cold War period and their aftermath now seem shortsighted in light of the atrophy and institutional neglect within the Air Force's nuclear enterprise. After a series of embarrassing incidents involving the loss of control of a nuclear weapon and related firing of the Air Force Secretary and Chief of Staff in 2009, the Air Force was compelled to reincarnate a SAC-like institution in the form of the Air Force Global Strike Command, led by a four-star general.<sup>5</sup> Secretary of Defense Chuck Hagel, addressing the obvious morale problem in the force, declared that "we must restore the prestige that attracted the brightest minds of the Cold War era."<sup>6</sup> Unfortunately, however, they had already, as airmen like to say, fallen behind the power curve on nuclear. No amount of report-writing, fist-pounding, rhetorical assurances, or half-hearted stabs at institutional reform could bring back the rather draconian, highly disciplined culture required to advocate for, control, and operate nuclear systems that had been established over decades.

Today, every important American nuclear system needs recapitalization, and the defense bureaucracy delayed each of those systems until there is no more room to retreat.<sup>7</sup> Due to bureaucratic triumphalism, the entire nuclear enterprise has been fighting a retrograde action since the end of the Cold War with no relief in sight.

The assault on nuclear institutions created a wasting strategic asset, but the bureaucratic effects of triumphalism also served to degrade America's conventional force posture after the end of the Cold War. The surprising overmatch in 1991 against the seemingly powerful Soviet-equipped Iraqi military in Operation Desert Storm exacerbated conventional pathologies.

## Impact on Defense Modernization and Recapitalization

Two areas where triumphalism hurt our conventional posture were defense modernization and recapitalization, which started on a decades-long hiatus in the 1990s from which it never recovered. Less well-understood is the complete reorientation of American war planning and force posture that left American forces geriatric, lacking in readiness, and stretched far too thin. We are now asking those depleted forces to deter and potentially confront two modernized, resurgent, acquisitive, self-confident militaries, each of which has been laser-focused on overcoming the U.S. military. How did that happen?

The U.S. military had been oriented toward deterring and fighting the Soviet military in a battle royal in the European Central Front and, to a lesser extent, in the Pacific. As the Soviet Union dissolved, each of the armed services found itself groping for a new identity that would support its people, forces, acquisition programs, and budget. What ensued was a gradual separation from war thinking and war planning and a slide into “engagement” and “shaping” the world. The Les Aspin-led 1993 Bottom-Up Review (BUR) exemplified this shift:

While deterring and defeating major regional aggression will be the most demanding requirement of the new defense strategy, our emphasis on engagement, prevention, and partnerships means that, in this new era, U.S. military forces are more likely to be involved in operations short of declared or intense warfare.<sup>8</sup>

Not all was lost: Strategy always lurks in dark corners of the Pentagon. During a brief period in the mid-1990s, spurred by the Office of Net Assessment’s concept of an ongoing Revolution in Military Affairs, the services briefly revived their interest in thinking about future warfare. A series of service-led annual war games ensued that imagined what threats might lurk in the future security environment.

But that brief flowering of interest was soon buried by the emerging “shaping” and “engagement” theory and its de-emphasizing of warfighting.

The Goldwater–Nichols Department of Defense Reorganization Act of 1986<sup>9</sup> also created very powerful regional combatant commanders who capitalized on peacetime engagement. U.S. European Command had always dominated the others for pragmatic reasons, but regionally focused shaping now provided increased status and purpose for others, especially U.S. Central Command. Threats posed by Iraq and Iran during the 1990s, including the post–Desert Storm Iraqi no-fly zone, allowed Central Command to grow in power and influence. General Anthony “Tony” Zinni in Central Command and Admiral Dennis Blair in Pacific Command capitalized on the regional commands’ newly found diplomatic leverage, filling a gap created by the Department of State, which remained content to emphasize bilateral, embassy-based diplomacy.<sup>10</sup> In this new geostrategic environment, the State Department found itself unable to match or control the growth of the Defense Department’s regional shaping mission.

Numerous commentators have deplored this “militarization of foreign policy,” but within the DOD, this trend led paradoxically to the “diplommatization” of the U.S. military senior leadership and their staffs, who increasingly saw themselves as super-ambassadors rather than as war planners and fighters. The *sine qua non* of a regional combatant commander’s power became the number of forces deployed in his theater, which supposedly provided greater shaping leverage, but his schedule began to look more like a diplomat’s. After the 1997 Quadrennial Defense Review,<sup>11</sup> which enshrined shaping, regional staffs dedicated to peacetime shaping ballooned at the expense of operational war planners, and this trend continued unabated in the ensuing decades.

As a result, the armed services found themselves having to supply more and more of their aging forces for regional shaping, and this drew their attention away from global deployment

and joint, combined-arms, operational warfighting. Forces deployed and operated more and prepared for war less, causing a gradual decline in warfighting readiness and an acceleration of equipment and personnel wear and tear. Even the concept of fighting two simultaneous “major theater wars,” albeit against weak opponents, became a fiction as U.S. forces deployed as “fight tonight” forces in various regions, or piecemeal to a series of non-war plan contingencies throughout the 1990s. These deployments sapped their ability to respond to the execution of actual war plans.

The constant deployment strain also affected military people and caused a troubling decline in retention, the bedrock of U.S. military expertise and professionalism. After a decade of strain, the 2001 Quadrennial Defense Review noted the effect on the force pinched by a lack of recapitalization and constant use: “Excessive operational demands on the force have taken a toll on military personnel.”<sup>12</sup> Brookings scholar Michael O’Hanlon wrote that despite some positive changes, “[b]y far the most troubling trend during the Clinton era was the real and significant decline in troop morale.”<sup>13</sup>

Those demands caused U.S. weapon systems to atrophy as well. The George H. W. Bush Administration believed it could curtail weapon system procurement by “skipping a generation” of systems, ostensibly to modernize more quickly, but under the Bill Clinton Administration, skipping a generation turned into the so-called procurement holiday in which defense procurement was slashed to 50 percent of Reagan-era levels. Those cuts made some sense given the Cold War victory, but the procurement hiatus went on far too long. Essentially, the so-called post-Cold War peace dividend came at the expense of military personnel and procurement even as overdeployment of forces caused the aging of key weapon systems.

### **Exploitation by Russian and Chinese Military Planners**

To make matters worse, constant U.S. presence and combat operations in the 1990s gave

Russian and Chinese military planners a convenient, threatening, and easily analyzable target that intensified and focused their acquisition and reform efforts. Both militaries studied each of the American campaigns carefully, often sending advisers to observe. The reform and modernization incentive that these operations provided our major-power competitors cannot be overstated.

- For China, Operation Desert Storm, the 1995–1996 Taiwan Strait crisis, and Operation Allied Force, the NATO operation to stop the Serbian slaughter of ethnic Albanians in Kosovo, provided a powerful stimulus for modernization and reform. Desert Storm showed the Chinese that they clearly lagged behind the U.S. military in significant ways; the carriers sent by the U.S. to tamp down the Taiwan Strait crisis hyperfocused their anti-carrier efforts, which resulted in the DF-21D medium-range ballistic missile system; and Allied Force included the accidental bombing of the Chinese embassy in Belgrade—an event that made an impression.
- For Russia, Desert Storm proved Admiral Sergey Gorshkov’s<sup>14</sup> prediction that the U.S. had achieved a “military-technical revolution” that obsolesced the Russian conventional forces that had seemed so ominous in the 1970s.<sup>15</sup> Moreover, several U.S. military operations in their Balkan backyard (notably Operations Deliberate Force and Allied Force) cemented the U.S. as a deeply threatening aggressor that they could not deter and that essentially did not respect their perceived zone of influence. As Vladimir Putin retorted in 2016 when asked whether Russian intervention in Syria “aggravated” U.S.–Russian relations, “Think about Yugoslavia. This is when it started.”<sup>16</sup>

Driven by those events, Russian and Chinese militaries set out to emulate and adapt various aspects of U.S. operational concepts,

weapons, and organizational structures. It was not hard for the Russians, since we invited several waves of Russian military officers to attend our joint warfighting and war planning schools during the 1990s. The Chinese downloaded what they needed through cyber-espionage and flooded academic institutions with students and professors eager to capitalize on our open system.

Yet within the Pentagon, those ripple effects barely caused concern. We were the champions, and the weak not only suffered what they must,<sup>17</sup> but were ignored. The 1990s addiction to shaping and its later incarnation in the 2000s as “Phase Zero” continued unabated, caught in an inertial cul-de-sac. Rather than providing a peace dividend for the American people and its military, the post-Cold War period became an era of constant military operations, produced senior leaders focused on diplomacy at the expense of warfighting, resulted in forces degraded by corroding readiness and personnel strain, and offered precious little strategic benefit from all the high-sounding, self-referential shaping rhetoric.

All of this happened for comprehensible reasons, but it was also based on the rather non-strategic assumption that the unipolar moment would last indefinitely. Triumphalism, a natural byproduct of a stunning victory in the Cold War and the evolutionary political dynamics in its aftermath, represented a seductive attraction that infuses the DOD to this day. Pentagon insiders may point the finger at others—and, indeed, the entire national security system contributed to the general decay—but if we are to rise out of the post-Cold War morass, the Pentagon bureaucracy must accept that it not only went along with, but also actively supported many of triumphalism’s most corrosive elements. Multiple generations of officers helped to create and support the shaping narrative and exacerbated the drift away from warfighting. Yet those years resulted in the emergence of more pathologies than just triumphalism.

## **Pathology #2: Strategic Distraction: 9/11 and Its Aftermath**

This gradual atrophy of war planning and focus, in addition to the high operational tempo experienced during the 1990s, accelerated after the attacks on 9/11. Operations in Afghanistan and Iraq dragged on with no meaningful strategic gains to show for the enduring, costly effort. The theory of shaping should have been debunked by this time if evidence had anything to do with it, but instead of preventing war and leading to a more peaceful world, constant deployment just led to a weary force engaged in constant operations. This accelerated the worst aspects of 1990s force atrophy, prompted international observers to view the U.S. as overly meddlesome, and stimulated unnecessary frictions. The result: strategic distraction.

Throughout the celebratory 1990s, a small minority of strategists like Andrew Marshall in the Office of Net Assessment (ONA) pointed to the potential emergence of China as a strategic competitor. Working in and for that office since 1996, I observed and supported a significant analytical effort exploring that issue. Despite evidence from Chinese sources that their economic resurgence and strategic rise might accelerate, however, ONA remained a voice crying out in the Pentagon wilderness.

Working in the ONA provided a catbird seat from which to watch Pentagon bureaucrats, in uniforms and suits, actively resist the possibility that any nation, let alone China, might emerge as a strategic competitor. But even ONA was largely dismissive of the storm brewing in Russia. In 1999, obscure Boris Yeltsin loyalist Vladimir Putin became the fifth Russian prime minister in less than 18 months. Russia’s economy was in shambles, its demographic trends looked disastrous, and its military was bogged down in a quagmire in Chechnya. Meanwhile, the Pentagon was captivated by its operations in the Balkans, which served as an operational distraction.

As a result, anyone arguing for China’s or Russia’s phoenix-like rise were easily dispatched by the Pentagon cognoscenti. The methods ranged from calling people Chicken



Littles, accusing them of pining for the Cold War, or more derisively charging them with attempting to create another major competitor to revitalize a Cold War–like defense industrial base. It was common to hear the rather strategically dubious retort (often from very senior officials), “Are you deliberately trying to turn China into our enemy?” The majority felt secure in ignoring the mounting evidence of Chinese and Russian resurgence, in part because they believed that American military dominance and global engagement precluded or suppressed the rise of belligerent powers, but also because their attention was occupied by never-ceasing military interventions.

The 9/11 terrorist attacks made it dramatically easier for the bureaucracy to distract itself even though the years following that tragic event also included the acceleration of both China and Russia as troubling strategic competitors. Furthermore, the U.S. response to 9/11 hastened military atrophy in real and subjective terms, most tellingly for the power projection forces that would be critical in deterring a rising China and revanchist Russia. Ground and special operations forces took center stage in Afghanistan and Iraq. The Rumsfeld 2001 Quadrennial Defense Review, which was going to shine a bright light on the rise of China, was hurriedly rewritten at the 11th hour to emphasize counterterrorism (CT).<sup>18</sup> Counterterrorism ruled the day in both ideological and budgetary terms, and the focus on counterinsurgency (COIN) gradually cemented America’s extended presence in Iraq and Afghanistan.

When the refocus on CT and COIN did not happen fast enough, Secretary of Defense Robert Gates pushed it harder at the expense of power projection forces. As a seasoned veteran of D.C. political turf wars, Gates knew that advocating for new CT/COIN systems was not good enough: He had to denigrate others in the zero-sum game of budgetary politics. Gates presided over what Center for Strategic and International Studies defense budget analyst Todd Harrison accurately described as “the hollow buildup” of the 2000s.<sup>19</sup> Although procurement

funding rose slightly, increases came from specialized gear that has little or no utility in fighting a major power. Under Gates’ watch, even talking about China as an adversary became banned speech for Pentagon personnel in the years from 2009–2011, well after the Chinese Second Artillery rocket forces had deployed DF-21D medium-range anti-ship ballistic missiles designed to hold the aircraft carrier air wing well outside its useful combat radius.<sup>20</sup>

The 2006 Quadrennial Defense Review identified China as a country poised at a “strategic crossroads.” In retrospect, the 2006 QDR serves as a lodestar for bureaucratic distraction: “U.S. policy seeks to encourage China to choose a path of peaceful economic growth and political liberalization, rather than military threat and intimidation.”<sup>21</sup> The bureaucracy loved that language, but China was not at a crossroads. It was marching down a very purposeful strategic path and would not be shaped.

Strategic distraction has a long half-life in the Pentagon. Even today, as the evidence pointing to the need to operate credibly against burgeoning Chinese and Russian conventional military formations multiplies, the Pentagon retains a distracting obsession with the “gray zone,” a term created by Special Operations Command that describes sub-threshold irregular activities designed to destabilize a territory. Rather than actively developing those lost or atrophied aspects of major force employment, combined-arms operating concepts, heavy logistics, and power projection against formidable defenses, commentators and bureaucrats still reflexively talk about the gray zone. After almost two decades of dealing with occupation and counterterrorism, the gray zone had become the comfort zone.

Again, former Secretary of Defense James Mattis teaches us: “The surest way to prevent war is to be prepared to win one.”<sup>22</sup> Chinese and Russian planners have carefully and painstakingly read our book and are becoming increasingly comfortable that they can prevail in major combat operations. If that continues, gray zone activity will be the least of our worries.

All of these distractions combined with 1990s triumphalism left the U.S. defense establishment at a dramatic analytical disadvantage as well, compared to our major power competitors. Events conspired to hyperfocus their study of our military, whereas ours became ever more distracted. How did a deficit in adversary analysis become yet another troubling pathology of victory?

### **Pathology #3: Lack of Analytical Depth and Sophistication**

Analytical depth and sophistication about oneself and one's adversary constitute the cornerstone of any strategic competition. In order to compete, you must know your adversary. To compete well, you must know your adversary better than he knows you. The vast analytical depth underpinning our understanding of the Soviet Union served as a critical foundation of our ability to conduct a purposeful strategic competition. To be sure, analytical depth did not guarantee perfect understanding or translate into a focused strategy. That is not how strategy works in America. But it is true that the nation itself—its government, academic institutions, journalists, and interested citizens—combined over decades to build a deep, elaborate, longitudinal body of knowledge about the Soviet Union.

Above all, it is the *relative* depth, sophistication, and competitive focus of that knowledge base that provide competitive leverage. The objective is not to gain such analytical superiority that you can anticipate an adversary's decisions and actions: We cannot achieve that even for our own government. The goal must be to gain a more focused, more complex, more diverse understanding of the enemy *than the enemy has of us*. In that important relative sense, the American national security community suffers from an analytical deficit of such magnitude that only a serious, focused, and well-resourced campaign can meet the strategic need.

The first, most compelling analytical deficit for America in this triangular strategic competition stems from a dramatic asymmetry of

focus. China and Russia know one thing: America is their most compelling existential threat and must be overcome. Our victory in the Cold War and liquidation of authoritarian regimes thereafter put us squarely in their strategic crosshairs. Our military employed an ever-expanding set of mind-bending innovations, seemingly without incentive, and was not shy about showing it off—stealth aircraft, precision guided munitions, even more accurate cruise missiles, and unmanned systems to name only a few. China had been carefully studying us as the prime target of their ambitions far longer than most Americans would like to admit, back to our normalization of relations in the 1970s and Ronald Reagan's acceleration of that relationship in the early 1980s.<sup>23</sup>

By contrast, we atomized our analytical focus from one big thing, the Soviet Union, to everything. Everything mattered, which meant that as a practical matter, nothing mattered. The intelligence community, for example, slashed its Russian analytical capability throughout the 1990s and then, after 9/11, gutted it, either retiring or repurposing highly educated, top-level analysts to counterterrorism work. The result was that by 2015, when I was asked by Deputy Secretary of Defense Robert Work to catalyze the DOD's and the intelligence community's Russian analytical effort, I found what amounted to a 15-year analytical black hole. When you lose longitudinal analytical depth, the rolling narrative about where they were and how they got here, it is hard to bring it back. We simply had lost our focus on Russia and required crash rehabilitation.

With respect to China, the defense community suffers from a different analytical deficit. For the most part, the DOD ignored the rise of China after the end of the Cold War. Starting with Admiral Dennis Blair, a succession of commanders of U.S. Pacific Command kept the Navy interested, but the Chinese Second Artillery's development and testing of the DF-21D anti-ship ballistic missile boosted the Navy's interest in the middle 2000s, right in the middle of the Pentagon's period

of maximum distraction during operations in Iraq and Afghanistan.

With the exception of efforts by the Navy, which largely kept adversary intelligence compartmented to naval issues and to itself, China was not the subject of serious analytical effort across the U.S. defense establishment until the evidence became overwhelming that its military rise constituted a looming threat. Unlike our approach to Russia, which benefitted from intense analytical focus during the Cold War but then fell into obscurity, the China effort started very slowly and rose gradually over time, but always in lag compared to the pace and magnitude of the People's Liberation Army's military modernization over the past three decades.

Today, intelligence and general analytical interest with respect to either adversary suffer from an inadequate level of analytical supply or demand across the defense community. The intelligence community's general disdain for open-source analysis continues unabated in an era when open-source information has exploded, leaving America with a perilous competitive information deficit.

The Navy remains a demanding customer for China information, but the Air Force, the other power projection service critical to dealing with China's rise, has largely neglected China analysis. Some individual exceptions exist, but for the most part, the Air Force still lacks the institutional interest or senior leader demand for analytical services. The Navy, for example, opened an open-source China Maritime Studies Institute at the Naval War College in the mid-2000s, whereas the Air Force's China Aerospace Studies Institute, modeled on the Navy's, did not open until more than a decade later. Similarly, the Army has slowly increased its demand for Russia-focused analytic support over the past several years, whereas the Air Force, also critical to the European theater, falls a distant second in its demand for Russian intelligence.

Finally, service-centered analytical demand tends to be rather tactical. With the neglect of open-source exploitation, broader strategic

information about either nation tends to be highly compartmented and unavailable to or unknown by senior DOD leaders.

The contrast between current efforts and the Cold War analytical effort within the academic community and among journalists and specialist authors also bears mention. The Pentagon still exerts a powerful influence on each group, so its own analytical loss of concentration inevitably reverberated through those communities as well.

The Cold War academic and journalistic community constituted a diverse, curious, strategically focused group who contributed to a sophisticated, deep analytical pool of knowledge. Most important, those non-governmental sources posed a challenge to government analysts, sharpening America's analytical edge. Investigative journalists dug for information. Academics capitalized on strategic moments like the orbit of Sputnik in 1957, the Cuban Missile Crisis of 1962, or the defense reform debates of the 1980s to examine and critique the defense issues of the day. Some of that work, such as the work that led to a more nuanced understanding of the role of nuclear weapons, happened entirely outside the government and proved to be groundbreaking.

Nothing approaching that diverse analytical ecosystem exists today to bolster our understanding of China and Russia as strategic competitors. There is very little focus on how to prevail. During the years of distraction, the academic community shifted its focus to counterterrorism or counterinsurgency, and it has been slow to adapt to the re-emergence of major-power competition. Online defense analysis generally lacks the weight and sophistication of its Cold War antecedents, mostly because younger authors lack that comparative lens. As a nation, we imagined away major-power competition. Now that it is back, we do not know what to make of it.

Blame is not the objective here. A natural course of events, evolving bureaucratic incentives, and social trends put us in this position. Well-meaning, patriotic Americans fell into the post-Cold War vortex, leaving strategic

iconoclasts to keep the major-power competition pilot light from extinguishing. But we are where we are, which brings us to our final post-Cold War pathology: wishful thinking.

#### **Pathology #4: Wishful Thinking: The Insidious Pathology**

Remediation of the three maladies described above constitutes a herculean task for the American national security enterprise. Of all the pathologies of victory, however, wishful thinking hurts American strategic competitiveness the most and is the hardest to cure. Wishful thinking describes a broader, umbrella category that serves as a key enabler for all of the other pathologies. In the presence of distractions and analytical hollowness, it gains power. Ironically, wishful thinking also gains momentum as contrary evidence mounts.

Perhaps most appallingly to hard-working Americans, wishful thinking permeates our national security bureaucracy, the very group entrusted with exploring and guarding against the worst scenarios. It drives bureaucratic behavior: The cheerful, positive bureaucrat makes the boss happy and gets promoted, while the brooding, pessimistic, reads-too-much-history, “Chicken Little” empiricist is either confined to a dusty room or reorganized out of a job. The Pentagon bureaucracy, like all government bureaucracies, flourishes on inertia and “go along to get along” attitudes that, from a strategic perspective, retard reform when it is most needed.

Wishful thinking intensifies all of the other maladies like a competitive immuno-suppressive. Strategy is no place for happy talk, and when you are the world’s sole superpower, no matter how loudly we whistle by the strategy graveyard, the human condition dictates unavoidably that everyone else in the world either wants to take America down or would be pleased if it happened. Someone must guard the strategic gates that Americans built over decades with blood and treasure, and they should not be smiling.

British author Christopher Booker captured the dynamics of American post-Cold

War wishful thinking in a striking if unintentional manner by identifying the three phases of what he calls “the fantasy cycle.” First, he observed that wishful thinkers experience the “dream stage” when “all things seem to go well for a time,” as in the triumphal 1990s. Then, “because this make-believe can never be reconciled with reality,” a “frustration stage” sets in, “prompting a more determined effort to keep the fantasy in being.”<sup>24</sup>

After the 1990s, with the catalytic events of 9/11 and the rise of China and resurgence of Russia, the Pentagon entered Booker’s frustration stage, typified by Secretary Robert Gates’ cutting power projection programs and banning references to China as a competitor. Then, as Vladimir Putin thrust Russia back on the stage and invaded Crimea, it took years for the Pentagon to come around to treating China and Russia as a problem requiring action. The Pentagon’s frustration period accelerated, along with escalating efforts at denial, until finally catalyzing in 2018 with the promulgation of Secretary Mattis’s National Defense Strategy, which declared that “we are emerging from a period of strategic atrophy.”<sup>25</sup>

But are we emerging or still mired in strategic atrophy? The Mattis National Defense Strategy seems only to have toughened the Pentagon’s bureaucratic “sitzkrieg.” How long will the dissonant “frustration stage” last? More important, what is Booker’s third and final stage in “the fantasy cycle?” He calls it the “nightmare stage” when, as he puts it, “the fantasy finally falls apart.”<sup>26</sup> Our purpose must be to fight the resistance to strategic reform caused by the pathologies of victory so that we can fend off the nightmare stage.

#### **Six Embattled Strategic Judgments**

Resistance comes in many forms, but it pops up repeatedly in response to key competitive strategic judgments that are critical to enacting the organizational changes required to conduct an effective competitive strategy against Russia and China. To understand the stiff institutional resistance to these ideas, one must understand their institutional ramifications.

Bureaucrats hate reform and understand that to kill it, they must attack its arguments. Six strategic judgments represent the ideological battlegrounds where this drama will play out.

**Strategic Judgment #1: Russia and China present threats that are *increasingly global in nature*.** One often hears denigration of adversary military capability as being only local or regional and thus not worthy of serious attention. Yet even though it has become increasingly obvious that the Russian and Chinese militaries may have achieved local overmatch, it is their increasingly global reach that poses a fundamental organizational challenge to the regional command stovepipes created by the Goldwater–Nichols legislation and exacerbated by the end of the Cold War.

In recent decades, we have become a global power with only regional strategies. How does the Pentagon coordinate and synthesize a response to global threats when each regional commander and staff cares about only one region? In an age in which the space and cyber domains, both inherently global and destabilizing, have become utterly indispensable to American military operations, the reform question becomes how we rationalize a geographically divided, integration-resistant system of regional fiefdoms behind a global campaign against two major-power adversaries.

**Strategic Judgment #2: Russia and China represent *enduring, multi-decadal challenges*.** Naysayers talk about China’s or Russia’s economy tanking as the end of those challenges, or that a change in leadership will somehow lead either nation to go back into its non-threatening box. Those arguments are merely excuses to do nothing and ignore the domestic politics of each country and the desire of their people to rise up out of a national humiliation.

If, however, you believe that China and/or Russia are here to stay as adversaries, that major-power competition is the historical norm and our post–Cold War unipolar decade was an anomaly, then you will advocate for significant changes in force structure and posture, changes in operational concepts, a dramatic

increase in analytic focus and resources, and a return to actual integration (i.e., jointness). Each of these choices rates high on the list of Pentagon institutional allergies.

**Strategic Judgment #3: Russia and China represent *highly volatile, crisis-unstable nuclear threats*.** Conventional force types in the Pentagon, smug in their Second Offset afterglow and the walkovers of the 1990s, thought they got rid of their former nuclear overlords with the end of the Cold War. Regardless of what those officials might desire, our enemies believe that nuclear deterrence represents the highest expression of national power. Moreover, the escalatory dynamics of this age represent a clear, present, and truly existential danger to the American people.

The increasing incentive for preemptive action in the space and cyber domains represents a step-function increase in crisis instability, and awareness of that threat exists only among a very small group of analysts who are able to translate the Cold War literature on this issue into 21st century geopolitical and military-technical terms. We must rediscover a broader understanding of comprehensive stability in the 21st century and find ways to compete that minimize the incentives for preemption and escalation on all three sides.

**Strategic Judgment #4: Russia and China express clear, significant *extraterritorial ambitions*.** Modernists cling to the belief that territorial acquisitiveness is a vestige of our barbaric past. They will often adopt adversary propaganda to support their claims that, for example, Crimea was a part of Russia and contains numerous Russian citizens. Yet we see strong evidence that China and Russia harbor territorial grievances and want to act on them.

Crimea is a “drop-the-mic” example, but new, militarized South China Sea islands, Taiwan, and territorial coercion against India are just a few on a long list of Chinese claims. Most egregiously, Russia’s numerous “frozen conflicts” such as in Eastern Ukraine, Transnistria (Moldova), and Abkhazia and South Ossetia (both in Georgia) represent the aggressive

revanchist doctrine not just of Vladimir Putin, but of the Russian people who applaud his actions.<sup>27</sup> Under the umbrella of advanced anti-access, area denial systems taken from America's Second Offset playbook, everyone on China's and Russia's borders has reason to be worried, and all represent escalatory dangers.

**Strategic Judgment #5: China and Russia represent a *metasystemic strategic challenge*.** That is, both have mobilized their nations to compete with America for primacy. Budgets must be modified, long-term investments made, institutions reimaged, and institutional connective tissues built. Accepting this in full requires a national commitment and a much higher degree of intra- and inter-governmental integration, which the unipolar-comfortable bureaucracy abhors. Integration is hard, but major-power competition demands it. Thankfully, we do not have to be perfect; we need only to be better than China and Russia. Perhaps we should analyze their integration activities to understand what we are up against.

**Strategic Judgment #6: The competition with Russia and China represents an *ideological struggle*.** It becomes tiring to hear wishful thinkers say that this is not an ideological struggle. Again, lack of analytical depth and sophistication seriously hampers this discussion. Very senior Russians and Chinese officials say repeatedly and with great passion that the United States represents an existential ideological enemy that is trying to penetrate and adulterate their cultures and liquidate their political systems. To them, this is ideological on a deep level.

Is it also a reciprocal threat? Former Secretary Mattis thinks so: "Failure to meet our defense objectives will result in decreasing U.S. global influence, eroding cohesion among allies and partners, and reduced access to markets that will contribute to a decline in our prosperity and standard of living."<sup>28</sup>

These six strategic judgments represent just a few of the rhetorical debates that define the struggle between those who desire strategic reform and those who like their current

jobs. In the 1990s, the evidence concerning the chances of major-power competition was there (albeit harder to assess) for those few who would see it. Now that it is obvious, bureaucratic naysayers and foot-draggers have responded by elevating their game. Resistance to reform keeps escalating even as Putin and Xi continue to solidify the case for it.

But the stakes for American national security must take precedence over the comfort requirements of "The Blob," as the entrenched, inertial bureaucracy has been called.<sup>29</sup> In order to support the 2018 National Defense Strategy and embark on a revitalized competitive trajectory, we must address the pathologies of victory and act on Secretary Mattis's admonition to "pursue urgent change at significant scale."<sup>30</sup>

## Conclusion

The only antidote to the pathologies of victory is fear. In a bureaucracy as large as the Pentagon's, collective fear must reach a point at which it overcomes inertia. That this certainly has happened in China and Russia is evidenced by a series of real institutional reforms in their national security establishments.

Moreover, we have done it before. We feared, in that serious, strategic, existential way, the British during the Revolutionary War and for decades afterward. We feared the Axis Powers enough during World War II to mobilize the nation. We feared the Soviet Union during the Cold War, the first time since the Revolution that we could have been utterly destroyed as a nation. In that extended conflict, both the First and Second Offset Strategies came about as a result of accumulated, collective fear opening the way to meaningful defense reform.

Yet even in the presence of self-declared, powerful nation-state enemies that possess nuclear arsenals and aim to prevail over us, our national security apparatus acts as though we still lived in the bucolic unipolar moment. They prefer business as usual today; about the future, who knows? Because of this bureaucratic sclerosis, the National Defense Strategy has not yet affected budgets or force structure or war plans, nor has it catalyzed an

across-the-board campaign to rebuild our anemic analytic ecosystem.

Thus, the wheel of strategy turns. If we as Americans do not want that wheel to roll over us, we can take positive steps to cast aside some of the more dysfunctional attitudes and orientations that have accumulated over the past 30 years. To prevail against self-declared enemies with focused national power and deeply held historical grievances, America needs to rediscover some of the harder, sharper, more pragmatic aspects of our national character and

adapt them to the challenges of the 21st century security environment. We must irradiate the pathologies of victory and, by doing so, help the defense community to rediscover its latent but uniquely American competitive drive.

The 21st century presents advantages for authoritarian regimes and vulnerabilities for open, representative governments that we have already observed. We ignore them now at our peril.

## Endnotes

1. This essay uses the term “major-power competition” instead of the more common “great-power competition” for a simple reason: By any standard, China and Russia are not great powers. America ranks as the only great power today and for the foreseeable future. We should not ascribe great-power status to adversaries who do not measure up.
2. Among this afflicted subgroup, the now-departed uber-strategist Andrew Marshall saw the potential emergence of China as a strategic adversary as far back as the 1980s and accelerated his analytical focus during the 1990s. Just one of his farsighted projects from the mid-1990s includes an investigation of a purported Chinese carrier-killing medium-range ballistic missile, for which he and his tiny staff were dismissed by a fleet of naval analysts as cranks. The author worked on this project for the Office of Net Assessment in the mid to late 1990s.
3. Susan J. Koch, “Presidential Nuclear Initiatives of 1991–1992,” National Defense University, Center for the Study of Weapons of Mass Destruction *Case Study* No. 5, September 2012, pp. 1 and 19, [https://ndupress.ndu.edu/Portals/68/Documents/casestudies/CSWMD\\_CaseStudy-5.pdf](https://ndupress.ndu.edu/Portals/68/Documents/casestudies/CSWMD_CaseStudy-5.pdf) (accessed July 3, 2019).
4. The First Offset Strategy countervailed the Soviet Red Army’s mass and proximity advantage by using nuclear coercion during the immediate post–World War II years. Then, as that competitive advantage waned in the 1960s and 1970s, American strategists conceived of the Second Offset Strategy, which employed microprocessor-based systems to achieve conventional overmatch against superior Red Army numbers and proximity. In both cases, fear drove the defense bureaucracy against a phalanx of naysayers to overcome inertia and enact real reform.
5. The post–Cold War nuclear atrophy adversely affected the Navy’s nuclear deterrent forces as well. The effects of corrosive institutional drift in both nuclear services were captured with clarity in a special independent review for the Secretary of Defense authored by former Strategic Air Command Commander in Chief and retired General Larry Welch and retired Admiral John Harvey in late 2014. For that extraordinary document, see *Independent Review of the Department of Defense Nuclear Enterprise*, U.S. Department of Defense, June 2, 2014, <https://dod.defense.gov/Portals/1/Documents/pubs/Independent-Nuclear-Enterprise-Review-Report-30-June-2014.pdf> (accessed July 3, 2019). The author served as Executive Secretary for the high-level Nuclear Deterrent Enterprise Review Group charged by Secretary of Defense Chuck Hagel with addressing the many deficiencies found in that report. See U.S. Department of Defense, “Statement on the Nuclear Enterprise Review & Reforms as Delivered by Secretary of Defense Chuck Hagel, Pentagon Press Briefing Room,” November 14, 2014, <https://dod.defense.gov/News/Speeches/Speech-View/Article/606634/statement-on-the-nuclear-enterprise-review-reforms/> (accessed July 3, 2019).
6. Eryn MacDonald, “Independent Review of DOD’s Nuclear Enterprise: Money, Maintenance, and Morale,” Union of Concerned Scientists, November 21, 2014, <https://allthingsnuclear.org/emacdonald/independent-review-of-dods-nuclear-enterprise-money-maintenance-and-morale> (accessed July 3, 2019).
7. For a good explanation of the price of delaying U.S. nuclear recapitalization, see Peter Huessy, “The 40 Year Nuclear Procurement Holiday,” *Real Clear Defense*, October 11, 2016, [https://www.realcleardefense.com/articles/2016/10/12/the\\_40\\_year\\_nuclear\\_procurement\\_holiday\\_110195.html](https://www.realcleardefense.com/articles/2016/10/12/the_40_year_nuclear_procurement_holiday_110195.html) (accessed July 3, 2019).
8. Les Aspin, Secretary of Defense, *Report on the Bottom-Up Review*, U.S. Department of Defense, October 1993, p. 8, <https://www.hsdl.org/?view&did=448259> (accessed July 3, 2019).
9. H.R. 3622, Goldwater–Nichols Department of Defense Reorganization Act of 1986, Public Law 99-433, October 1, 1986, <https://www.govinfo.gov/content/pkg/STATUTE-100/pdf/STATUTE-100-Pg992.pdf> (accessed July 4, 2019).
10. For a trenchant examination of the emergence of America’s new proconsuls in the 1990s, see Dana Priest, *The Mission: Waging War and Keeping Peace with America’s Military* (New York, W.W. Norton, 2003).
11. See, for example, “Section III, Defense Strategy: Shaping the International Environment,” in U.S. Department of Defense, *Report of the Quadrennial Defense Review*, May 1997, pp. 9–10, <https://history.defense.gov/Portals/70/Documents/quadrennial/QDR1997.pdf?ver=2014-06-25-110930-527> (accessed July 6, 2019).
12. U.S. Department of Defense, *Quadrennial Defense Review Report*, September 30, 2001, p. 8, <https://archive.defense.gov/pubs/qdr2001.pdf> (accessed July 4, 2019).
13. Michael O’Hanlon, “Clinton’s Strong Defense Legacy,” *Foreign Affairs*, Vol. 82, No. 6 (November/December 2003), p. 133, <https://www.brookings.edu/wp-content/uploads/2016/06/20031101.pdf> (accessed July 4, 2019).
14. Sergey Gorshkov was Admiral of the Fleet of the Soviet Union, leading the U.S.S.R. navy and serving at the highest levels of the Soviet defense establishment for much of the Cold War.
15. Eliot A. Cohen, “Come the Revolution,” *National Review*, July 31, 1995.
16. Christian Snyder, “Analysis: How a 1999 NATO Operation Turned Russia Against the West,” *The Pitt News*, September 7, 2017, <https://pittnews.com/article/121917/opinions/analysis-1999-nato-operation-turned-russia-west/> (accessed July 4, 2019).



17. In the Peloponnesian War, 431–404 BC, Athens embarked on a military expedition against the people of Melos, who stood neutral in the war. Facing subjugation or destruction, the Melians protested to the Athenians, who replied that “you know as well as we do that right, as the world goes, is only in question between equals in power, while the strong do what they can and the weak suffer what they must.” See Chapter XVII, “Sixteenth Year of the War—The Melian Conference—Fate of Melos,” in Thucydides, *History of the Peloponnesian War*, <https://www.mtholyoke.edu/acad/intrel/melian.htm> (accessed July 4, 2019).
18. See, for example, U.S. Department of Defense, *Quadrennial Defense Review Report*, September 30, 2001, pp. 18–19.
19. Todd Harrison, “Defense Modernization Plans Through the 2020s: Addressing the Bow Wave,” Center for Strategic and International Studies, *International Security Program Report*, January 2016, p. 3, [https://csis-prod.s3.amazonaws.com/s3fs-public/legacy\\_files/files/publication/160126\\_Harrison\\_DefenseModernization\\_Web.pdf](https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/publication/160126_Harrison_DefenseModernization_Web.pdf) (accessed July 4, 2019). The labels can be both entertaining and revealing. In the 1990s, the triumphalist acquisition downturn was called the “procurement holiday.”
20. For a comprehensive analysis of this threat, its Soviet precursors during the Cold War, and what the Navy could build to offset this anti-ship system effectively, see Thomas P. Ehrhard and Robert O. Work, *Range, Persistence, Stealth, and Networking: The Case for a Carrier-Based Unmanned Combat Air Wing*, Center for Strategic and Budgetary Analysis, 2008, <https://csbaonline.org/uploads/documents/The-Case-for-A-Carrier-Based-Unmanned-Combat-Air-System.pdf> (accessed July 4, 2019). Despite building a representative prototype and flying it from a carrier in a series of historic flight tests, the Navy resisted procuring this system for the fleet in a classic case of failure to integrate a strategically leveraged, innovative system. To understand why, see Robert Martinage and Shawn Brimley, “The Navy’s New Museum Drone and Strategic Malpractice,” *War on the Rocks*, April 28, 2015, <https://warontherocks.com/2015/04/the-navys-new-museum-drone-and-strategic-malpractice/> (accessed July 4, 2019).
21. U.S. Department of Defense, *Quadrennial Defense Review Report*, February 6, 2006, p. 29, <https://history.defense.gov/Portals/70/Documents/quadrennial/QDR2006.pdf?ver=2014-06-25-111017-150> (accessed July 4, 2019).
22. James Mattis, Secretary of Defense, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military’s Competitive Edge*, U.S. Department of Defense, 2018, p. 5, <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf> (accessed July 4, 2019).
23. Jacqueline Deal, “The Fudan Fulcrum,” Ronald Reagan Institute, [https://www.reaganfoundation.org/media/354598/dr\\_jacqueline\\_deal\\_fudan\\_university.pdf](https://www.reaganfoundation.org/media/354598/dr_jacqueline_deal_fudan_university.pdf) (accessed July 4, 2019).
24. Booker lists as one of the contemporary fantasies of our time “the belief that we can sort out the world’s trouble spots by reckless military interventions which fail to anticipate the bloody chaos they will unleash.” Christopher Booker, “What Happens When Great Fantasies, Like Wind Power or European Union, Collide with Reality?” *The Telegraph*, April 9, 2011, <https://www.telegraph.co.uk/comment/columnists/christopherbooker/8440423/What-happens-when-the-great-fantasies-like-wind-power-or-European-Union-collide-with-reality.html> (accessed July 4, 2019).
25. Mattis, *Summary of the 2018 National Defense Strategy of the United States of America*, p. 1.
26. Booker, “What Happens When Great Fantasies, Like Wind Power or European Union, Collide with Reality?”
27. Russia maintains military bases in Transnistria, South Ossetia, and Abkhazia. See Robert Ortung and Christopher Walker, “Putin’s Frozen Conflicts,” *Foreign Policy*, February 13, 2015, <https://foreignpolicy.com/2015/02/13/putins-frozen-conflicts/> (accessed July 4, 2018).
28. Mattis, *Summary of the 2018 National Defense Strategy of the United States of America*, p. 1.
29. Susan B. Glasser, “Trump Takes on The Blob,” *Politico*, March/April, 2017, <https://www.politico.com/magazine/story/2017/03/trump-foreign-policy-elites-insiders-experts-international-relations-214846> (accessed July 4, 2019).
30. Mattis, *Summary of the 2018 National Defense Strategy of the United States of America*, p. 11.



# Being Realistic About Strategy

Bill Hix

*In the midst of peace, war is looked upon as an object too distant to merit consideration.*

—Publius Flavius Vegetius Renatus,  
*De re militari*

As this essay is written, America is reacting to a complex mix of international and domestic challenges. The U.S. and those aligned with it confront geostrategic rivalries characterized as great-power conflict, with a rising, revisionist China<sup>1</sup> and a resurgent, revanchist Russia<sup>2</sup> that act both independently and in collaboration.<sup>3</sup> Growing and increasingly dangerous regional challenges manifest in nearly every corner of the globe. The scourge of terrorism, though diminished for the moment, remains.<sup>4</sup> These challenges are further complicated by significant economic tension<sup>5</sup> and daunting technological change.<sup>6</sup> Diverging priorities and political discord at home<sup>7</sup> and abroad<sup>8</sup> often result in half measures and paralysis on large issues. The assumptions of the past have not worn well.<sup>9</sup>

These contemporary developments are complex, demanding, and dangerous. Former CIA Deputy Director Michael Morell characterizes this period as “the most complex and difficult global security environment in our nation’s history.”<sup>10</sup> Economically, Bloomberg recently reported leading investors are “bracing for protracted superpower conflict and adjusting their portfolios accordingly.”<sup>11</sup> Exacerbating these challenges is a “technological revolution...unlike anything humankind has experienced before.”<sup>12</sup> Indeed, Leon Panetta,

former CIA Director and Secretary of Defense, observed “The last time the global threat picture was this crowded and combustible was in the lead-up to World War I.”<sup>13</sup> That combustion consumed the world in a catastrophe of world war, economic calamity, and political upheaval that spanned three decades.

America eventually prevailed, but its response, bereft of strategy, was at best reactive. The U.S. entry into World War I, more out of “passion and propaganda...than by realistic analysis [or] prudent...‘war planning,’” left the President and the nation “powerless”<sup>14</sup> to “make the world safe for democracy.” On the eve of World War II, General Albert C. Wedemeyer has noted, “Washington seemed as confused and divided as the nation itself.”

I could find few if any concrete answers to... vital questions. So far as I could discover, no systematic official attention had been given them. No mechanisms for considering them in an orderly and informed way existed within the government. Indeed, I found little awareness or acceptance of the notion that supreme issues of war and peace *required* thorough analysis in the top echelons of the national government. An uneasy feeling came over me that the ship of state was rudderless in the storm; or, if the rudder were still intact, there at least were no charts and orders on the bridge to guide the navigator.<sup>15</sup>

Success came at an exceptionally high cost. For the U.S., this included the economic and social displacement of the Great Depression and the bloodiest period of war in its history.<sup>16</sup> With nations across the globe suffering, on average, a 30 percent economic downturn, rising illiberal political movements, including fascism, socialism, and Communism; civil and global war; and, in the end, some 100 million dead,<sup>17</sup> this 30-year period was perhaps history's most consequential.

Yet in its aftermath, the U.S. prevailed in the no less dangerous four-decade Cold War at far less cost. Historically guided by doctrines,<sup>18</sup> America's response to the Cold War challenge was a unique act of grand strategy.<sup>19</sup> Compelled by its new role as a great power and the existential, global post-war challenge posed by an increasingly aggressive and capable Soviet Union,<sup>20</sup> America formalized its grand strategy of containment in President Harry Truman's National Security Council Paper NSC-68. Refined by President Dwight Eisenhower and comprehensively leveraging the whole of statecraft,<sup>21</sup> that grand strategy guided America's successful response across nine presidential Administrations.<sup>22</sup>

The Cold War, despite many lesser crises, saw the U.S. avoid nuclear Armageddon and end that great-power conflict with a "whimper rather than a bang."<sup>23</sup> The question is whether the U.S. can engineer a similar outcome despite facing two collaborating great-power competitors<sup>24</sup> and a host of other challenges as complex and volatile as any in history.<sup>25</sup>

Today's great-power challenges, like those of the past, are contests of true consequence, as the global catastrophe of two world wars and the Cold War's threat of nuclear Armageddon confirm. Today's risks, posed by the centennial ambitions, capabilities, and actions of China,<sup>26</sup> along with Russia,<sup>27</sup> separately and in collaboration,<sup>28</sup> are no less consequential. Indeed, they may well be greater as the world has not yet properly evaluated the risk.<sup>29</sup>

Given the magnitude of those challenges, America and others invested in a system that supports self-ruling government and

market economics should seek to repeat the geostrategic success of our Cold War predecessors: retaining America's global leadership, avoiding Armageddon, and preserving the principles that underpin that system. Fully realized, such an effort must be comprehensive, placing demands on every instrument of statecraft. The business of strategy is a complex one.

### Why Strategy?

*Strategy without tactics is the slowest route to victory. Tactics without strategy is the noise before defeat...*

—Sun Tzu, *The Art of War*

The concept of strategy originated in ancient Greece<sup>30</sup> and evolved over time, with the Romans, Chinese, and Europeans all adding to its understanding. Entering common use in Europe in the late 18th century, its framework expanded as national interests ranged continentally and then globally; weapons increased in sophistication, reach, and lethality; and the resources, reach, and instruments of statecraft grew. On the eve of World War II, Princeton's Edward Meade Earle offered that "strategy is...an inseparable element in statecraft at all times."<sup>31</sup>

In the modern era, strategy has extended beyond the realm of government and war. As Lawrence Freedman has observed, "Everyone needs a strategy.... [N]o serious organization could imagine being without one.... [N]o military campaign, company investment or government initiative is likely to receive backing unless there is a strategy to evaluate."<sup>32</sup>

Yet, while many fields rely on strategy to guide their endeavors, none is more consequential than national security. It is here that the concept of strategy originated and evolved, and it is here that the interests of nations and life and death hang in the balance. Given history and the risk inherent in a world challenged by conditions uncomfortably parallel to those preceding World War I,<sup>33</sup> it would seem prudent to "address causes rather than symptoms, to see the woods rather than the trees."<sup>34</sup>

## What Kind of Strategy?

In the realm of national security, however, the debate is spirited and unresolved. As strategy lacks an “agreed-upon definition...that describes the field and limits its boundaries,”<sup>35</sup> authorities generally take one of two views on strategy and national security. One holds that strategy is solely the purview of war. The other advances a more expansive understanding.

In this debate, adherents of Clausewitz, author of the 19th century classic *On War*,<sup>36</sup> maintain that strategy’s sole focus is war. This view, advanced by many,<sup>37</sup> is exemplified by Oxford’s Hew Strachan: “[P]oliticians, who in practice exercise strategic responsibility, have been persuaded by neo-Clausewitzians that war really is the continuation of policy by other means. This is to elevate theory over actuality.”<sup>38</sup> He continues:

Today strategy is too often employed simply as a synonym for policy.... Strategy has to deal in the first instance not with policy, but with the nature of war.... [W]estern military thought has been hoodwinked by the selective citation of... Clausewitz’s own introduction...that ‘war is nothing but the continuation of policy with other means.’ That...is not a statement about the nature of war.<sup>39</sup>

While Strachan acknowledges more expansive views,<sup>40</sup> he is unconvinced. He asserts that “[s]trategy is about war and its conduct, and if we abandon it, we surrender the tool that helps us to define war, to shape it and to understand it.”<sup>41</sup>

Strachan’s skepticism would be familiar to Johns Hopkins’ Eliot Cohen, who rejects the very notion of grand strategy, specifically targeting Earle’s definition of grand strategy as “the science and art of controlling and utilizing the resources of a nation...to the end that its vital interests shall be effectively promoted and secured.”<sup>42</sup> Perhaps reflecting frustration over the Iraq and Afghan wars, Cohen maintains that the “lure of grand strategy reflects the frustration of military officers at

the intractability of the problems they are assigned, and at what often seems to them the slackness of the rest of government”<sup>43</sup> and asserts that “grand strategy is an idea whose time will never come, because the human condition does not permit it [and it] confuses the big idea with important choices.”<sup>44</sup>

For Cohen, containment of the Soviet Union was merely “policy...a more useful if less grand term”<sup>45</sup> that proved inadequate in defining the U.S. response to the likes of the Suez crisis, Vietnam, or China’s opening. His analysis appears to ignore containment’s larger geostrategic success. Focused on the existential threat of the Soviet Union, as Kennan described,<sup>46</sup> containment was more than mere policy. Comprehensively orchestrating all instruments of statecraft, this grand strategy enabled America to maintain its focus on the primary threat, notwithstanding countless crises. Reflecting Eisenhower’s view that in the “cold war...victory...could be as devastating as defeat,”<sup>47</sup> this grand strategy, balancing America’s strengths, guided successful resolution of that generational struggle.

While a thoughtful observer and strong advocate for military power, Cohen does not demonstrate that military-centered strategy is superior to a grand strategy. As Paul Kennedy concludes in *The Rise and Fall of the Great Powers*, “the history of the past five hundred years of international rivalry demonstrates that military ‘security’ is never enough.”<sup>48</sup> Moreover, a strategy that relies solely on military power would seem to be insufficient given the challenge of China, described by Cohen as “America’s greatest challenge,”<sup>49</sup> and the complexities of Cohen’s other “distinct challenges.”<sup>50</sup> It is notable that recent Defense Department,<sup>51</sup> U.S.–China Economic and Security Review Commission,<sup>52</sup> and other reporting cast China and the greater security environment as far more challenging than even Cohen found.<sup>53</sup>

Seemingly responding to Cohen, Freedman concludes that “[s]trategies are neither designed nor implemented in controlled environments.... [S]uccessful outcomes depend on trying to affect a range of institutions,

processes, personalities, and perceptions...[to cope] with situations in which nobody [has] total control.”<sup>54</sup> Consistent with this view, John Hopkins’ Hal Brands proposes that “[g]rand strategy is the highest form of statecraft...the intellectual architecture that lends structure to foreign policy” that is “essential to effective statecraft, but...so challenging as to be an illusion.”<sup>55</sup>

Illusion or not, an evolving concept of grand strategy emerged from the realities of a world either at or on the brink of war. “The expansion in the meaning of strategy and grand strategy spilled over the boundaries of war and peace, propelled by the increasing complexity of war,” writes Lukas Milevski. “Strategy—and grand strategy—evolved in reaction to the requirements posed by the actual geopolitical context”<sup>56</sup> where the “distinction between war and peace [is] insignificant.”<sup>57</sup> These observations are instructive as strategists consider today’s challenges and those on the horizon.

Consistent with “actual geopolitical context,” Brands delineates grand strategy as “[a] purposeful and coherent set of ideas about what a nation seeks to accomplish in the world, and how it should go about doing so.”<sup>58</sup> In a new geostrategic environment of the sort described by Milevski, “[s]trategy is not merely the art of preparing for the armed conflicts in which a nation may become involved.... It is the rational determination of a nation’s vital interests...its fundamental...priorities” that guide “the narrower strategy of war planning and warfighting.”<sup>59</sup>

In an era of increasingly complex geostrategic conditions, the interplay between a grand strategy and a series of aligned and complementary functional and regional strategies would seem to provide a more agile and resilient approach to “what a nation seeks to accomplish in [this] world, and how it should go about doing so.”<sup>60</sup> Such an approach acknowledges the complexities of this age, the unique and complementary nature of each instrument of statecraft, and the geographic, social, cultural, and historical distinctiveness of various regions.

While the Cold War era was fraught with unforeseen developments,<sup>61</sup> it ended well. That outcome reinforces grand strategy’s value in the modern age while also exposing insights into the challenges of strategy development and key considerations for framing a strategy that can endure over the coming decades.

### Considerations of Strategy

*This comprehensive interpretation of strategy would give U.S. policy a measure of coherence and stability it has not had, and does not now possess, but which is utterly mandatory if our republic is to meet the challenges of the future.*

—General Albert C. Wedemeyer,  
USA, Retired

While essential to dealing with complexity, strategy is difficult business. In *Explorations in Strategy*, Colin S. Gray identifies six difficulties: its “complexity,” its demands on “the intellect” and “the imagination,” its “unique physical and moral burdens,” “the uniquely pervasive and uniquely debilitating nature” of friction “in that realm,” and the fact that “success in strategy calls for a quality of judgment that cannot be taught.”<sup>62</sup> As America repostures strategically, Gray’s analysis warrants careful consideration, particularly when assessing the qualities of those charged with developing and implementing strategy.

Noting Gray’s cautions, strategy also requires capacity. Albert C. Wedemeyer, principal author of the World War II Victory Plan and no stranger to the imperatives for and challenges of strategy, questioned “the adequacy of our national policymaking machinery to deal with the challenges of an increasingly turbulent and complex world.”<sup>63</sup> He advocated more effective strategies, asserting that “all the [post-World War II] ordeals America has experienced...could have been much brighter” with more coherent strategies.<sup>64</sup>

The complexity of today’s challenges, however, demands that other considerations be accounted for as well. A recent study usefully noted that U.S. strategies have suffered

systemically from unclear priorities, inattentive leadership leading to lowest-common-denominator decisions, poor links between objectives and resources, and are slow to respond to change.<sup>65</sup> Its recommendations emphasize the necessity to involve leadership, account for politics, drive priorities, account for resourcing, align objectives across strategies, focus aims, and address risk.<sup>66</sup>

Mindful of history, the perspectives and insights reviewed above, and current and emerging challenges, several considerations should be taken into account in framing a strategy relevant to this era.

**Interests.** National interests, “the essential foundation for a successful American foreign policy,”<sup>67</sup> can be characterized as vital, extremely important, important, and secondary.<sup>68</sup> Interests are synonymous with priority, and strategies not aligned with interests needlessly expend resources and often fail at a high cost. “Only a foreign policy grounded in America’s national interests...will allow America’s leaders to explain persuasively how and why American citizens should support expenditures of American treasure or blood.”<sup>69</sup> While central to our understanding of our priorities, understanding other nations’ interests is equally important. As British Prime Minister Lord Palmerston observed, “Our interests are eternal and perpetual, and those interests it is our duty to follow.”<sup>70</sup>

American interests evolved rapidly in the early days of the Cold War. NSC 68 framed U.S. vital interests around national survival, avoiding war, and preserving America’s sphere of influence in the face of exhausted allies and a growing Soviet threat.<sup>71</sup> With NSC 162-2, emerging from Eisenhower’s Solarium Project, expressions of national interests expanded, recognizing the importance of allies, the necessity of choices, the need to balance defense and economics, and the value of stabilizing nations and creating mutual interests.<sup>72</sup>

On the eve of the 21st century, the Commission on America’s National Interests found “five vital US national interests” that reflect those formulated some 50 years earlier:

- Prevent, deter, and reduce the threat of nuclear, biological, and chemical weapons attacks on the United States or its military forces abroad;
- Ensure US allies’ survival and their active cooperation with the US in shaping an international system in which we can thrive;
- Prevent the emergence of hostile major powers or failed states on US borders;
- Ensure the viability and stability of major global systems (trade, financial markets, supplies of energy, and the environment); and
- Establish productive relations, consistent with American national interests, with nations that could become strategic adversaries, China and Russia.<sup>73</sup>

Even with this consistency, however, fostering a common understanding of these interests and the challenges to them, as well as building support for the actions and resources necessary to protect them, requires evidence, leadership, and communication. Unity on what comprises the nation’s vital interests is vital.

Mindful of Lord Palmerston’s judgment, strategy development must consider the interests of others. For example, the strategic concept of “offshore balancing,” relying on a regional power to check instability and counter hostile powers, depends on the alignment of national interests. The challenges of the non-aligned movement during the Cold War; the limits of ally or proxy commitment in Iraq, Afghanistan, Libya, or Syria; and issues of freeriding in alliances and coalitions all highlight the implications of conflicting or misaligned national interests. Mapping interests before acting prevents disappointment, overextension, and failure.

**Leadership.** As in most things, leadership is central to the development and execution of strategy. Leadership has both individual and international components. From an individual

perspective, effective strategy depends on vested leaders. Leadership styles and priorities vary; therefore, process must conform to the leader in question. However, the absence of leader involvement leaves strategy subject to bureaucratic and external influences, risking failure. From an international perspective, alliances and coalitions rarely function effectively when ruled by committee. One member must assume the leadership mantle.

The formulation of NSC 68 originated from Truman's staff because the President was not experienced in policy and planning and was wrestling with a host of domestic and international issues. Truman's inexperience was not unique. In the lead-up to World War II, Franklin Roosevelt "had little time to consider grand strategy."<sup>74</sup> This bottom-up approach created an impetus for action, but it also resulted in an overly militarized grand strategy and a host of disconnected policies.

Eisenhower's experience drove the top-down Project Solarium, resulting in a comprehensive strategy that prioritized economics and politics, buttressed by prudent military deterrence. Conversely, captured by Vietnam and domestic issues, Lyndon Johnson and Richard Nixon allowed focus to slip. The result was military surprise as the Arab-Israeli War exposed superior Soviet military capabilities that nearly defeated Israeli forces, a reasonable proxy for American forces.<sup>75</sup> Ronald Reagan hastened the Soviet collapse through a complex, balanced campaign of economic growth, military modernization, aggressive pressure in Europe, arms control, relentless political action, and unsparing political warfare. Engaged national leadership ensures effective strategy.

Absent America's current global leadership role, any strategic approach is not likely to succeed. No nation or coalition with similar interests or values is likely to assume that role or capably bear that burden. Moreover, history has been unkind to declining powers in great-power transitions.<sup>76</sup> Further, eras without strategic leadership have invited risk, including world wars. However, unlike during the Cold War, growing diversification of power,<sup>77</sup> especially

economic power, enables more to share this burden. Current and future allies likely resist this obligation.

**Unity.** The Constitution's requirement that the Congress declare war and the Senate ratify treaties reflects the Framers' intent that a degree of unity is required on questions of national interest and security beyond our nation's shores. Developing, resourcing, and implementing a strategy that can resolve complex and enduring problems requires consent across political constituencies. Strategies without this consensus are invariably under-resourced, lack resilience, and exploitable by an adversary.

This challenge is reflected in the reception accorded America's most recent security and defense strategies. While addressing great-power conflict,<sup>78</sup> and despite statements of their import,<sup>79</sup> they are the subject of great criticism.<sup>80</sup> Moreover, they neither reflect a consensus view, given a widening partisan gap in national priorities,<sup>81</sup> nor enjoy consensus support within the nation's political leadership.<sup>82</sup>

**Problem Definition.** Not all challenges, no matter how emotionally compelling, can be treated equally. At best, addressing low-priority or poorly defined problems can needlessly waste resources. At worst, such errors can mire the nation in distractions, exposing it to strategic surprise or risking political, economic, and strategic bankruptcy. Clarity on the problem and its relationship to national interest reduces this risk. Conversely, the absence of unity on the nation's problems makes the coherent formulation and implementation of strategy less likely. This hinders the advancement of U.S. interests, creates opportunities for adversaries and other actors, and denies opportunities to the U.S. and its allies.

America is confronted by a complex mix of international and domestic challenges. Sorting these out is a function of probability and consequence. Some high-probability challenges are continuous, requiring careful prioritization and judicious response so that they will not distract attention from the most



consequential. In the current environment, the challenges of China and Russia are existential, with economics and technology equally consequential as “technology has blurred the lines between national security and economic competitiveness.”<sup>83</sup>

China, both a Cold War adversary and partner of convenience, is now an expansionist, opportunistic power. Chinese strategic culture is asymmetric to Western tradition while involving the whole of statecraft.<sup>84</sup> Its social-historical culture is likewise asymmetric.<sup>85</sup> China’s approach is decidedly long-term. China was recently characterized as “climate change: long, slow, and pervasive, as opposed to Russia’s ‘hurricane.’”<sup>86</sup> Its strategic ambition, not yet well understood, is to supplant America as the dominant global power by mid-century.<sup>87</sup>

China competes comprehensively. Economically, its gross domestic product (GDP) exceeds that of the U.S.<sup>88</sup> Technology figures heavily for China, presenting a decade-long,<sup>89</sup> Sputnik-like moment that can be existential. Over time, given the dominance historically accrued by technologically ascendant nations, China’s military will protect Chinese interests as they expand along the Belt and Road.<sup>90</sup> Should China’s military modernization and institutional reforms succeed, its military will likely pose an existential military threat in 10 to 15 years.<sup>91</sup> Should China succeed in supplanting the U.S., America’s very way of life will be at stake.

Russia, as the Soviet Union, was a deliberate, opportunistic, and expansionist power with checks and balances that controlled escalation. Today, Russia is a defensive, reactive, and declining power with a smaller, less balanced structure that dangerously fears and will resist decline. Its strategic and historical-social culture is not in the Western tradition. It is driven by perceived vulnerabilities, comprehensive views of power, and the need for immediate decisive advantage.<sup>92</sup>

While spanning Eurasia, Russia’s center of gravity remains west of the Urals.<sup>93</sup> Russia remains focused on securing buffers and restructuring Europe’s balance of power. Its military

is a priority: Its military creates a shield of perceived impunity behind which it wages an indirect campaign to unravel the European Union and NATO, seeking to improve its advantage in a divided Europe. Russia remains an existential threat, given its nuclear weapons, and its asymmetric political will and information power may create existential outcomes. Successful disintegration of Europe would invite instability and war, invariably pulling the U.S. across the Atlantic.

Economics remains an American strength. America and its allies must preserve, promote, and revise the market economic system that has significantly increased wealth, reduced poverty, and diversified economic power across the globe.<sup>94</sup> Unlike the Soviet Union in the Cold War, China is proving to be a worthy economic adversary, with a GDP exceeding America’s.<sup>95</sup> Economic security is national security as technology blurs the lines between national security and economic competitiveness.<sup>96</sup> Further, success will demand constant demonstration of the value of liberty and market economics, as current debates on inequality and socialism highlight. The U.S. must take steps to sustain if not increase economic growth to create resources both to meet the economic and social expectations of its people and to support necessary effort across all instruments of statecraft.<sup>97</sup> Allies must also reassess their economies and likewise increase the resources available to their nations.

Technology defines the 21st century socially, politically, economically, and militarily. In a period of change of greater consequence than the dislocating impact of the Industrial Age,<sup>98</sup> the U.S. and selected allies must regain and preserve undisputed intellectual and developmental leadership in technology and proactively prepare the international system and society for the potentially dislocating impacts of this emerging age.

**Assumptions.** In lieu of facts, prudently employed assumptions enable foresight and narrow the degree of uncertainty over time; imprudent assertions create or obscure risk. Strategy is necessarily forward-looking and is

only as good as the assumptions upon which it rests. Absent facts and evidence, assumptions allow the strategist to see the way forward. However, using overly optimistic projections merely hastens strategic surprise. When assumptions change, the strategies they underpin must change as well. Yet stubborn adherence to strategy despite changing conditions remains more the rule than the exception.<sup>99</sup>

To America's benefit, Charles Bohlen did not fall prey to stubborn adherence to failing assumptions. In 1947, setting the predicate for containment, he observed that:

The United States is confronted with a condition in the world which is at direct variance with the assumptions upon which, during and directly after the war, major United States policies were predicated.... [H]owever much we may deplore it, the United States...must re-examine its major policy objectives.... Failure to do so would mean that we would be pursuing policies based on the assumptions which no longer exist....<sup>100</sup>

Today's strategic process has not benefitted from such candid foresight. Despite decades of assumptions that discounted adverse outcomes,<sup>101</sup> adversaries have been able to take advantage of American distraction. Although awareness is improving,<sup>102</sup> technological trends can lead to optimistic assumptions on future conflict.<sup>103</sup> To temper such optimism, strategists should carefully consider Lawrence Freedman's *The Future of War: A History*, which chronicles the folly of short-war pundits and the consequences of their promoting hope rather than clear-eyed analysis.<sup>104</sup>

**Methods.** The instruments of statecraft are most effective when adequately resourced, employed comprehensively, and coordinated. Significant objectives are rarely achieved without the coordinated use of these instruments; without coordination, they can even work at cross-purposes. The resources and capacity of the agencies associated with each instrument must also be clearly understood; otherwise,

strategies will fall prey to unrealistic expectations. Recognizing the truth of Eisenhower's Cold War concern that "victory...could be as devastating as defeat,"<sup>105</sup> America's political, economic, informational, and technological instruments must lead and be backed by capable military power, prudently resourced, and mindful of Paul Kennedy's great-power trap.<sup>106</sup>

Given its importance to national security, military power deserves a more focused review. Military power serves the nation by protecting, defending, and supporting America and its people, deterring physical—or, given the technologies of this age, nonphysical or virtual—attack on the United States and its allies.

In the face of indirect operations in peacetime, the military must create conditions that enable statecraft's other instruments to create and sustain an environment in which American society, liberty, and market economies thrive. If America is attacked, military power should fight forward and defeat any attacker to defend the strength and viability of America's society and allies and minimize war's effects on the homeland.

However, the realities of war against an existential threat place a premium on deterrence, made real by the capability and capacity to fight and win. Deterrence enables other instruments of power to check and defeat China and/or Russia artfully, without direct conflict. While a militarized strategy is inadequate given the comprehensive and complex threats facing America, the other instruments of statecraft cannot succeed in the absence of a viable military strategy.

Accounting for these roles and emerging, new methods and means for war will require the military to posture accordingly. This is a complex undertaking, resolution of which exceeds the scope of this essay.

**Resources.** Resources enable action. An inadequately resourced strategy is merely rhetorical flourish, obscuring risk and inviting miscalculation by the nation and its adversaries. Conversely, resource-constrained objectives can also obscure risk. The phrase "strategy driven, resource informed," while

promoting the preeminence of interests over resources, loses credibility in the face of scarce resources. This requires a careful balance of disciplined ambition, risk, and resources, including the need to generate more. Absent that balance, any strategy rapidly becomes hollow rhetoric or worse.

In the concluding chapter of *The Rise and Fall of the Great Powers*, Paul Kennedy highlights the risk of imbalanced, overextended strategies, noting that they come with “dire implications for [a state’s] long-term capacity to maintain...its international position.”<sup>107</sup> Reflecting that insight, Eisenhower weighted the economic and political over the military, relying on nuclear forces instead of a larger conventional military for deterrence. Reagan avoided Kennedy’s great-power trap by growing the economy, balancing America’s economic and military power, while creating additional resources to fund the so-called Reagan buildup, which built the modern military that delivered Desert Storm’s four-day air-ground war.

Strategies today require similar balances.

## Conclusion

The international developments challenging the U.S. and the larger international system

are daunting. Nevertheless, those challenges can be resolved, ending with a “whimper rather than a bang”<sup>108</sup> through the development and implementation of comprehensive strategy.

This strategy must preserve America’s global leadership role and its military, economic, and technological advantages while preventing conflict, and success will demand leadership, clarity on America’s national interests and the challenges to them, a sense of common national purpose, adequate resources, foresight, and constant assessment and adjustment. It must be realistic regarding interests, risk, resources, and endurance. It cannot be narrowly focused on one aspect of statecraft, but rather should comprehensively orchestrate all instruments of statecraft.

Navigating this dangerous and complex period can repeat the geostrategic success realized by our Cold War predecessors: retaining America’s global leadership, avoiding Armageddon, and preserving the principles that underpin a system that promotes the consent of the governed and free markets. To do so, this effort must be comprehensive, placing demands on every instrument of statecraft. That is the business of grand strategy.

## Endnotes

1. The Honorable Kevin Rudd, "Understanding China's Rise Under Xi Jinping," address to cadets, United States Military Academy, West Point March 5, 2018, <https://sinocism.com/p/understanding-chinas-rise-under-xi-jinping-by-the-honourable-kevin-rudd> (accessed August 7, 2019); Xi Jinping, "Secure a Decisive Victory in Building a Moderately Prosperous Society in All Respects and Strive for the Great Success of Socialism with Chinese Characteristics for a New Era," address delivered at the 19th National Congress of the Communist Party of China, October 18, 2017, [http://www.xinhuanet.com/english/download/Xi\\_Jinping%27s\\_report\\_at\\_19th\\_CPC\\_National\\_Congress.pdf](http://www.xinhuanet.com/english/download/Xi_Jinping%27s_report_at_19th_CPC_National_Congress.pdf) (accessed August 7, 2019), pp. 17, 25, 26, and 48; Gerry Grimstone, "Barclays Bank's Grimstone on Market Volatility, U.S.-China Trade, Brexit," Bloomberg Markets, November 19, 2018, <https://www.bloomberg.com/news/videos/2018-11-20/barclays-bank-s-grimstone-on-market-volatility-u-s-china-trade-brexit-video> (accessed August 7, 2019); Minxin Pei, "How China and America See Each Other and Why They Are on a Collision Course," *Foreign Affairs*, March/April 2014, <https://www.foreignaffairs.com/reviews/review-essay/how-china-and-america-see-each-other> (accessed August 7, 2019).
2. Andrew Monaghan, "'An Enemy at the Gates' or 'From Victory to Victory'?" Russian Foreign Policy," *International Affairs*, Vol. 84, No. 4 (July 2008), pp. 717-733; Stephen R. Covington, "The Culture of Strategic Thought Behind Russia's Modern Approaches to Warfare," Harvard University, Kennedy School of Government, Belfer Center for Science and International Affairs *Paper*, October 2016, p. 21, <https://www.belfercenter.org/sites/default/files/legacy/files/Culture%20of%20Strategic%20Thought%203.pdf> (accessed August 7, 2019); Sergey Lavrov, "Russia's Foreign Policy: Historical Background," Voltaire Network, March 5, 2016, <http://www.voltairenet.org/article190623.html> (accessed August 7 2019).
3. Richard J. Ellings and Robert Sutter, eds., *Axis of Authoritarians: Implications of China-Russia Cooperation* (Seattle and Washington, D.C.: National Bureau of Asian Research, 2018); Thomas Wright, "The Return to Great-Power Rivalry Was Inevitable," *The Atlantic*, September 12, 2018, <https://www.theatlantic.com/international/archive/2018/09/liberal-international-order-free-world-trump-authoritarianism/569881/> (accessed August 7, 2019).
4. Michael Morell, "Patrick Shanahan Faces More Challenges than Any Other Pentagon Chief," *The Washington Post*, May 10, 2019, [https://www.washingtonpost.com/opinions/2019/05/10/patrick-shanahan-faces-more-challenges-than-any-other-pentagon-chief/?utm\\_term=.8188072e8960](https://www.washingtonpost.com/opinions/2019/05/10/patrick-shanahan-faces-more-challenges-than-any-other-pentagon-chief/?utm_term=.8188072e8960) (accessed August 7, 2019).
5. The World Bank, "The Global Economy: Heightened Tensions, Subdued Growth," June 4, 2019, <https://www.worldbank.org/en/news/immersive-story/2019/06/04/the-global-economy-heightened-tensions-subdued-growth> (accessed August 7, 2019).
6. Klaus Schwab, "The Fourth Industrial Revolution: What It Means, How to Respond," World Economic Forum, January 14, 2016, <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/> (accessed August 27, 2019).
7. Bradley Jones, "Republicans and Democrats Have Grown Further Apart on What the Nation's Top Priorities Should Be," Pew Research Center, February 5, 2019, <https://www.pewresearch.org/fact-tank/2019/02/05/republicans-and-democrats-have-grown-further-apart-on-what-the-nations-top-priorities-should-be/> (accessed August 27, 2019).
8. "The Near Future: Tensions Are Rising," in Office of the Director of National Intelligence, *Global Trends*, <https://www.dni.gov/index.php/global-trends/near-future> (accessed August 27, 2019); Stewart Patrick, "How U.S. Allies Are Adapting to 'America First': Trump and World Order at One," *Foreign Affairs*, January 23, 2018, <https://www.foreignaffairs.com/articles/world/2018-01-23/how-us-allies-are-adapting-america-first> (accessed August 27, 2019); Chris Giles, "US Relations with Closest Allies Fall to New Lows," *Financial Times*, June 10, 2018, <https://www.ft.com/content/89eecb5c-6c9f-11e8-852d-d8b934ff5ffa> (accessed August 27, 2019); "America and Its Allies Disagree on Huawei," *The Economist*, February 21, 2019, <https://www.economist.com/business/2019/02/21/america-and-its-allies-disagree-on-huawei> (accessed August 27, 2019); Eric Johnston, "G20 World Leaders Agree on Some Issues, but Significant Gaps Remain Following Osaka Summit," *Japan Times*, June 30, 2019, <https://www.japantimes.co.jp/news/2019/06/30/national/g20-world-leaders-agree-issues-significant-gaps-remain-following-osaka-summit/#.XTcV2ndFw2w> (accessed August 27, 2019); Agence France-Presse, "Who Needs the G20? Question Gets Louder in Osaka," *France 24*, June 29, 2019, <https://www.france24.com/en/20190629-who-needs-g20-question-gets-louder-osaka> (accessed August 27, 2019).
9. *The National Security Strategy of the United States of America*, The White House, September 2002, p. 28 <https://www.globalsecurity.org/military/library/policy/national/nss-020920.pdf> (accessed August 27, 2019); *National Security Strategy*, The White House, May 2010, p. 11, <https://www.hsdl.org/?view&did=24251> (accessed August 27, 2019).
10. Morell, "Patrick Shanahan Faces More Challenges than Any Other Pentagon Chief."
11. Enda Curran and Bei Hu, "Traders Brace for New Cold War That Will 'Last Our Careers,'" Bloomberg, May 30, 2019, <https://www.bloomberg.com/news/articles/2019-05-30/investors-brace-for-a-new-cold-war-that-will-last-our-careers> (accessed August 27, 2019).
12. Schwab, "The Fourth Industrial Revolution."

13. Leon Panetta, "1 Big Thing: Global Threats Multiply," Axios AM, June 1, 2019, <https://www.axios.com/newsletters/axios-am-a7b764b8-9d01-4afe-8ac9-b266b050dd57.html> (accessed August 27, 2019).
14. Keith E. Eiler, ed., *Wedemeyer on War and Peace* (Stanford, CA: Hoover Institution Press, 1987), p. xvi.
15. General Albert C. Wedemeyer, U.S. Army (Retired), "Memorandum on a National Strategy Council," in *Military Planning in the Twentieth Century: Proceedings of the Eleventh Military History Symposium 10–12 October 1984*, ed. Lieutenant Colonel Harry R. Borowski, U.S. Air Force, Office of Air Force History, 1986, pp. 409–410, <https://media.defense.gov/2010/Sep/28/2001330153/-1/-1/0/AFD-100928-023.pdf> (accessed August 27, 2019). Emphasis in original.
16. Fact Sheet, "America's Wars," U.S. Department of Veterans Affairs, May 2017, [https://www.va.gov/opa/publications/factsheets/fs\\_americas\\_wars.pdf](https://www.va.gov/opa/publications/factsheets/fs_americas_wars.pdf) (accessed August 27, 2019).
17. Nadège Mougel, "World War I Casualties," trans. Julie Gratz, Centre Européen Robert Schuman, REPERES, <https://www.census.gov/history/pdf/reperes112018.pdf> (accessed August 27, 2019); National World War II Museum, "Research Starters: Worldwide Deaths in World War II," <https://www.nationalww2museum.org/students-teachers/student-resources/research-starters/research-starters-worldwide-deaths-world-war> (accessed August 27, 2019).
18. These "doctrines" include the Polk Doctrine, or Manifest Destiny; the Monroe Doctrine; and the Roosevelt Corollary.
19. Ernest May, "National Security Council (NSC) 68," in *American Cold War Strategy: Interpreting NSC 68*, ed. Ernest R. May (Boston, MA: Bedford Books, 1993), pp. 1–19, cited in Tami Davis Biddle, *Strategy and Grand Strategy: What Students and Practitioners Need to Know* (Carlisle Barracks, PA: U.S. Army War College Press, December 2015), p. 34, <https://ssi.armywarcollege.edu/pdffiles/PUB1305.pdf> (accessed August 27, 2019); William Burr and Robert Wampler, "'The Master of the Game': Paul H. Nitze and U.S. Cold War Strategy from Truman to Reagan," National Security Archive *Electronic Briefing Book* No. 139, October 27, 2004, <https://nsarchive2.gwu.edu/NSAEBB/NSAEBB139/> (accessed August 27, 2019).
20. "George Kennan's 'Long Telegram,'" February 22, 1946, History and Public Policy Program Digital Archive, National Archives and Records Administration, Department of State Records (Record Group 59), Central Decimal File, 1945–1949, 861.00/2-2246, reprinted in *Foreign Relations of the United States, 1946, Eastern Europe; The Soviet Union, Volume VI*, ed. Rogers P. Churchill and William Slany (Washington: United States Government Printing Office, 1969), pp. 696–709, <http://digitalarchive.wilsoncenter.org/document/116178> (accessed August 28, 2019); Charles E. Bohlen, "Memorandum by the Counselor of the Department of State (Bohlen) to the Under Secretary of State (Lovett)," September 2, 1947, *Foreign Relations of the United States, 1947, General; The United Nations, Volume I*, Document 391, U.S. Department of State, Office of the Historian, <https://history.state.gov/historicaldocuments/frus1947v01/d391> (accessed August 28, 2019).
21. James S. Lay, Jr., "A Report to the National Security Council by the Executive Secretary on Basic National Security Policy," NSC 162-2, October 30, 1953, pp. 5–7, <https://fas.org/irp/offdocs/nsc-hst/nsc-162-2.pdf> (accessed August 28, 2019).
22. James M. Ludes, "The Russians Read Our Cold War Playbook," War on the Rocks, November 3, 2016, <https://warontherocks.com/2016/11/the-russians-read-our-cold-war-playbook/> (accessed August 28, 2019).
23. Graham Allison, "The Thucydides Trap," *Foreign Policy*, June 9, 2017, <https://foreignpolicy.com/2017/06/09/the-thucydides-trap/> (accessed August 28, 2019).
24. *National Security Strategy of the United States of America*, The White House, December 2017, p. 27, <https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf> (accessed August 28, 2019); Wright, "The Return to Great-Power Rivalry Was Inevitable."
25. Panetta, "1 Big Thing: Global Threats Multiply."
26. Rudd, "Understanding China's Rise Under Xi Jinping;" Xi Jinping, "Secure a Decisive Victory," pp. 17, 25, 26, and 48; Grimstone, "Barclays Bank's Grimstone on Market Volatility, U.S.–China Trade, Brexit."
27. Monaghan, "An Enemy at the Gates' or 'From Victory to Victory?'" pp. 717–733; Covington, "The Culture of Strategic Thought Behind Russia's Modern Approaches to Warfare," p. 21; Lavrov, "Russia's Foreign Policy."
28. Ellings and Sutter, eds., *Axis of Authoritarians*, pp. ix–xv and 170–172.
29. Liza Tobin, "Xi's Vision for Transforming Global Governance: A Strategic Challenge for Washington and Its Allies," *Texas National Security Review*, Vol 2, Issue 1 (November 2018), <https://tnsr.org/2018/11/xis-vision-for-transforming-global-governance-a-strategic-challenge-for-washington-and-its-allies/> (accessed August 28, 2019); Grimstone, "Barclays Bank's Grimstone on Market Volatility, U.S.–China Trade, Brexit."
30. Beatrice Heuser, *The Evolution of Strategy: Thinking War from Antiquity to the Present* (Cambridge, UK: Cambridge University Press, 2010), p. 4.
31. Edward Mead Earle, "Political and Military Strategy for the United States," *Proceedings of the Academy of Political Science*, Vol. 19, No. 2 (January 1941), p. 7.

32. Lawrence Freedman, *Strategy: A History* (New York: Oxford University Press, 2013), p. ix.
33. Ana Swanson, "The World Today Looks Ominously Like Before World War I," *The Washington Post*, December 29 2016, [https://www.washingtonpost.com/news/wonk/wp/2016/12/29/the-world-today-looks-ominously-like-it-did-before-world-war-i/?utm\\_term=.331b6cd58e8e](https://www.washingtonpost.com/news/wonk/wp/2016/12/29/the-world-today-looks-ominously-like-it-did-before-world-war-i/?utm_term=.331b6cd58e8e) (accessed August 28 2019).
34. Freedman, *Strategy: A History*, p. ix.
35. *Ibid.*, p. xi.
36. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976).
37. For example, Russell Weigley, *The American Way of War: A History of United States Military Strategy and Policy* (Bloomington: Indiana University Press, 1973), p. xviii; Edward Luttwak, *Strategy: the Logic of War and Peace* (Cambridge, MA: Belknap Press, 1987), p. 4; Eliot A. Cohen, *The Big Stick: The Limits of Soft Power & the Necessity of Military Force* (New York: Basic Books, 2016), p. 206; Colin S. Gray, *Explorations in Strategy* (Westport, CN: Greenwood Press, 1996), p. 4.
38. Hew Strachan, *The Direction of War: Contemporary Strategy in Historical Perspective* (Cambridge and New York: Cambridge University Press, 2013), p. 6.
39. *Ibid.*, pp. 11 and 12–13.
40. For example, Julian Corbett's concepts of "minor strategy and major strategy," J.F.C. Fuller's grand strategy construct in which "the first duty of the grand strategist is...to appreciate the commercial and financial position of his country," and B. H. Liddell Hart's "'pure strategy' and 'grand strategy.'" *Ibid.*, pp. 15 and 33.
41. *Ibid.*, p. 42.
42. Earle, "Political and Military Strategy for the United States," cited in Cohen, *The Big Stick*, p. 204.
43. Cohen, *The Big Stick*, p. 204.
44. *Ibid.*, p. 205.
45. *Ibid.*
46. "George Kennan's 'Long Telegram.'"
47. Dwight Eisenhower, quoted in John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of Postwar American National Security Policy* (New York: Oxford University Press, 1982) pp. 135–136.
48. Paul Kennedy, *The Rise and Fall of the Great Powers, Economic Change and Military Conflict from 1500–2000* (New York: Vintage Books, 1987), p. 539.
49. Cohen, *The Big Stick*, p. 99.
50. *Ibid.*, p. 195.
51. U.S. Department of Defense, Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2019*, pp. i–iii, [https://media.defense.gov/2019/May/02/2002127082/-1/-1/1/2019\\_CHINA\\_MILITARY\\_POWER\\_REPORT.pdf](https://media.defense.gov/2019/May/02/2002127082/-1/-1/1/2019_CHINA_MILITARY_POWER_REPORT.pdf) (accessed August 28, 2019).
52. Chapter 2, Section 2, "China's Military Reorganization and Modernization: Implications for the United States," in U.S.–China Economic and Security Review Commission, *2018 Report to Congress of the U.S.–China Economic and Security Review Commission*, 115th Cong., 2nd Sess., November 2018, p. 205, [https://www.uscc.gov/sites/default/files/annual\\_reports/2018%20Annual%20Report%20to%20Congress.pdf](https://www.uscc.gov/sites/default/files/annual_reports/2018%20Annual%20Report%20to%20Congress.pdf) (accessed August 29, 2019).
53. National Defense Strategy Commission, *Providing for the Common Defense, The Assessment and Recommendations of the National Defense Strategy Commission*, released November 2018, p. vi, <https://www.usip.org/sites/default/files/2018-11/providing-for-the-common-defense.pdf> (accessed August 29, 2019).
54. Freedman, *Strategy: A History*, p. 609.
55. Hal Brands, "Introduction: The Meaning and Challenge of Grand Strategy," in *What Good Is Grand Strategy? Power and Purpose in American Statecraft from Harry S. Truman to George W. Bush* (Ithaca, NY: Cornell University Press, 2014), p. 1.
56. Lukas Milevski, *The Evolution of Modern Grand Strategic Thought* (Oxford and New York: Oxford University Press, 2016), p. 71.
57. *Ibid.*, p. 71.
58. Brands, *What Good Is Grand Strategy?*, p. 3.
59. Gordon A. Craig and Felix Gilbert, "Reflections on Strategy in the Present and Future," in *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, ed. Peter Paret (Princeton, NJ: Princeton University Press, 1986), p. 869.

60. Brands, *What Good Is Grand Strategy?*, p. 3.
61. The Suez crisis, Vietnam, and the opening of China, not to mention the many wars of national liberation, the expansion of democracy, the 1973 Arab–Israeli war, oil embargoes, international terrorism, the advent of the information age, Grenada, Panama, Desert Storm, and numerous proxy conflicts.
62. Gray, *Explorations in Strategy*, pp. 8–11.
63. Wedemeyer, “Memorandum on a National Strategy Council,” in *Military Planning in the Twentieth Century*, p. 409.
64. *Ibid.*, p. 411.
65. Center for Strategic and International Studies, International Security Program, *Formulating National Security Strategy: Past Experience and Future Choices*, Center for Strategic and International Studies, June 2017, p. X, [https://csis-prod.s3.amazonaws.com/s3fs-public/publication/171006\\_CSIS\\_NationalSecurityStrategyFormulation\\_FINAL.pdf?42zeMDWbvXQ1xJs90Te64dWZwVMXT.gZ](https://csis-prod.s3.amazonaws.com/s3fs-public/publication/171006_CSIS_NationalSecurityStrategyFormulation_FINAL.pdf?42zeMDWbvXQ1xJs90Te64dWZwVMXT.gZ) (accessed August 29, 2019).
66. *Ibid.*, pp. XII–XV.
67. Commission on America’s National Interests, *America’s National Interests*, July 2000, p. 1, <https://www.belfercenter.org/sites/default/files/files/publication/amernatinter.pdf> (accessed August 31, 2019).
68. *Ibid.*, pp. 6–8.
69. *Ibid.*, p. 2.
70. Lord Palmerston, speech in the House of Commons, March 1, 1848, Oxford Reference, <https://www.oxfordreference.com/view/10.1093/acref/9780191826719.001.0001/q-oro-ed4-00008130> (accessed August 31, 2019).
71. James S. Lay, Jr., “A Report to the National Security Council by the Executive Secretary on United States Objectives and Programs for National Security,” NSC 60, April 14, 1950, pp. 12, 41, 50, and 63, <http://digitalarchive.wilsoncenter.org/document/116191> (accessed August 29, 2019).
72. Lay, “A Report to the National Security Council by the Executive Secretary on Basic National Security Policy,” pp. 9, 13, 14, 19–20, and 22–23.
73. Commission on America’s National Interests, *America’s National Interests*, p. 20.
74. Andrew Roberts, *Masters and Commanders: How Four Titans Won the War in the West, 1941–1945* (New York: HarperCollins, 2009), p. 19.
75. Major General Donn A. Starry, “October 1973 Mideast War,” May 12, 1975, declassified August 29, 2007, p. 2–6, General Donn A. Starry Papers, U.S. Army Heritage and Education Center, Carlisle Barracks, Pennsylvania, Box 59, Folder 3. See also [http://warontherocks.com/wp-content/uploads/2016/10/19750512\\_Starry\\_Info\\_Paper\\_Arab\\_Israeli\\_War\\_Observations.pdf](http://warontherocks.com/wp-content/uploads/2016/10/19750512_Starry_Info_Paper_Arab_Israeli_War_Observations.pdf) (accessed September 4, 2019).
76. Harvard University, Kennedy School of Government, Belfer Center for Science and International Affairs, “Thucydides’s Trap Case File,” <https://www.belfercenter.org/thucydides-trap/case-file> (accessed August 29, 2019); for a graphic version, see <https://www.belfercenter.org/thucydides-trap/resources/case-file-graphic> (accessed August 29, 2019). See also Graham Allison, *Destined for War: Can America and China Escape Thucydides’s Trap?* (Boston, MA: Houghton Mifflin Harcourt, 2017).
77. Mike Patton, “U.S. Role in Global Economy Declines Nearly 50%,” *Forbes*, February 29, 2016, <https://www.forbes.com/sites/mikepatton/2016/02/29/u-s-role-in-global-economy-declines-nearly-50/> (accessed August 29, 2019); U.S. Central Intelligence Agency, “Country Comparison: GDP (Purchasing Power Parity),” in *The World Factbook*, <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2001rank.html> (accessed August 29, 2019); Pricewaterhouse Coopers, *The World in 2050: Will the Shift in Global Economic Power Continue?* February 2015, p. 11, <https://www.pwc.com/gx/en/issues/the-economy/assets/world-in-2050-february-2015.pdf> (accessed August 29, 2019).
78. *National Security Strategy of the United States of America*, December 2017, p. 27; James Mattis, U.S. Secretary of Defense, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military’s Competitive Edge*, U.S. Department of Defense, p. 2, <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf> (accessed August 29, 2019).
79. Jim Garamone, “Shanahan Stresses National Defense Strategy in First Meetings as Acting Secretary,” U.S. Department of Defense, January 3, 2019, <https://dod.defense.gov/News/Article/Article/1723767/shanahan-stresses-national-defense-strategy-in-first-meetings-as-acting-secretary/> (accessed August 29, 2019); Michael R. Pompeo, U.S. Secretary of State, “An Update on American Diplomacy to Advance our National Security Strategy,” testimony before the Committee on Foreign Relations, U.S. Senate, July 25, 2018, <https://www.state.gov/an-update-on-american-diplomacy-to-advance-our-national-security-strategy/> (accessed May 14, 2019).

80. Rebecca Friedman Lissner, "The National Security Strategy Is Not a Strategy," *Foreign Affairs*, December 19, 2017, <https://www.foreignaffairs.com/articles/united-states/2017-12-19/national-security-strategy-not-strategy> (accessed August 29, 2019); Elliott Abrams, "The Trump National Security Strategy," Council on Foreign Relations Blog Post, December 17, 2019, <https://www.cfr.org/blog/trump-national-security-strategy> (accessed August 29, 2019); "Brookings Experts on Trump's National Security Strategy," Brookings Institution, December 21, 2017, <https://www.brookings.edu/research/brookings-experts-on-trumps-national-security-strategy/> (accessed August 29, 2019); Gregory D. Foster, "The National Defense Strategy Is No Strategy," *Defense One*, April 4, 2019, <https://www.defenseone.com/ideas/2019/04/national-defense-strategy-no-strategy/156068/> (accessed August 29, 2019).
81. Politico and Harvard T.H. Chan School of Public Health, "Americans' Priorities for the New Congress in 2019," December 2018, <https://www.politico.com/f/?id=00000168-1450-da94-ad6d-1ffa86630001> (accessed August 29, 2019); Jones, "Republicans and Democrats Have Grown Further Apart on What the Nation's Top Priorities Should Be."
82. Kevin Schaul and Kevin Uhrmacher, "The Issues 2020 Democrats Are Running on, According to Their Social Media," *The Washington Post*, updated June 24, 2019, [https://www.washingtonpost.com/graphics/politics/policy-2020/priorities-issues/?utm\\_term=.60cd8e66c293](https://www.washingtonpost.com/graphics/politics/policy-2020/priorities-issues/?utm_term=.60cd8e66c293) (accessed August 29, 2019); Elias Groll and Lara Seligman, "Democrats Clash on Top National Security Threats," *Foreign Policy*, June 27, 2019, <https://foreignpolicy.com/2019/06/27/democrats-clash-on-top-national-security-threats/> (accessed August 29, 2019).
83. "Transcript: Henry Paulson on 'Face the Nation,' CBS News, May 12, 2019, <https://www.cbsnews.com/news/transcript-henry-paulson-on-face-the-nation-may-12-2019/> (accessed August 29, 2019).
84. Personal observations from engagements with People's Liberation Army and Central Military Commission representatives.
85. Richard E. Nisbett, *The Geography of Thought: How Asians and Westerners Think Differently...and Why*, (New York: The Free Press, 2003).
86. Rob Joyce, senior National Security Agency cybersecurity adviser and former White House cybersecurity coordinator, quoted in Joseph Marks, "The Cybersecurity 202: U.S. Officials: It's China Hacking that Keeps Us up at Night," *The Washington Post*, March 6, 2019, [https://www.washingtonpost.com/news/powerpost/paloma/the-cybersecurity-202/2019/03/06/the-cybersecurity-202-u-s-officials-it-s-china-hacking-that-keeps-us-up-at-night/5c7ec07fb326b2d177d5fd3/?utm\\_term=.629f6e58a8c1](https://www.washingtonpost.com/news/powerpost/paloma/the-cybersecurity-202/2019/03/06/the-cybersecurity-202-u-s-officials-it-s-china-hacking-that-keeps-us-up-at-night/5c7ec07fb326b2d177d5fd3/?utm_term=.629f6e58a8c1) (accessed August 30, 2019).
87. Tobin, "Xi's Vision for Transforming Global Governance;" Grimstone, "Barclays Bank's Grimstone on Market Volatility, U.S.–China Trade, Brexit."
88. U.S. Central Intelligence Agency, "Country Comparison: GDP (Purchasing Power Parity)."
89. Grimstone, "Barclays Bank's Grimstone on Market Volatility, U.S.–China Trade, Brexit."
90. Li Keqiang, Premier of the State Council, "Report on the Work of the Government," delivered at the Third Session of the 12th National People's Congress on March 5, 2015, [http://english.gov.cn/archive/publications/2015/03/05/content\\_281475066179954.htm](http://english.gov.cn/archive/publications/2015/03/05/content_281475066179954.htm) (accessed August 29, 2019).
91. U.S. Department of Defense, Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2019*, pp. i–iii; U.S.–China Economic and Security Review Commission, *2018 Report to Congress of the U.S.–China Economic and Security Review Commission*, p. 205; National Defense Strategy Commission, *Providing for the Common Defense*, p. vi; Tobin, "Xi's Vision for Transforming Global Governance;" Li Keqiang, "Report on the Work of the Government."
92. Covington, "The Culture of Strategic Thought Behind Russia's Modern Approaches to Warfare," p. 5.
93. Russia remains historically and contemporarily centered west of the Urals ethnically, linguistically, culturally, geographically, and economically.



94. Max Roser, "Economic Growth," Our World in Data, 2019, <https://ourworldindata.org/economic-growth> (accessed August 30, 2019); BlackRock, "Shifting Economic Power," <https://www.blackrock.com/uk/intermediaries/themes/megatrends/shifting-economic-power?switchLocale=y&siteEntryPassthrough=true> (accessed August 30, 2019); Dan Steinbock, "The Global Economic Balance of Power Is Shifting," World Economic Forum, September 20, 2017, <https://www.weforum.org/agenda/2017/09/the-global-economic-balance-of-power-is-shifting> (accessed August 30, 2019); Joe Myers, "Which Are the World's Fastest-Growing Economies?" World Economic Forum, April 18, 2016, <https://www.weforum.org/agenda/2016/04/worlds-fastest-growing-economies> (accessed August 30, 2019); Max Roser and Esteban Ortiz-Ospina, "Global Extreme Poverty," Our World in Data, substantive revision March 27, 2017, <https://ourworldindata.org/extreme-poverty> (accessed August 30, 2019); Our World in Data, "The Visual History of World Poverty," <https://slides.ourworldindata.org/world-poverty/#/title-slide> (accessed August 30, 2019); Joe Hasell and Max Roser, "How Do We Know the History of Extreme Poverty?" Our World in Data, updated February 9, 2019, <https://ourworldindata.org/extreme-history-methods> (accessed August 30, 2019); Linda Qiu, "Did We Really Reduce Extreme Poverty by Half in 30 Years?" PolitiFact, March 23, 2016, <https://www.politifact.com/global-news/statements/2016/mar/23/gayle-smith/did-we-really-reduce-extreme-poverty-half-30-years/> (accessed August 30, 2019); United Nations, "The Millennium Development Goals Report 2015," United Nations, released July 2015, [https://www.un.org/millenniumgoals/2015\\_MDG\\_Report/pdf/MDG%202015%20rev%20\(July%2015\).pdf](https://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20(July%2015).pdf) (accessed August 30, 2019); Andrea Peer, "Global Poverty: Facts, FAQs, and How to Help," World Vision, updated November 21, 2018, <https://www.worldvision.org/sponsorship-news-stories/global-poverty-facts> (accessed August 30, 2019); Klaus Schwab and Claude Smadja, "Power and Policy: The New Economic World Order," *Harvard Business Review*, November–December 1994, <https://hbr.org/1994/11/power-and-policy-the-new-economic-world-order> (accessed August 30, 2019); Esteban Ortiz-Ospina, Diana Beltekian, and Max Roser, "Trade and Globalization," Our World in Data, last revised October 2018, <https://ourworldindata.org/trade-and-globalization> (accessed August 30, 2019).
95. U.S. Central Intelligence Agency, "Country Comparison: GDP (Purchasing Power Parity)."
96. "Transcript: Henry Paulson on 'Face the Nation.'"
97. Kennedy, *The Rise and Fall of the Great Powers*, p. 539.
98. Swanson, "The World Today Looks Ominously Like Before World War I."
99. Center for Strategic and International Studies, International Security Program, *Formulating National Security Strategy*, p. X.
100. Bohlen, "Memorandum by the Counselor of the Department of State (Bohlen) to the Under Secretary of State (Lovett)."
101. Thomas G. Mahnken, Grace B. Kim, and Adam Lemon, *Piercing the Fog of Peace, Developing Innovative Operational Concepts for a New Era*, Center for Strategic and Budgetary Assessments, 2019), pp. iv–v and 39–48; *The National Security Strategy of the United States of America*, September 2002, p. 28; *National Security Strategy*, May 2010, pp. 2 and 11.
102. U.S. Department of Defense, Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2019*; Chapter 2, Section 2, "China's Military Reorganization and Modernization: Implications for the United States," in U.S.–China Economic and Security Review Commission, *2018 Report to Congress of the U.S.–China Economic and Security Review Commission*; National Defense Strategy Commission, *Providing for the Common Defense*, p. vi.
103. Mahnken, Kim, and Lemon, *Piercing the Fog of Peace*, pp. iv–v.
104. Lawrence Freedman, *The Future of War: A History*, (New York: Public Affairs, 2017), pp. xix, 7, 10, 11, 15, and 23.
105. Eisenhower, quoted in Gaddis, *Strategies of Containment*, p. 91.
106. Kennedy, *The Rise and Fall of the Great Powers*, p. 539.
107. *Ibid.*, p. 539.
108. Allison, "The Thucydides Trap."



# Pragmatism, Populism, and How Americans Think About Investing in Defense

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History shows that sustained defense investment comes about in America only as a reaction to an emergency: Pearl Harbor, Russia's A-bomb, the Korean War, Sputnik, Vietnam, the Soviet Union's buildup after 1979, 9/11, the Iraq surge. It is a national impulse and one that subsides abruptly.

Americans, however, may no longer be able to afford that episodic approach to national security. Great-power competition is back, and its blend of diplomacy, economics, and military matchups requires the U.S. to keep the upper hand. The rise of China and the return of Russian adventurism have altered course for U.S. strategy, but if America can find a way to break its typical boom-and-bust cycle in defense spending, it can enjoy a second century as the world's superpower.

As things stand today, more money is needed to make up for earlier cuts in defense programs, recover fully from nearly three decades of global combat operations, and prepare the U.S. for future challenges that, if history is any guide, could include a high-end fight. "Without sustained and predictable investment to restore readiness and modernize our military to make it fit for our time," warned the 2018 National Defense Strategy (NDS), "we will rapidly lose our military advantage, resulting in a Joint Force that has legacy systems irrelevant to the defense of our people."<sup>1</sup>

In November 2018, a bipartisan Commission on the National Defense Strategy found that "the security and wellbeing of the United States are at greater risk than any time in decades" and recommended that the Department of Defense (DOD) budget be increased at rates from 3 percent to 5 percent above inflation for the next five years, and perhaps beyond. As the commission pointed out, investments made now will pay off in capabilities that the military will use into the 2070s and 2080s.<sup>2</sup>

The Pentagon agreed on the need for consistent and predictable funding and laid in a 4.9 percent increase for fiscal year (FY) 2020. The five-year program, to run through FY 2024, funds what the NDS characterizes as "decisive and sustained military advantages."<sup>3</sup>

Can Americans shake off the old pattern of up-and-down defense spending and set a course for sustained investment? The threats from Russia, China, and others are clear, but the case for sustained investment in defense needs work. Stinging expert critique, a vocal business community committed to trade with China, volatile public opinion with respect to defense spending, and a reflexive, populist critique of the defense establishment are still powerful forces impeding the case for sustained investment.

## Background: Missed Opportunity 2009–2015

The problem stems in part from the way the U.S. came off the crest of defense spending brought about by the Iraq surge. A comparison between the way the U.S. handled its defense spending during and after the Iraq war and how it handled defense spending during the Korean War illustrates the point. Caught off guard by Communist aggression, the Truman Administration increased the defense budget from just \$213 billion in FY 1950 to \$672 billion in FY 1952. Defense budgets did not reach that high a level again for 50 years, until the Iraq surge set a period of steep increases from FY 2006 through FY 2012. The peak came with a total budget of \$801 billion in FY 2008.

While the 1952 budget allotted \$162 billion in operations and maintenance with \$262 billion in procurement, the defense budgets of the Iraq and Afghanistan surges paid for the wars that were taking place, not future modernization. A stunning proportion of the budgets went to operations and maintenance. The FY 2008 budget funded \$305 billion in operations and maintenance and \$195 billion in procurement. Day-to-day expenses far outpaced purchases of equipment. The high daily costs of the Iraq War included other elements such as health care services and information technology. The nation spent hundreds of billions on war costs in those years without investing for the future.

Also, while Americans gave their forces in battle the best capabilities possible—new systems like the Predator/Reaper family of unmanned planes and over \$45 billion in Mine Resistant Ambush Protected (MRAP) vehicles were fast-tracked to meet urgent warfighter needs<sup>4</sup>—these systems were designed for use in Iraq and Afghanistan and not for burgeoning threats from China and Russia. In contrast, the buildups during Korea, Vietnam, and the Reagan years bought force structure that supplied the armed services for years to come.

Despite record levels of funding, however, the long-term task of replacing Reagan-era equipment and buying new force structure,

scheduled for the 2000s, was not carried out. The services came out of the surge with aging force structure and insufficient progress on advanced weapons. As Secretary of the Army Mark Esper has said of this period, the Army “mortgaged its readiness” for the future fight.<sup>5</sup>

Then it was time to cut the budget. At the time, Washington dialogue led by Secretary of Defense Robert Gates settled on a moderate risk assessment and made the case that the military was much too big. According to Pentagon leadership, there were only moderate military threats ahead in the 2010s. This aligned with the Obama Administration’s focus on the growing national debt and a desire for defense to take up less of the discretionary share of the federal budget.

Gates chose deep cuts in procurement. The Pentagon did trim back operations and maintenance, but following Gates’ instructions, it also cut modernization. In his own words, the weapons and other programs that Gates deemed questionable “have not only been plucked, they have been stomped on and crushed.”<sup>6</sup> Cuts began in April 2009 with restructuring and termination of major defense programs like the F-22 fighter and the Army’s Future Combat System.

A tinge of populism had brought back the passion for lambasting big budgets and with it a misty-eyed conception that America’s military could use a bit of a rest. Under this thinking, the U.S. military was big enough to coast for years without much investment in force structure.

Gates made several speeches almost mocking the military for expensive platforms and having more ships and planes than several other militaries combined. For example, his 2010 speech to the Navy League pilloried “significant naval overmatch,” and Gates quipped that “no one is going to challenge us to a Dreadnought race.”<sup>7</sup>

“It is important to remember that, as much as the U.S. battle fleet has shrunk since the end of the Cold War, the rest of the world’s navies have shrunk even more. So, in relative terms, the U.S. Navy is as strong as it has ever been,” Gates calculated. He continued:

The U.S. operates 11 large carriers, all nuclear powered. In terms of size and striking power, no other country has even one comparable ship.... Our Navy can carry twice as many aircraft at sea as all the rest of the world combined. The U.S. has 57 nuclear-powered attack and cruise missile submarines—again, more than the rest of the world combined. Seventy-nine Aegis-equipped combatants carry roughly 8,000 vertical-launch missile cells. In terms of total missile firepower, the U.S. arguably outmatches the next 20 largest navies.<sup>8</sup>

These remarks seemed to assure the public that the U.S. military was sufficiently (if not overly) strong and would be so indefinitely.

The populist toting up of fleet sizes, refusal to distinguish one platform from another, and inattention to emerging threats from Russia and China created a fog bank around future defense investment. Possibly the most generous comment on this period came years later from Chairman of the Joint Chiefs of Staff General Joseph Dunford. Looking back, Dunford said the operating assumption for many in Washington was that overseas commitments would decline and the fiscal environment would stabilize.<sup>9</sup>

Neither happened. Disagreements between Congress and the Obama Administration in the summer of 2011 led to the Budget Control Act and sequestration cuts. Congress forged deals to create room under the budget caps, but defense investment actually dropped far below what the Gates budget had planned. Lost defense investment surpassed \$539 billion in the period from 2012 to 2019.<sup>10</sup> The cutbacks hurt readiness as the services deferred maintenance and cancelled training and exercises. Long-term modernization suffered as well, with major procurements in programs like the F-35 Joint Strike fighter slowed to meet budget caps.

### Great Powers Show Their Hands

Of course, the world did not stand still. The moderate risk talked about in 2010–2011

morphed into competition with not one but two resurgent great powers as Russia and China moved swiftly to expand their military operations and influence.

During the 1990s and 2000s, Russia and China had appeared on track to integrate into global economic institutions (Vladimir Putin once talked about an economic cooperation zone from Lisbon to Vladivostok) and were far behind the U.S. and allies in defense modernization, but both of those conditions began to change, especially after 2012. Putin consolidated his power in Russia, and Xi Jinping did the same in China. Both stepped up military activities and began to shed the veneer of cooperation with Western economic institutions.

In 2014, the annexation of Crimea from Ukraine marked the end of any show of Russian interest in formal integration. Russian military forces went into Syria and set up military bases.<sup>11</sup> In 2018, the Russian state security services conducted a nerve agent poisoning in Great Britain.<sup>12</sup> Thirty thousand Russian troops assembled on NATO countries' borders and practiced with tactical nuclear weapons. Russia accelerated development of nuclear and conventional missile types. Sanctions on Russia and a downward economy bumped Russia out of the G8 group of leading world economies, but this did not lead Russia to reduce its military activity.

In China, Xi Jinping was elected president in March 2013. The era of “peaceful rise” gave way to a plan for increased influence and dominance of key sectors such as artificial intelligence. Meanwhile, China's military forces displayed huge advances. China had launched its first aircraft carrier, the *Liaoning*, in 2012. Soon thereafter, China began a dredging and construction program in the South China Sea, converting small reefs and terrain features into a string of seven military bases. China also set up military facilities in Djibouti and began to buzz the airspace around Japan on a daily basis.

China's gross domestic product grew from \$9.6 trillion in 2013 to \$12.2 trillion in 2017. The U.S.–China trade deficit was \$318 billion in 2013 but grew to \$439 billion in 2018 according

to official U.S. government figures.<sup>13</sup> Xi's program included military reforms, advanced technology, ship construction, and development of advanced aircraft. The final stroke was the militarization of the South China Sea terrain features. By 2018, despite a 2016 pledge to desist, China had created a string of bases with capabilities that included a 10,000-foot runway, petroleum storage, electronic warfare capabilities, and more.

Chinese and Russian influence touched NATO and the Middle East and penetrated into Central and South America. Collectively, "China and Russia are also trying to shuffle the U.S. out of the Central Command theater of operations," said Marine Corps General Kenneth F. McKenzie, Commander, U.S. Central Command.<sup>14</sup>

"By 2015," said Dunford, "it was clear to all that operational commitments were not going to be reduced and the fiscal situation was not stabilized."<sup>15</sup> Global competition was back, and this time the United States was competing with two other major powers. Added to this were ongoing disruptions from North Korea and Iran and the generational problem of terrorism.

## Turnaround

So began the efforts of Secretary of Defense James Mattis and others to align and stabilize investment in the military. From FY 2017 to FY 2020, the defense budget request rose from \$606 billion to \$718 billion, as documented by the DOD Comptroller.<sup>16</sup> The modest FY 2017 increase marked the first sustained uptick. Budgets for FY 2018 and FY 2019 also included emergency funding for space systems and extra ballistic missile defense capabilities, including theater-based THAAD and a doubling of the Alaska ground-based interceptor protecting the U.S. homeland. The FY 2018 and FY 2019 budgets also improved unit readiness and set a stable course for investment.

However, the episodic pattern of U.S. defense spending is not reassuring. Before the Reagan buildup, budget increases lasted no more than four years, even in wartime. The Reagan buildup saw increased budgets from

FY 1981 to FY 1986 with FY 1987 also quite high.<sup>17</sup> According to this historic pattern, the great power buildup has been underway since FY 2017 and will have no more than three years to go. That will not cover the nuclear modernization of the mid-2020s, the move to advanced multi-domain information systems, or the restocking of equipment for the services.

International conflict and military operations do not fully account for the pattern. Stronger forces are at work and can be seen in public opinion data. Even during the Reagan buildup, consensus on defense wavered. In 1980, on the cusp of the Reagan buildup, 71 percent of responding Americans told a Harris poll that they favored increased defense spending. By 1983, the number had plummeted to 14 percent.<sup>18</sup> Those numbers suggest that support can be found for quick infusions of investment but not for steady, long-term increases of the kind recommended earlier by the bipartisan Commission on the National Defense Strategy.

The same problem may affect defense investment in the 2020s. Americans in 2019 rightly hold the military in high regard. That regard is so high, in fact, that Americans polled by Gallup in early 2019 believed that military spending was about right or somewhat too high. Just 31 percent of Americans favored higher defense spending. They also felt more satisfied with national defense than with any of 21 other issues facing the nation. Compared to immigration, the economy, and other issues, defense seemed just fine.<sup>19</sup>

The investment in and modernization of forces needed to project power and achieve superiority in any domain are now at stake. "The challenge for Trump and Pentagon leaders," Gallup senior scientist Frank Newport has observed, "is to explain why the excellent job the military is doing today (as perceived by the public) translates into the need for more and more military funding tomorrow."<sup>20</sup>

## Public Opinion, Populism, and Pragmatism

Though illogical, the rhetoric of the Gates speeches on Dreadnought competitions and

the oversized military caught hold in part because it resurfaced certain deep strains in American public sentiment: distrust of the defense establishment, concerns about the share of defense spending and the economy, fatigue with the problems of the world “over there,” and a popular impulse to bash defense programs that dates back nearly 100 years. These familiar themes still have the power to knock 2020s defense investment plans off balance.

There has long been a strain in American public opinion that has been wary of the entire defense establishment. Historical ambivalence about military power, perhaps stemming from George Washington’s warning to beware of foreign entanglements, is as much a part of American culture as the Fourth of July. During World War I, President Woodrow Wilson took over two years to settle on the message rallying Americans to side with Britain and France in 1917.

Joining in the Great War did not eradicate the problem. On the contrary, it linked war with a powerful populist sentiment. After the war, military strength plummeted to new lows. Reaction to World War I also engraved a distaste for overseas wars and for munitions makers into the American consciousness. From 1925 to 1935, the belief that war could be stripped of its profitability—or even outlawed through international mechanisms—became widespread. The decade that spawned the Great Depression also encompassed the Spirit of Locarno, the Kellogg–Briand Pact to outlaw war, and the Nye Committee’s hearings on war profits.<sup>21</sup>

In September 1934, the Senate Munitions Committee opened its investigation into whether arms manufacturers had dragged America into World War I. North Dakota Senator Gerald Nye led the committee through 93 separate hearings debating whether “manufacturers of armaments had unduly influenced the American decision to enter the war in 1917,” thereby reaping “enormous profits at the cost of more than 53,000 American battle deaths.” The investigation was sparked by concern that “these ‘merchants of death’ [might] again drag

the United States into a struggle that was none of its business.” Among the captains of industry called to testify were J. P. Morgan, Jr., and Pierre Du Pont (the Du Ponts had been in the gunpowder business since the Revolution). The Nye Committee found little but stoked “popular prejudice against the greedy munitions industry.”<sup>22</sup>

It was against this background that President Dwight Eisenhower warned of the military–industrial complex in his farewell speech in 1961.<sup>23</sup> He mentioned that the annual defense appropriation was nearly equivalent to the share of corporate profits in a single year. Back then, defense spending was a major chunk of the federal budget and held greater sway in the U.S. economy. Now neither is true. The term “military–industrial complex” has been popular ever since then, with numerous anniversary articles in 2011 from the Council on Foreign Relations. “Eisenhower was able to keep a lid on the military–industrial complex because he was Eisenhower,” noted Leslie Gelb in a 2011 interview,<sup>24</sup> and the term continues to pop up in 2020 election speeches.<sup>25</sup>

The populist tide against defense investment recurs periodically, as it did at the peak of the Reagan defense buildup in the 1980s when defense program bashing started to single out specific programs. Journalists made easy prose of it, highlighting the absurdities of alleged Pentagon expenditures: “a \$285 screwdriver, a \$7,622 coffee maker,” and “a \$640 toilet seat,” wrote *Los Angeles Times* columnist and former World War II Marine combat reporter Jack Smith in 1986.<sup>26</sup>

In 2018, a full 32 years later, it was Iowa Senator Chuck Grassley speaking out against “thousand-dollar coffee cups” on Air Force aerial refueling tanker planes. The facts of the case actually concerned innovation by enlisted airmen who 3D-printed replacement handles for just a few dollars,<sup>27</sup> but the part of the story that stuck was the sardonic, populist takedown of military spending.

The point is that Americans adore stories about bloated defense spending partly because of a cultivated skepticism about defense

industry and “foreign wars.” Underlying this theme is the idea that defense spending is “too big” as a share of national spending and can imperil the economy. By this thinking, high defense spending is somehow an abnormality and will ebb in time.

Since Eisenhower’s time, there has been a vast decoupling of defense spending from the American economy—something of which he would have approved. Based on 2018 dollars and statistics from the St. Louis Federal Reserve Bank and the Department of Defense, in 1959, U.S. corporate profits totaled \$1.14 trillion, and the defense budget was \$422 billion. In 2018, U.S. corporate profits were \$7.7 trillion, and the base defense budget was \$643 billion. The defense budget was indeed about 37 percent of the total income of U.S. corporations in 1959, as Eisenhower suggested. In 2018, it was only about 8 percent of that same total income.<sup>28</sup>

Corporations and the defense budget have changed a great deal since 1959, and the comparison is not academically perfect, but the overall message still rings out: The FY 2020 defense budget is no burden on America’s economy.

The theme persists, however, currently expressed as a concern for the national debt. In 2012, a group of august former officials including Henry Kissinger and former Chairman of the Joint Chiefs of Staff Admiral Michael Mullen issued a statement warning that “our long-term debt is the single greatest threat to our national security.”<sup>29</sup> Although an amended 2016 statement also recognized growing threats from Russia and China, this group still recommended reform of the Pentagon, elimination of unnecessary or antiquated weapons systems, and encouragement of soft power as remedies.<sup>30</sup>

The national debt rightly worries many Americans, but familiar populist complaints about America spending more on defense than is spent by other nations are nothing more than a superficial approach to the problem.

### **China: Partner and Rival**

One final area of public opinion is of great significance in staying the course on sustained

defense spending: On the one hand, there is the view of China as a military rival; on the other, there is the conflicting view of China as a business partner. Washington’s coalescing view sees China as a military threat and rival that did not play fair after joining the World Trade Organization; American businesses see China as a vital market.

That split poses a challenge. The complex China threat asks Americans to hold conflicting images in tension and to back sustained investment in defense against a nation that also makes their phones, shoes, and shirts.

This problem did not come up during the U.S.–Soviet Cold War. U.S. military policy toward the USSR did not have to contend with a big trade relationship. American companies did relatively little business with the Soviet Union. According to RAND economist Abraham Becker, in 1984, a peak year of the Cold War, just 1.5 percent of U.S. exports went to the Soviet Union, and the Soviet Union accounted for a miniscule 0.2 percent of total U.S. imports. Trade between the USSR and Western Europe, especially Finland, was somewhat higher. However, self-sufficiency was a pillar of Soviet policy. The USSR had little to sell other than gold and energy. Imports focused on grain and valued manufacturing equipment like drill bits.<sup>31</sup>

In short, the trade was insignificant enough to be batted around as a policy tool with little risk. Richard Nixon and Leonid Brezhnev used trade as a tool of détente. So did Ronald Reagan and Mikhail Gorbachev as they dealt with fluctuating grain sales and export controls. However, U.S.–Soviet trade was available as a policy tool partly because it was so limited.

In contrast, U.S. trade relations with China will remain a variable. Vociferous debates on tariff positions have amplified the implications for business, again crowding out the implications for national security. The Trump Administration’s imposition of tariffs beginning in 2018 was justified in part on national security grounds, including intellectual property theft. High-profile cases like B-2 bomber espionage,<sup>32</sup> the 2013 Office of Personnel Management data



hack by China,<sup>33</sup> and intrusion into Tennessee Valley Authority nuclear facilities<sup>34</sup> would seem to make the case. Yet discussion remains bifurcated. “China is not an enemy. It is a nation trying to raise its living standards,” wrote one professor in a recent editorial.<sup>35</sup>

However, discussion of the economic relationship should not provide an avenue of retreat. China is not confused: It sees the U.S. as a rival. “The men in Beijing understand that Trump is the first president in a generation to ‘get it’ about China’s effort to create a new world order that depends on the Chinese economy,” one observer has written.<sup>36</sup> Whatever the trade situation, America needs the fortitude to invest in systems to deter China in the Pacific, in space, and around the globe.

### **Business Tools for Sustained Defense Spending**

So far, this essay has argued that policymakers must present a credible and consistent threat analysis and develop a case for sustained defense spending that can navigate past obstacles in public opinion and take on the popularity of the China market with the business community.

Rebuilding the military does not end with appropriation and justification. Assume, for a moment, that a good budget is put in place with a sound future-year plan that keeps the U.S. ahead of Russia and China. Another equally important step remains: implementing management tools within the Pentagon’s future years defense program. “Even though DoD is a public entity, it should manage itself more like a business (whenever it can),” according to the Defense Business Board.<sup>37</sup>

Business reviews of the Pentagon tend to focus on personnel costs, management layers, and overhead. While there is room for improvement in these areas, the business executive approach often overlooks specific management tools already available within the DOD and on Capitol Hill. Fortunately, a few tools are available that are centered on a common theme: sound execution of major defense programs.

**Program Management: Multiyear Procurement and Economic Order Quantity.** The defense program manager and his or her service acquisition overseers have two powerful tools at their disposal for defense investment: multiyear procurement and economic order quantity. Used effectively, these tools can save billions while still providing America with the military it needs.

A multiyear procurement is an agreement by the government to buy ships or planes across multiple fiscal years instead of in a single year. Generally, the government contracts to buy a fixed quantity in one year only. In a multiyear procurement, the contract is for unit quantities for several years. In March 2019, for example, the Navy awarded Boeing a \$4 billion contract to buy 78 F/A-18E/F Superhornet fighters across three years from 2019–2021. “A multiyear contract helps the F/A-18 team seek out suppliers with a guaranteed three years of production, instead of negotiating year to year,” explained Dan Gillian, Boeing’s vice president of F/A-18 and EA-18G programs.<sup>38</sup>

Multiyear procurements work best when the weapon system is stable and past the modification and price volatility of early production learning curves. Defense industry program managers like multiyears because they can buy from suppliers in economic order quantities. Other efficiencies include steady labor force plans, investment in cost-reducing factory improvements, and lower administrative burdens. Granted, the government must negotiate a good price up front. Typical multiyear contracts save 10 percent, which is a substantial amount on billion-dollar contracts.<sup>39</sup> Each multiyear procurement requires a justification and approval from Congress.

Most Navy ships are bought under multi-year procurements. This approach should be extended to major aircraft, helicopter, and other acquisitions.

With or without multiyear procurements, sustained defense investment depends on the concept of economic order quantity. In cases such as the production of aircraft and Navy surface combatants, there exist periods a few

years in to full-rate production where learning curves have created significant unit price savings. These are the prime years in which to buy. Stretching out purchases is almost never a wise move.

According to a landmark RAND study on Navy shipbuilding, costs of weapon systems go up over time because of two types of factors: those driven by the customer and those driven by the economy.<sup>40</sup> The customer-driven factors include design changes, among others. The economy-driven factors include real zingers: labor costs, matériel prices, and—looming over it all—inflation. A program on a 10-year acquisition cycle is subject to variable cost inflation that is both independent of any improvements in the system itself and largely beyond government managerial control. The longer the program runs, the more subject it is to variations in inflation from one year to the next. The only thing the defense program manager can do is buy in quantity at the right time.

While putting aside funding does tempt Pentagon management and congressional committees to pilfer and reallocate those big dollars, economic order quantity and multi-year purchases are two powerful fiscal tools that should be used for sustained investment.

**Fencing Programs: Strategic Deterrence Modernization.** The best way to achieve stable investment for some programs may be to fence them off from the larger defense budget. The Congressional Budget Office has projected that modernizing nuclear forces will cost \$494 billion from 2019 to 2028.<sup>41</sup> That sum, almost \$50 billion per year, includes some Department of Energy funding but is centered primarily on DOD modernization programs.

Congress can limit volatility by establishing stable funding for strategic nuclear modernization apart from the regular budget for defense. Despite occasional debate, the strategic nuclear triad of bombers, land-based ICBMs, and submarines remains a solid foundation. Nor has NATO given serious thought to abandoning the tactical nuclear weapons delivered by a variety of fighters and bombers. Both Russia and China have modernized and expanded

their nuclear forces, and nuclear ambitions persist in several other countries.

Here is a case for American pragmatism. Fenced funding for the major nuclear modernization programs including the B-21 bomber, *Columbia*-class submarine, ICBM modernization, nuclear command and control, and weapons programs can help to ensure fiscal stability for these expensive programs and deliver capability at the same time. Several of these programs would be good candidates for multiyear contracts. Safeguarding this major cluster of programs could allow service program managers to use all of the management tools at their disposal to bring their programs in on time and at more efficient cost.

Gaining support for \$50 billion of sustained investment per year will require great effort. The Pentagon must free the armed services to tie investment to these programs by name. President Reagan did not “recapitalize long-range aviation”; he built the B-1 bomber. While it may seem a minor point, a little more explanatory publicity and a little less secrecy could help to forge the consensus on investment.

**Prioritizing the Services.** Along the same lines, one of the best ways to sustain defense spending is to remember that it ultimately buys capability for the military services, not for the Pentagon. The high regard that Americans have for the military is regard for the Army, Navy, Air Force, and Marine Corps (and perhaps one day, a Space Force).

The best leaders for sustained defense investment are the Secretaries of the Army, Navy, and Air Force. They, not the Office of the Secretary of Defense, have the statutory authority to cultivate top talent through their general and flag officer promotion systems. Their requirements drive funding, and the actions of their servicemembers produce the results in the form of military operations. The service departments alone are the one type of organization that is set up to manage requirements and leadership over a long period. The service secretaries and their staffs are also in the best position to conduct requirements trades for new systems and set upgrade,

logistics, and other funding priorities across the force structure.

While joint command has been a huge success, the post-Goldwater–Nichols legacy of joint requirements evaluation has not produced notable investment efficiencies; arguably, it may have compounded problems by creating oversized program offices. Joint weapons procurement actually works best in the form of bilateral agreements on specific programs. For example, the Army went on to buy the unmanned Grey Eagle plane after the Air Force had developed and tested it in combat.

Now for some good news. Orbiting overhead is a success story for sustained defense investment based on a service vision: in this case, the Air Force's. The Global Positioning System (GPS) began as a military satellite constellation to provide accurate navigation and timing. The system, owned by the U.S. government and operated and controlled by the U.S. Air Force's 50th Space Wing, also makes possible countless commercial/private-sector transactions, from banking to map location. The timing signal is accurate to a millionth of a second, and location is better than 100 feet. An even more accurate system is reserved for military users.

When the full constellation of 24 satellites filled out in 1993, GPS began providing radio-navigation to unlimited users. More than 30 years of sustained investment has created a global information resource used by individuals and businesses large and small every day. It also provided an on-ramp for significant private investment to break into and establish market share for a highly demanding government customer. GPS satellites have now been launched by SpaceX's Falcon 9 rocket, marking a success for sustained private investment.

## Conclusion

The U.S. exited the Cold War still reaping the benefits of earlier technology investments. Since then, the episodic pattern of surge and

cut has eroded the U.S. military's competitive edge. The U.S. remains the world's strongest military power, but steady investment is crucial if America is to maintain its edge through 2025 and beyond. That time horizon is important. According to a U.S. Army estimate, Russia's military strength will grow through 2028 and beyond, while China will not reach its peak goals until 2030.<sup>42</sup>

Sound defense investment planning must steer through the ups and downs of public opinion and craft a rationale that takes into account the competing military and economic tides of a bumpy multipolar world where deterrence and trade go hand-in-hand. U.S. defense investment buys long-range power projection in many forms and the ability to respond with tailored ground forces. Most of all, the military must complete its transition to a framework in which the use of information and cyberspace can decide the tactical advantage. All of this will take place under the commons of space, which must be safeguarded as never before.

As President Eisenhower told America in his farewell address long ago:

[What] is called for [is] not the emotional and transitory sacrifices of crisis, but those which enable us to carry forward steadily, surely, and without complaint the burdens of a prolonged and complex struggle—with liberty the stake. Only thus will we remain, despite every provocation, on our charted course toward permanent peace and human betterment.<sup>43</sup>

The plans and actions of Russia, China, Iran, and others make clear that the struggle is complex and the stakes still high. "We pray that... those who have freedom will understand, also, its heavy responsibilities," said Eisenhower back in 1961. "May we be ever unswerving in devotion to principle, confident but humble with power, diligent in pursuit of the Nation's great goals."<sup>44</sup>

## Endnotes

1. James Mattis, Secretary of Defense, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge*, U.S. Department of Defense, p. 1, <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf> (accessed June 17, 2019).
2. Commission on the National Defense Strategy for the United States, *Providing for the Common Defense: The Assessment and Recommendations of the National Defense Strategy Commission*, released November 14, 2018, pp. v, xii, and x, <https://www.usip.org/sites/default/files/2018-11/providing-for-the-common-defense.pdf> (accessed June 17, 2019).
3. Mattis, *Summary of the 2018 National Defense Strategy of the United States of America*, p. 4.
4. David Axe, "The Great MRAP Debate: Are Blast-Resistant Vehicles Worth It?" *Breaking Defense*, October 1, 2012, <https://breakingdefense.com/2012/10/the-great-mrap-debate-are-blast-resistant-vehicles-worth-it/> (accessed June 17, 2019).
5. Mike Stone, "U.S. Army Estimates Russian Capability Will Peak in 2028, China's in 2030," Reuters, February 26, 2019, <https://www.reuters.com/article/us-usa-pentagon-army/u-s-army-estimates-russian-capability-will-peak-in-2028-chinas-in-2030-idUSKCN1QF2RR> (accessed June 17, 2019).
6. Robert M. Gates, speech on defense spending as delivered to the American Enterprise Institute, Washington, D.C., May 24, 2011, <https://archive.defense.gov/Speeches/Speech.aspx?SpeechID=1570> (accessed June 17, 2019).
7. Secretary Gates was referring to the arms race between Great Britain and Germany before World War I. Britain committed to ensuring that its navy could beat Germany's and launched production of massive battleships, the first of which was the HMS *Dreadnought*. Germany responded with its own class of super battleships. Similar arms races have occurred in airpower, nuclear weapons, and space-based capabilities and are evolving most recently in cyber and hypervelocity weapons. Robert M. Gates, remarks as delivered at Navy League Sea-Air-Space Exposition, Gaylord Convention Center, National Harbor, Maryland, May 3, 2010, <https://archive.defense.gov/Speeches/Speech.aspx?SpeechID=1460> (accessed June 17, 2019).
8. Ibid.
9. Stenographic transcript, "A Conversation with Chairman of the Joint Chiefs of Staff General Joseph F. Dunford," The Brookings Institution, Washington, D.C., May 29, 2019, [https://www.brookings.edu/wp-content/uploads/2019/05/fp\\_20190529\\_dunford\\_transcript.pdf](https://www.brookings.edu/wp-content/uploads/2019/05/fp_20190529_dunford_transcript.pdf) (accessed June 17, 2019).
10. Commission on the National Defense Strategy for the United States, *Providing for the Common Defense*, p. 50.
11. BBC News, "Russia Joins War in Syria: Five Key Points," October 1, 2015, <https://www.bbc.com/news/world-middle-east-34416519> (accessed June 17, 2019).
12. BBC News, "Russian Spy Poisoning: What We Know So Far," October 8, 2018, <https://www.bbc.com/news/uk-43315636> (accessed June 17, 2019).
13. Table, "2018: U.S. Trade in Goods with China," in U.S. Department of Commerce, U.S. Census Bureau, "Foreign Trade: Trade in Goods with China," <https://www.census.gov/foreign-trade/balance/c5700.html> (accessed June 17, 2019).
14. Kenneth F. McKenzie, Jr., Remarks at Conference on "Rising to the Threat: Revitalizing America's Military Power, Foundation for Defense of Democracies, Washington, D.C., May 8, 2019, <https://www.fdd.org/wp-content/uploads/2019/05/Transcript-CMPP-McKenzie.pdf> (accessed June 17, 2019).
15. Stenographic transcript, "A Conversation with Chairman of the Joint Chiefs of Staff General Joseph F. Dunford."
16. U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, *Defense Budget Overview: United States Department of Defense Fiscal Year 2020 Budget Request*, March 2019, p. 1–3, [https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/fy2020\\_Budget\\_Request\\_Overview\\_Book.pdf](https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/fy2020_Budget_Request_Overview_Book.pdf) (accessed June 17, 2019).
17. U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller), *National Defense Budget Estimates for FY 2019*, April 2018, [https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2019/FY19\\_Green\\_Book.pdf](https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2019/FY19_Green_Book.pdf) (accessed June 17, 2019).
18. William Sweet, "Reagan's Defense Buildup," CQ Researcher, April 27, 1084, <https://library.cqpress.com/cqresearcher/document.php?id=cqresrre1984042700> (accessed July 23, 2019).
19. Frank Newport, "The Military's Positive Image and the Defense Budget," Gallup *Polling Matters*, April 1, 2019, <https://news.gallup.com/opinion/polling-matters/248153/military-positive-image-defense-budget.aspx> (accessed June 18, 2019).
20. Ibid.
21. J. B. Duroselle, "The Spirit of Locarno: Illusions of Pactomania," *Foreign Affairs*, Vol. 50, No. 3 (July 1972), <https://www.foreignaffairs.com/articles/russian-federation/1972-07-01/spirit-locarno-illusions-pactomania> (accessed June 13, 2019). Subscription required.

22. U.S. Senate, Art & History, Senate Stories 1921–1940, “‘Merchants of Death,’ September 4, 1934,” [https://www.senate.gov/artandhistory/history/minute/merchants\\_of\\_death.htm](https://www.senate.gov/artandhistory/history/minute/merchants_of_death.htm) (accessed July 21, 2019). For the committee’s findings, see “Report of the Special Committee on Investigation of the Munitions Industry (The Nye Report), U.S. Congress, Senate, 74th Congress, 2nd sess., February 24, 1936, pp. 3–13,” <https://www.mtholyoke.edu/acad/intrel/nye.htm> (accessed July 21, 2019).
23. Dwight D. Eisenhower, “Farewell Address,” January 17, 1961, <https://millercenter.org/the-presidency/presidential-speeches/january-17-1961-farewell-address> (accessed June 18, 2019).
24. Leslie H. Gelb, “Military-Industrial Complex, Fifty Years On,” interview with Bernard Gwertzman, January 11, 2011, <https://www.cfr.org/interview/military-industrial-complex-fifty-years> (accessed June 18, 2019).
25. See, for example, Joe Gould, “Elizabeth Warren Targets Military-Industrial Complex in New Plan,” *Defense News*, May 16, 2019, <https://www.defensenews.com/congress/2019/05/16/elizabeth-warren-announces-plan-to-unravel-military-industrial-complex/> (accessed June 18, 2019).
26. Jack Smith, “\$37 Screws, a \$7,622 Coffee Maker, \$640 Toilet Seats: Suppliers to Our Military Just Won’t Be Oversold,” *Los Angeles Times*, July 30, 1986, <https://www.latimes.com/archives/la-xpm-1986-07-30-vw-18804-story.html> (accessed June 18, 2019).
27. Oriana Pawlyk, “Air Force Ends Purchase of Pricey Coffee Cups After Senator Complains,” *Military.com*, October 24, 2018, <https://www.military.com/defensetech/2018/10/24/air-force-ends-purchase-pricey-coffee-cups-after-senator-complains.html> (accessed June 18, 2019).
28. U.S. Department of Commerce, Bureau of Economic Analysis, “Corporate Profits After Tax (Without IVA and CCAAdj),” retrieved from FRED, Federal Reserve Bank of St. Louis, updated May 30, 2019, <https://fred.stlouisfed.org/series/CP> (accessed June 18, 2019); U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller), *National Defense Budget Estimates for FY 2019*, p. 183.
29. Coalition for Fiscal and National Security, “Addressing Our Debt: A National Security Imperative,” released December 4, 2012, [https://www.pgpf.org/sites/default/files/cfns\\_full\\_statement\\_12042012.pdf](https://www.pgpf.org/sites/default/files/cfns_full_statement_12042012.pdf) (accessed July 19, 2019). See also press release, “Group of Distinguished Defense, Economic and Foreign Policy Leaders Identify the National Debt as the Single Greatest Threat to U.S. National Security,” Peter G. Peterson Foundation, December 4, 2012, [https://www.pgpf.org/sites/default/files/sitecore/media%20library/Landers/fiscalandnationalsecurity/cfns\\_pr\\_12042012.pdf](https://www.pgpf.org/sites/default/files/sitecore/media%20library/Landers/fiscalandnationalsecurity/cfns_pr_12042012.pdf) (accessed July 19, 2019).
30. Coalition for Fiscal and National Security, “Strength at Home and Abroad: Ensuring America’s Fiscal and National Security,” May 10, 2016, <https://www.pgpf.org/sites/default/files/Strength-at-Home-and-Abroad-Ensuring-Americas-Fiscal-and-National-Security.pdf> (accessed June 18, 2019).
31. Abraham S. Becker, “U.S.–Soviet Trade in the 1980s,” RAND Corporation, *RAND Note* No. N-2682-RC, November 1987, <https://www.rand.org/pubs/notes/N2682.html> (accessed June 18, 2019).
32. Nelson Daranciang, “Maui Man Guilty in Leak of B-2 Secrets,” *Honolulu Star-Advertiser*, August 10, 2010, <https://www.staradvertiser.com/2010/08/10/hawaii-news/maui-man-guilty-in-leak-of-b-2-secrets/> (accessed June 18, 2019).
33. Evan Perez, “FBI Arrests Chinese National Connected to Malware Used in OPM Data Breach,” CNN, August 24, 2017, <https://www.cnn.com/2017/08/24/politics/fbi-arrests-chinese-national-in-opm-data-breach/index.html> (accessed June 18, 2019).
34. Daniel Uria, “Former Nuclear Power Plant Employee Admits to Selling Secrets to China,” UPI, April 30, 2016, [https://www.upi.com/Top\\_News/US/2016/04/30/Former-nuclear-power-plant-employee-admits-to-selling-secrets-to-China/9791462020512/](https://www.upi.com/Top_News/US/2016/04/30/Former-nuclear-power-plant-employee-admits-to-selling-secrets-to-China/9791462020512/) (accessed June 14, 2019).
35. Jeffery Sachs, “China Is Not the Source of Our Economic Problems—Corporate Greed Is,” CNN, updated May 27, 2019, <https://www.cnn.com/2019/05/26/opinions/china-is-not-the-enemy-sachs/index.html> (accessed June 18, 2019).
36. Arthur Herman, “Arthur Herman: Mueller vs. Trump—America’s the Real Loser and Russia, Iran, China Look Like Big Winners,” Fox News, June 1, 2019, <https://www.foxnews.com/opinion/arthur-herman-mueller-trump-russia-china-iran-winners-impeachment> (accessed June 18, 2019).
37. U.S. Department of Defense, Defense Business Board, *Focusing a Transition: Challenges Facing the New Administration*, 2016, p. 40, <https://dbb.defense.gov/Portals/35/Documents/Reports/2016/DBB%20Transition%20Report%202016%20-%2020160920.pdf> (accessed June 18, 2019).
38. Ben Werner, “Boeing Awarded \$4B Multi-Year for 78 Super Hornets,” U.S. Naval Institute News, March 21, 2019, <https://news.usni.org/2019/03/21/42021> (accessed June 18, 2019).
39. Scott A. Arnold and Bruce R. Harmon, *The Relative Costs and Benefits of Multi-Year Procurement Options*, (Alexandria, VA, Institute for Defense Analysis, 2013).

40. Mark V. Arena, Irv Blickstein, Obaid Younossi, and Clifford A. Grammich, *Why Has the Cost of Navy Ships Risen? A Macroscopic Examination of the Trends in U.S. Naval Ship Costs Over the Past Several Decades*, RAND Corporation, RAND National Defense Research Institute, 2006, [https://www.rand.org/content/dam/rand/pubs/monographs/2006/RAND\\_MG484.pdf](https://www.rand.org/content/dam/rand/pubs/monographs/2006/RAND_MG484.pdf) (accessed June 18, 2019).
41. Congressional Budget Office, “Projected Costs of U.S. Nuclear Forces, 2019–2028,” January 2019, <https://www.cbo.gov/system/files/2019-01/54914-NuclearForces.pdf> (accessed June 18, 2019).
42. Stone, “U.S. Army Estimates Russian Capability Will Peak in 2028, China’s in 2030.”
43. Eisenhower, “Farewell Address.”
44. *Ibid.*

# The Economic Dimension of Great-Power Competition and the Role of Cyber as a Key Strategic Weapon

Samantha F. Ravich, PhD, and Annie Fixler

Napoleon Bonaparte may have said that an army marches on its stomach, but it is perhaps even truer that a military force marches, sails, flies, and attacks on the back of its nation's economy. Cripple an enemy's economy and not only will the stomachs of its fighting forces go empty, but commerce, trade, and innovation will grind to a halt, sapping the will of the people and depriving the leadership of most of the parts needed for the machinery of war.

Ancient civilizations recognized that economic warfare could destroy an adversary during conflict and weaken him during more peaceful times to keep him from becoming a rival. The catalyst for the Peloponnesian War nearly 2,500 years ago was an act of economic warfare. The Athenians imposed crippling economic sanctions against an ally of Sparta in order to sow dissension and weaken the coalition's ability to threaten Athens and its allies. Recognizing the danger, Sparta responded with military action. The war culminated in a final act of economic warfare when Sparta (with Persia's assistance) blockaded Athens and forced its surrender.<sup>1</sup>

Closer to our own time, Napoleon made wide use of economic aggression in hopes of shaping the battlefield to his advantage. In 1806, in an attempt to weaken England's fighting forces by ruining the economy that undergirded its power, he issued the Berlin Decree

declaring the British Isles to be in a state of blockade. While not as successful in that case—in fact, some scholars blame it for the ultimate ruin of France—the military strategy of using economic means to cripple the adversary has never fallen out of favor.<sup>2</sup>

## Economic Warfare, Invention, and Innovation

Economic warfare and, conversely, economic invention and innovation have been integral to American strategy since the Founding. George Washington believed so strongly in the importance of encouraging the advancement and protection of inventions for the benefit of the national defense that he called for passage of the Patent Act in his first State of the Union address on January 8, 1790. "To be prepared for war is one of the most effectual means of preserving peace," Washington declared, and to be prepared, manufacturing, "particularly for military supplies," had to be encouraged and protected.<sup>3</sup> Washington personally signed and sealed each of the 150 patents issued during his presidency.<sup>4</sup>

Having witnessed British attempts to use blockades to weaken the rebellious American colonies,<sup>5</sup> Alexander Hamilton encouraged another kind of economic warfare to advantage fledgling American industries and curb the military prowess of England. In his *Report on*

*the Subject of Manufactures* sent to Congress in 1791, Hamilton encouraged the new nation to engage in extensive private theft and application of foreign intellectual property in order to transfer wealth-generating capabilities to the new nation.<sup>6</sup> England recognized the threat posed by this pervasive intellectual property theft not only to the British economy, but also to its national security and thus implemented initiatives, including barring the export of key technologies, to prevent it from succeeding.<sup>7</sup>

## The Great Wars

In the first half of the 20th century, America watched Great Britain incorporate economic warfare into its World War I and World War II strategies. In the lead-up to the Great War, the Naval Intelligence Department of the British Admiralty developed a plan to cripple Germany's ability to wage war by leveraging British advantages in "the largely British-controlled infrastructure of international trade." Specifically:

Economic warfare strategy entailed doing "all in our power" to disrupt the already strained enemy economy, recognizing that significant additional pressure could be exerted upon the German economy by systematically denying access to the largely British-controlled infrastructure of international trade—British banks, insurance companies, and communications networks. In essence, the Admiralty argued that the beginning of a major war would find the German economy teetering on the edge of a precipice and that British strategy should seek to push it over the edge and down into "unemployment, distress, &c., and eventually in bankruptcy."<sup>8</sup>

The idea was that Britain could prepare for such a collapse and even leverage it, while Germany would be immobilized. Although the plan was never fully implemented, partly because England feared loosing the economic dogs of war more than it feared traditional

military conflict, at the start of the Second World War, London created a new Ministry of Economic Warfare (the successor to the Ministry of Blockade during World War I) and specified that "[t]he aim of economic warfare is so to disorganise the enemy's economy as to prevent him from carrying on the war."<sup>9</sup>

During this time, but before the United States formally entered World War II, Washington also turned to economic warfare. President Franklin Roosevelt ordered a U.S. embargo of all sales of oil and scrap metal to Japan, hoping to constrain Japanese foreign aggression. The result may not have been what Washington desired: Emperor Hirohito's diaries from those years reveal that Japan went to war with the United States because of the embargo.<sup>10</sup>

Despite that outcome, economic coercion has become a key component of U.S. national security strategy, and Washington has relied increasingly on economic sanctions to deny adversaries access to global markets, thereby significantly degrading their capabilities. The United States controls the essential infrastructure that underpins global trade, and over the past two decades, we have used it to further our foreign policy and national security aims.

## Fine-Tuning U.S. Strategy for Economic Warfare

The sophistication of U.S. sanctions began 15 years ago with efforts to punish Pyongyang's illicit activities and deny the regime funds to support its nuclear weapons program. When the United States slapped money-laundering sanctions on a little-known bank in Macau, Banco Delta Asia, in 2005, Washington "unleashed financial furies" unlike any the world had seen before.<sup>11</sup> Juan Zarate, Assistant Secretary of the Treasury for Terrorist Financing and Financial Crimes, said that after those sanctions, "[e]very conversation [with the North Koreans] began and ended with the same question: 'When will we get our money back?'"<sup>12</sup> During the Six Party Talks, an inebriated North Korean delegate admitted that with those sanctions, "[y]ou Americans have finally



found a way to hurt us.”<sup>13</sup> With the world’s largest economy standing behind it, the almighty dollar was a powerful foe, and given the relative lack of economic engagement between the U.S. and North Korea, American businesses never felt any pain from the sanctions imposed by Washington or the U.N.

Washington then took this preliminary playbook and developed its economic toolkit by testing its powers against Iran. Six months after Congress passed comprehensive sanctions against Iran’s energy sector, then-Undersecretary for Political Affairs William Burns testified in December 2010 that the legislation had already cost Iran between \$50 billion and \$60 billion.<sup>14</sup> As a result of U.S. sanctions and economic mismanagement, Iran’s gross domestic product (GDP) contracted by 6 percent in 2012/2013 and another 2 percent in 2014/2015.<sup>15</sup>

The imposition of sanctions following U.S. withdrawal from the international nuclear agreement with Tehran has similarly triggered worsening economic conditions.<sup>16</sup> In April 2018, one month before the U.S. decision to withdraw, average annual inflation was 8 percent. Less than a year later, inflation had more than tripled to about 30 percent.<sup>17</sup> Both the International Monetary Fund and the World Bank have begun to forecast deepening recession.<sup>18</sup> As recently as June 2018, the World Bank was projecting a 4.1 percent GDP growth for 2018 and 2019, but in January 2019, it had revised those numbers down to 1.5 percent and 3.6 percent GDP reduction.<sup>19</sup>

The U.S. government estimates that between May 2018 and April 2019, sanctions had taken 1.5 million barrels of Iranian oil off the market and “denied the regime direct access to more than \$10 billion in oil revenue.”<sup>20</sup> As a result, Tehran’s regional proxies are starved for cash. Hezbollah has appealed for donations for the first time and has implemented austerity measures.<sup>21</sup> Militants in Syria have missed paychecks, and projects are going unfunded.<sup>22</sup> Without access to capital, it is difficult for Tehran to project power in the region and threaten U.S. interests and allies.

## Washington’s Economic Warfare Blind Spot

Disturbingly, despite the continued use of economic coercion by Washington since September 11, 2001, U.S. policymakers have an economic warfare blind spot: We have forgotten that we can be the victim and not just the perpetrator of economic warfare. Perhaps we have grown complacent because since the early years of the Republic, we have not faced a great-power rival with the ability to damage our economic wherewithal not just during, but also before and below the level of armed conflict.

Not even during the height of the Cold War, when the Soviet nuclear arsenal contained at least 55,000 warheads, did the best of America’s military strategists consider how Moscow could undermine American economic wherewithal to weaken the United States strategically. This snapshot in time, roughly 1947–1991, frames much of the assessment and planning for great-power conflict by today’s strategic thinkers, but there is a major deficiency in seeing that past as prologue.

The Soviet economy did indeed possess the strength to create one of the world’s strongest militaries during its heyday, but in the end, it was self-defeating. As the late Dr. Charles Wolf, Jr., wrote, the Soviet system was based on five fundamental principles:

- (1) Pervasive and centralized political and social control;
- (2) rule by a self-perpetuating political/military elite;
- (3) domination of military/security priorities over civil ones;
- (4) persistent cultivation of external/internal threats, and requirement for international “struggle”; and
- (5) preference for self-reliance.<sup>23</sup>

These principles, when operationalized, left the Soviet Union in an ever-weaker position vis-à-vis the United States. Although there was little doubt that Moscow’s nuclear capability could indeed obliterate both Wall Street and Main Street, in the absence of that cataclysmic event, the United States grew more prosperous,

more innovative, and more capable of shaping the world to its advantage.

During the postwar period between the 1950s and mid-1970s, some Western economists assessed Soviet economic growth rates as averaging about 5 percent per year, suggesting that the USSR was outpacing the average growth of the United States.<sup>24</sup> More detailed studies of the Soviet economy, however, recognized the mendacious data upon which those growth numbers were based and estimated a truer measure of the two countries that ranged from the Soviet economy's being equal to only 14 percent of the U.S. economy on the low side to 30 percent at the high end.<sup>25</sup> In 1988, Soviet foreign purchases and sales were roughly \$200 billion, less than one-third those of the United States, and much of that trade was with other Soviet states that had no choice but to buy the inferior products foisted upon them in the closed Soviet system.<sup>26</sup>

### **Chinese Cyber-Enabled Economic Warfare Threatens U.S. Supremacy**

The largest U.S. companies of 1980, from Exxon Mobil to General Motors to IBM to General Electric (first, second, eighth, and ninth, respectively, on the *Fortune* 500 list of that year<sup>27</sup>), did not fear that Moscow might execute a coordinated campaign to steal intellectual property, contaminate the supply chain, degrade operational systems, or offer below-market prices on key technological solutions to drive them out of business and weaken the digital fabric of the American national security industrial base. The reality today is far different, and so are the contours of the battlefield upon which the U.S. is now forced to engage.

"[U]nlike the 'bad old days' of the U.S.–Soviet Cold War, when our economic engagement with the USSR was relatively insignificant," Assistant Secretary of State for International Security and Nonproliferation Christopher Ford has commented, "the United States and its friends and allies have deep and extensive economic ties to China in this era of high-technology international commerce."<sup>28</sup> In the words of

General Paul Nakasone, head of the National Security Agency and U.S. Cyber Command:

We are in a period where our adversaries are looking to really take us on below that level of armed conflict, to be able to steal our intellectual property, to be able to leverage our personally identifiable information, to be able to sow distrust within society, to be able to attempt to disrupt our elections.<sup>29</sup>

China's economy is the second largest in the world behind the United States and the "largest if measured in purchasing price parity terms."<sup>30</sup> China has been the largest single contributor to world growth since 2008.<sup>31</sup> While the real size and growth rate are likely far below the Chinese Communist Party's official claims,<sup>32</sup> the reach of China's global investments gives Beijing leverage that it can use to challenge U.S. supremacy.

China conducts cyber-enabled economic warfare against the United States and its allies.<sup>33</sup> After South Korean conglomerate Lotte Group provided its government the land on which to deploy the Terminal High Altitude Area Defense (THAAD) missile defense system, Chinese hackers unleashed cyberattacks, and the government issued trumped-up regulatory action against the company as a way to pressure Seoul to change its policies.<sup>34</sup> Beijing's tactics seem to have succeeded: South Korea acquiesced to military constraints in return for relief from Chinese economic warfare.<sup>35</sup>

Today, China is engaged in a massive, prolonged campaign of intellectual property theft, using cyber-enabled technologies to target nearly every sector of the U.S. economy.<sup>36</sup> China's strategy is one of "rob, replicate and replace. Rob the American company of its intellectual property, replicate the technology, and replace the American company in the Chinese market and, one day, in the global market," according to the U.S. Department of Justice. "From 2011–2018, more than 90 percent of the Department's cases alleging economic espionage by or to benefit a state involve China,

and more than two-thirds of the Department's theft of trade secrets cases have had a nexus to China.<sup>37</sup> Even when technology is commercially available, China engages in a "concerted effort to steal, rather than simply purchase" these products.<sup>38</sup>

For a sense of scale, intellectual property theft costs the U.S. economy as much as \$600 billion per year.<sup>39</sup> If China respected intellectual property rights, the U.S. economy would gain 2.1 million jobs and \$107 billion in sales.<sup>40</sup> In just one case in which wind turbine company Sinoval stole trade secrets from U.S.-based AMSC, the company "lost more than \$1 billion in shareholder equity and almost 700 jobs, over half its global workforce."<sup>41</sup>

Beijing's military-civil fusion<sup>42</sup> means that none of this intellectual property theft is driven purely by commercial motivation. President Xi Jinping has called "military-civilian integration" a "prerequisite for building integrated national strategies and strategic capabilities and for realizing the Party's goal of building a strong military in the new era."<sup>43</sup> Particularly with emerging technologies, the line between civilian and military purposes is disappearing.<sup>44</sup> Beijing's effort to build national champions in sensitive technologies "directly complements the PLA's modernization efforts and carries serious military implications," according to the U.S. Department of Defense (DOD).<sup>45</sup>

Meanwhile, more than 60 percent of Chinese export violations are attempts to acquire critical technologies that have military applications,<sup>46</sup> and the targets of Chinese hackers align with the priorities of Beijing's Made in China 2025 strategy.<sup>47</sup> China's J-20 fighter plane, for example, bears striking similarities to the F-22 Raptor made by Lockheed Martin—the same company from which the Department of Justice accused a Chinese national of stealing technical data.<sup>48</sup> At the time, a nine-man team run by Chinese intelligence officers was hacking a French aerospace manufacturer and U.S. companies that made parts for turbofan jet engines, and "a Chinese state-owned aerospace company was working to develop a comparable engine for use in commercial aircraft

manufactured in China and elsewhere," according to the Department of Justice.<sup>49</sup> Meanwhile, press reports revealed that one group of Chinese hackers has targeted dozens of universities and private companies over the past two years to steal military-related maritime technology.<sup>50</sup>

Each cyberattack, each espionage operation, each export control violation is "part of an overall economic policy of developing China at American expense" and "stealing our firepower and the fruits of our brainpower," in the words of Assistant Attorney General for National Security John Demers.<sup>51</sup>

Beijing's strategy is to weaken U.S. geopolitical and military capabilities and advance its own by using all means available including cyberattacks to undermine the defense industrial base and the broader U.S. economy from which America draws its strength. "U.S. military superiority since World War II has relied on both U.S. economic scale and technological superiority," a January 2018 DOD study concluded.<sup>52</sup>

Washington should never send its soldiers into a fair fight. Our adversaries agree, so they are trying to defeat our weapons systems and undermine our military capabilities before we realize that we are already at war. Belatedly, the U.S. military and intelligence communities are starting to take notice. For example:

- In its annual report to Congress on China's military capabilities, the Pentagon has warned that Beijing uses its cyber capabilities to "exfiltrate sensitive information from the [defense industrial base]" which in turn "threaten[s] to erode U.S. military advantages and imperil the infrastructure and prosperity on which those advantages rely."<sup>53</sup>
- The head of FBI counterintelligence has testified similarly that China's "economic aggression, including its relentless theft of U.S. assets" through cyber and traditional means, "is positioning China to supplant [the United States] as the world's superpower."<sup>54</sup>

- The U.S. Navy reportedly has made the economic endgame of adversaries such as China even more explicit: “The systems the U.S. relies upon to mobilize, deploy and sustain forces have been extensively targeted by potential adversaries, and compromised to such extent that their reliability is questionable.”<sup>55</sup>

### **Global Trade, Rule Enforcement, and China’s Civil–Military Fusion**

As the U.S. military considers how to fight and win wars in the 21st century when it has an adversary with an economy that is quickly advancing on its own, diagnosing how Beijing’s creeping invasion of our national security industrial base could have gone unnoticed—or, perhaps worse, been noticed but not addressed—is critical.

A 2005 RAND study, for example, warned that Huawei and other ostensibly private companies are in fact merely the “public face for, sprang from, or are significantly engaged in joint research” with the Chinese military. Huawei itself “maintains deep ties with the Chinese military.”<sup>56</sup> An even earlier 2001 report in the *Far Eastern Economic Review* concluded that Huawei is “financially and politically supported by the Chinese government.”<sup>57</sup> In 2012, the House Intelligence Committee concluded that Huawei’s “assertions denying support by the Chinese government are not credible.”<sup>58</sup> Yet Western media continue to treat Huawei’s ownership as an unanswered question,<sup>59</sup> and the CIA is still trying to convince U.S. allies that Huawei receives state funding.<sup>60</sup>

We have known since that 2012 House Intelligence Committee investigation that Chinese telecommunications giant Huawei shows a “pattern of disregard” for intellectual property rights.<sup>61</sup> This state-backed, multibillion-dollar company is accused of stealing innovations from everyone from start-ups to multinational companies, yet the press was surprised that Huawei had a policy of providing bonuses to employees who stole trade secrets.<sup>62</sup>

Huawei’s theft of trade secrets is just one example of China’s persistent efforts to steal

research and development, intellectual property, and proprietary technology. In another example, China announced in 2014 that it intended to spend \$150 billion to become dominant in the semiconductor industry.<sup>63</sup> Semiconductors are critical components of all modern technology. The Semiconductor Industry Association warned that while the United States has led previous semiconductor innovations, “overseas governments are seeking to displace U.S. leadership through huge government investments in both commercial manufacturing and scientific research.”<sup>64</sup> Their efforts include stealing trade secrets from American companies that make the world’s most advanced semiconductors.

Boise, Idaho-based Micron provides as much as a quarter of the world’s Dynamic Random Access Memory (DRAM) integrated circuits, which are used in everything from personal computers to the U.S. military’s next-generation thermal weapon sights.<sup>65</sup> In 2018, the U.S. government indicted Chinese state-owned Fujian Jinhua Integrated Circuit Company for stealing Micron’s trade secrets<sup>66</sup> and added Fujian Jinhua to its Entity List, barring the export of any U.S.-origin goods to the company.<sup>67</sup> The theft began after Micron turned down an acquisition offer from a Chinese company.<sup>68</sup> Before this intellectual property theft, China did not possess DRAM technology, but instead of investing in research and development, it “conspired to circumvent Micron’s restrictions on its proprietary technology,” according to the indictment.<sup>69</sup>

Nor was this American company the only target of Chinese operations. Dutch company ASML, a global supplier to the semiconductor industry, was also the victim of commercial espionage but quickly denied any “national conspiracy.” ASML’s CEO said, “We resent any suggestion that this event should have any implication for ASML conducting business in China. Some of the individuals (involved) happened to be Chinese nationals.”<sup>70</sup>

This defensiveness is perhaps understandable given the limited recourse available to companies that are victimized by Chinese

government-supported espionage. After the Department of Justice accused Chinese military hackers of cyber-enabled espionage and trade secrets theft against U.S. Steel,<sup>71</sup> the company has tried to bring a case before the U.S. International Trade Commission against Chinese firm Baosteel for selling a high-tech steel similar to its own products, but U.S. Steel faces a problem. It is asserting that Baosteel stole proprietary technology, but the indicted hackers worked only for the Chinese military, never for Baosteel.<sup>72</sup> The global trade system and mechanism for enforcing the rules are not set up to address China's military-civil fusion.

Additionally, the U.S. legal system is not well suited to combating China's exploitation of the rules-based system for its geopolitical and military gain.<sup>73</sup> For example, instead of undergoing a Committee on Foreign Investment in the United States (CFIUS) process, which likely would have resulted in a negative review,<sup>74</sup> Chinese firm Wanxiang waited until A123 Systems went bankrupt and purchased the company's technology for fast-charging lithium-ion batteries.<sup>75</sup> When high-end microchip producer ATopTech went bankrupt, Chinese firm Avatar Integrated Systems used the judicial system to block U.S. competitor Synopsys from raising CFIUS concerns<sup>76</sup> and purchased ATopTech's technology.<sup>77</sup>

The bankruptcy process is not the only area in which China has figured out how to maneuver around the CFIUS process. The U.S.-China Economic and Security Review Commission warned in a May 2019 report that CFIUS and export control regulations "have been unable to adequately assess and address the risks of increased technology transfers to China." As a result, China has been able "to pursue investments in critical U.S. technologies that could jeopardize U.S. technological innovation and national security."<sup>78</sup>

China participates in more than 10 percent of all venture capital deals in the United States and in 2015 alone invested \$11.5 billion in early-stage technology deals.<sup>79</sup> Investments in emerging technology, including artificial intelligence, augmented reality/virtual reality,

robotics, and financial technology, represent about 40 percent of China's overall investments.<sup>80</sup> Put succinctly, because innovation occurs in the private sector, "state competitors and non-state actors will also have access to them, a fact that risks eroding the conventional overmatch to which our Nation has grown accustomed," as the National Defense Strategy recognized.<sup>81</sup>

Meanwhile, Beijing requires foreign companies interested in selling into the Chinese market to form joint ventures with local firms and uses "the administrative licensing and approvals process to require or pressure the transfer of technology" from foreign firms to their Chinese counterparts, according to an in-depth U.S. Trade Representative study of China's unfair trade policies.<sup>82</sup> The American Chamber of Commerce in China has similarly warned that Chinese government authorities often demand "unnecessary disclosure" of confidential technological and other information.<sup>83</sup> European companies report feeling similarly compelled to give away critical technology to gain access to the Chinese market.<sup>84</sup>

In short, China uses all means to acquire sensitive, national security-related technology at the expense of America's economy and military capabilities. China uses illegal means like industrial and cyber espionage and forcible technology transfers as well as legal ones like strategic investment.<sup>85</sup>

As the United States considers how these economic battle campaigns could affect the outcome of military engagements, it is wise to consider that World War II could have ended differently had such adversarial practices been in place at that time. General Dwight Eisenhower attributed U.S. victory to Andrew Jackson Higgins, a small-boat builder who adapted his shallow-draft boat designs to fulfill the U.S. military's request for a small vessel that could transport both troops and vehicles from ships to the beach.<sup>86</sup> Higgins's story is a combination of individual ingenuity and the American military's ability to gain an advantage over the adversary by deploying next-generation weaponry and matériel onto the battlefield.

- What would have happened if the Axis Powers had stolen Higgins's boat designs before he could get his product into the hands of the U.S. military?
- What would have happened if, when he applied for his patent, Japanese government-affiliated entities had beaten him to the punch and filed a patent using designs they had stolen?
- What if, during the interwar period, Higgins had decided to sell into the European market but had been forced to form a joint venture with German firms and transfer critical technology to a government the U.S. would soon face on the battlefield?

Controlling the data of the battlefield is akin to controlling the commanding heights. With such control, one can see the gathering armies, their supply lines, and their points of weakness. China is engaged in “eco-political terraforming” to achieve such a position by planting its equipment throughout the global infrastructure and then leveraging that equipment to gather, manipulate, or otherwise control the vast amounts of data moving through the system.

The import of the Huawei issue is the import of the future of high-speed bidirectional data transmission, which is critical for the functioning of a modern military and a modern economy. With an estimated 75 billion devices connected to the Internet by 2025, who controls the telecommunications architecture and infrastructure ultimately can control the data those devices carry. The road that is being built to carry that data is 5G, and the U.S. government does not wish to see those personal, consumer, technological, and military data travelling that road to Beijing.

Yes, the build-out of 5G infrastructure is ideal for China's eco-political terraforming strategy.

### **Building a Secure Infrastructure for National Security Data Transmission**

With a challenge as large as the one presented by China's eco-political terraforming,

the solutions to the problem of preserving U.S. military superiority necessarily come from all corners of the government. While the “whole of government” mantra sounds nice, it has become synonymous with “whole of little.” The battlefield of the 21st century will truly demand a more unified approach.

Fifteen years after the United States unleashed its financial furies against its adversaries, Congress added the Secretary of the Treasury as a statutory member of the National Security Council,<sup>87</sup> but battles of the latter half of the 20th century and the beginning of the 21st have not taught policymakers the importance of other elements of the U.S. government like the Department of Commerce and the Federal Communications Commission (FCC). These agencies and others will be central to Washington's ability to defend its economic, defense, and overall national security interests against its adversaries' campaigns.

In May 2019, for example, the FCC rejected an application by state-owned China Mobile to provide international service for U.S. callers,<sup>88</sup> citing a recommendation from the Commerce Department to deny the application because of national security and law enforcement concerns.<sup>89</sup> The FCC also issued a proposed rule banning the use of federal funds by local municipalities to purchase equipment from “companies that pose a national security threat to United States communications networks or the communications supply chain.”<sup>90</sup> The FCC is awaiting input from the Commerce Department with respect to which companies would fit the ban's criteria.<sup>91</sup> The Commerce Department, for its part, is attempting to define emerging technologies and introduce export controls to prevent the sale of these technologies to adversaries.<sup>92</sup>

Most recently, the President issued an executive order banning all U.S. persons from purchasing information communication technology from firms controlled by a foreign adversary and deemed to pose “an unacceptable risk to the national security of the United States or the security and safety of United States persons.”<sup>93</sup> The executive order itself does not

name specific companies and technologies and does not mention U.S. adversaries by name, but it is widely seen as addressing Chinese technology companies in general and Huawei in particular.<sup>94</sup> To emphasize this point, on the same day, the Commerce Department added Huawei to its Entity List.<sup>95</sup>

Federal agencies, meanwhile, are working with U.S. allies to create lists of trusted suppliers in an effort to cultivate viable alternatives to Chinese products. As Department of Homeland Security Cybersecurity and Infrastructure Security Agency Director Christopher Krebs has testified, allied coordination would “drive the dynamics that could move the market” to address “China’s predatory industrial policy approach.”<sup>96</sup>

Coordination creates market incentives for companies to innovate and create more secure products. Without these incentives, U.S. companies might not be able to compete with Chinese firms’ discounted prices and thus not be able to convert innovation into commercial success and commercial success back into additional innovation, which in turn would leave the U.S. at a disadvantage across a broad range of security interests. The Prague 5G summit in May 2019, for example, set out a nonbinding but common approach to ensuring that 5G decisions consider not only economic, but also national security concerns.<sup>97</sup> More broadly, a consortium of likeminded nations that identifies both trusted vendors and the companies and technology that pose risks to critical infrastructure and communications systems would protect the integrity of networks and data on which the U.S. and allied military capabilities depend.

## Conclusion

The U.S. government’s recognition that the private sector is a conduit through which adversaries conduct cyber-enabled economic warfare and other cyberattacks<sup>98</sup> and that the future information and communications infrastructure must therefore have security at its core is welcome but insufficient. Without robust defense and concerted counteroffensive investments, hostile adversaries will rapidly erode our military and political strength.

The United States is now in a peer competition, and if our adversaries are embedded in both our publicly and privately owned and operated critical infrastructure, the U.S. military cannot fully trust its warfighting capability. Mutually Assured Destruction was a central tenet of Cold War deterrence in the nuclear age. Much is now being written about how to achieve deterrence in a cyber-enabled world.<sup>99</sup> If the U.S. is to maintain the advantage over adversaries who try to undermine our ability to trust our own systems, and if it is to eliminate or mitigate vulnerabilities to such attacks, perhaps the adversary must also be skeptical of the integrity of his own weapons and communications systems. Call it Mutually Assured Military Standoff if you will.

In any event, it is abundantly clear that competition—and outright conflict if and when it occurs—between great powers will incorporate the full range of tools available to major states, including economic and cyber measures that directly attack both the military’s might and the citizenry’s willpower. To ensure its standing as the world’s largest free-market democracy, the U.S. must not only recognize the importance of the economy to our ability to defend ourselves, but also take the necessary steps to prepare for this domain of 21st century state warfare.

## Endnotes

1. Mark Cartwright, "Peloponnesian War," *Ancient History Encyclopedia*, May 2, 2018, [https://www.ancient.eu/Peloponnesian\\_War/](https://www.ancient.eu/Peloponnesian_War/) (accessed June 12, 2019), and "Peloponnesian War," *Encyclopaedia Britannica*, <https://www.britannica.com/event/Peloponnesian-War> (accessed June 12, 2019).
2. "Blockades—Development of the Law," American Foreign Relations, <https://www.americanforeignrelations.com/A-D/Blockades-Development-of-the-law.html> (accessed June 12, 2019), and Frank J. Merli and Robert H. Ferrell, "Blockades," in *Encyclopedia of American Foreign Policy*, 2nd ed., Vol. 1, Chronology A–D, ed. Alexander DeConde, Richard Dean Burns, Frederick Logevall, and Louise B. Ketz (New York: Charles Scribner's Sons, 2002), pp. 171–184, <http://1.droppdf.com/files/X3CPy/encyclopedia-of-american-foreign-policy.pdf> (accessed June 12, 2019).
3. "From George Washington to the United States Senate and House of Representatives, 8 January 1790," National Archives, *Founders Online*, <https://founders.archives.gov/documents/Washington/05-04-02-0361> (accessed June 12, 2019).
4. "10 Facts About the 18th Century Patents," George Washington's Mount Vernon, <https://www.mountvernon.org/george-washington/the-first-president/patents/> (accessed June 12, 2019).
5. Ben Baack, "The Economics of the American Revolutionary War," Economic History Association, EH.Net, <https://eh.net/encyclopedia/the-economics-of-the-american-revolutionary-war-2/> (accessed June 12, 2019).
6. "Alexander Hamilton's Final Version of the Report on the Subject of Manufactures, [5 December 1791]," National Archives, *Founders Online*, <https://founders.archives.gov/documents/Hamilton/01-10-02-0001-0007#ARHN-01-10-02-0001-0007-fn-0123> (accessed June 12, 2019).
7. Michael Hsieh, "Intellectual Property Piracy as Economic Privateering," in *Cyber-Enabled Economic Warfare: An Evolving Challenge*, ed. Samantha F. Ravich (Washington: Hudson Institute, 2016), pp. 73–92, <https://s3.amazonaws.com/media.hudson.org/files/publications/2015.08CyberEnabledEconomicWarfareAnEvolvingChallenge.pdf> (accessed June 12, 2019).
8. Nicholas A. Lambert, *Planning Armageddon: British Economic Warfare and the First World War* (Cambridge, MA: Harvard University Press, 2012), p. 124, <http://the-eye.eu/public/concen.org/Nicholas%20A.%20Lambert%20-%20Planning%20Armageddon%20-%20British%20Economic%20Warfare%20and%20the%20First%20World%20War%20-%20pdf%20%5BTKR%5D/Nicholas%20A.%20Lambert%20-%20Planning%20Armageddon%20-%20British%20Economic%20Warfare%20and%20the%20First%20World%20War%20-%20pdf%20%5BTKR%5D.pdf> (accessed July 19, 2019).
9. Quoted in W. N. Medlicott, *The Economic Blockade*, Vol. 1 (London: His Majesty's Stationery Office and Longmans, Green and Co., 1952), p. 1, [https://archive.org/stream/economicblockade012328mbp/economicblockade012328mbp\\_djvu.txt](https://archive.org/stream/economicblockade012328mbp/economicblockade012328mbp_djvu.txt) (accessed June 13, 2019).
10. Daniel Yergin, "Blood and Oil: Why Japan Attacked Pearl," *The Washington Post*, December 1, 1991, [https://www.washingtonpost.com/archive/opinions/1991/12/01/blood-and-oil-why-japan-attacked-pearl/1238a2e3-6055-4d73-817d-baf67d3a9db8/?utm\\_term=.bcbd1805075d](https://www.washingtonpost.com/archive/opinions/1991/12/01/blood-and-oil-why-japan-attacked-pearl/1238a2e3-6055-4d73-817d-baf67d3a9db8/?utm_term=.bcbd1805075d) (accessed June 13, 2019).
11. Juan C. Zarate, *Treasury's War: The Unleashing of a New Era of Financial Warfare* (New York: Public Affairs, 2013), p. 240.
12. *Ibid.*, p. 244.
13. Victor Cha, *The Impossible State: North Korea, Past and Future* (New York: HarperCollins, 2013), p. 266.
14. William J. Burns, Under Secretary for Political Affairs, U.S. Department of State, testimony in hearing, *Implementing Tougher Sanctions on Iran: A Progress Report*, Committee on Foreign Affairs, U.S. House of Representatives, 111th Cong., 2nd Sess., December 1, 2010, p. 14, <https://www.govinfo.gov/content/pkg/CHRG-111hrg62665/pdf/CHRG-111hrg62665.pdf> (accessed June 13, 2019).
15. Figure 7, "Sentiment Stagnated in Late 2014/Early 2015 But at Much Improved Levels from 2012/2013 (Red Line = Sentiment)," in Mark Dubowitz, Annie Fixler, and Rachel Ziemba, "Iran's Economic Resilience Against Snapback Sanctions Will Grow Over Time," Foundation for Defense of Democracies, Center on Sanctions and Illicit Finance, and Roubini Global Economics, June 2015, p. 13, [https://s3.us-east-2.amazonaws.com/defenddemocracy/uploads/publications/Iran\\_economy\\_resilience\\_against\\_snapback\\_sanctions.pdf](https://s3.us-east-2.amazonaws.com/defenddemocracy/uploads/publications/Iran_economy_resilience_against_snapback_sanctions.pdf) (accessed June 13, 2019).
16. Genevieve Abdo and Firas Maksad, "Evidence Trump's Iran Policy Is Working," *New York Daily News*, May 2, 2019, <https://www.nydailynews.com/opinion/ny-oped-evidence-trumps-iran-policy-is-working-20190502-xwjyle54rbed5jcounqz5d4tjm-story.html> (accessed June 13, 2019).
17. Saeed Ghasseminejad, "Inflation in Iran Is on the Rise," Foundation for Defense of Democracies *Policy Brief*, April 30, 2019, <https://www.fdd.org/analysis/2019/04/30/inflation-in-iran-is-on-the-rise/> (accessed June 13, 2019).
18. Mark Dubowitz, "Midterm Assessment: Iran," Foundation for Defense of Democracies, January 21, 2019, <https://www.fdd.org/analysis/2019/01/31/midterm-assessment-iran/> (accessed June 13, 2019).



19. Table 2.4.2, "Middle East and North Africa Economy Forecasts," in World Bank Group, *Global Economic Prospects: The Turning of the Tide?*, June 2018, p. 136, <http://pubdocs.worldbank.org/en/731741526414103878/Global-Economic-Prospects-June-2018-Middle-East-and-North-Africa-analysis.pdf> (accessed June 13, 2019), and Table 2.4.2, "Middle East and North Africa Economy Forecasts," in World Bank Group, *Global Economic Prospects: Darkening Skies*, January 2019, p. 94, <http://pubdocs.worldbank.org/en/478341542818395087/Global-Economic-Prospects-Jan-2019-Middle-East-and-North-Africa-analysis.pdf> (accessed June 13, 2019).
20. Fact Sheet, "Advancing the U.S. Maximum Pressure Campaign on Iran," U.S. Department of State, April 22, 2019, <https://www.state.gov/advancing-the-u-s-maximum-pressure-campaign-on-iran/> (accessed June 13, 2019).
21. Liz Sly and Suzan Haidamous, "Trump's Sanctions on Iran Are Hitting Hezbollah, and It Hurts," *The Washington Post*, May 18, 2019, [https://www.washingtonpost.com/world/middle\\_east/trumps-sanctions-on-iran-are-hitting-hezbollah-hard/2019/05/18/970bc656-5d48-11e9-98d4-844088d135f2\\_story.html?utm\\_term=.61f2c6117eb2](https://www.washingtonpost.com/world/middle_east/trumps-sanctions-on-iran-are-hitting-hezbollah-hard/2019/05/18/970bc656-5d48-11e9-98d4-844088d135f2_story.html?utm_term=.61f2c6117eb2) (accessed June 13, 2019).
22. Ben Hubbard, "Iran's Allies Feel the Pain of American Sanctions," *The New York Times*, March 28, 2019, <https://www.nytimes.com/2019/03/28/world/middleeast/iran-sanctions-arab-allies.html> (accessed June 13, 2019).
23. Abstract of Charles Wolf, Jr., "Future Directions for Analysis of the Soviet Economy," RAND Corporation *Paper*, 1984, <https://www.rand.org/pubs/papers/P7040.html> (accessed June 13, 2019).
24. Glenn E. Curtis, ed., *Russia: A Country Study*, Library of Congress, Federal Research Division, Area Handbook Series, 1998, <https://cdn.loc.gov/master/frd/frdcstdy/ru/russiacountrystu00curt/russiacountrystu00curt.pdf> (accessed June 13, 2019).
25. Charles Wolf, Jr., and Steven W. Popper, eds., *Defense and the Soviet Economy: Military Muscle and Economic Weakness* (Santa Monica: RAND Corporation, 1992), p. 6, <https://www.rand.org/content/dam/rand/pubs/notes/2007/N3474.pdf> (accessed June 13, 2019).
26. Chris C. Carvounis and Brinda Z. Carvounis, "Economic Competition and Cooperation Between the Soviet Union and the United States in Less-Developed Countries," *Business Economics*, Vol. 25, No. 1 (January 1990), pp. 36–41.
27. Fortune 500, "1980 Full List," [http://archive.fortune.com/magazines/fortune/fortune500\\_archive/full/1980/](http://archive.fortune.com/magazines/fortune/fortune500_archive/full/1980/) (accessed June 13, 2019).
28. Christopher Ashley Ford, Assistant Secretary, Bureau of International Security and Nonproliferation, "Chinese Technology Transfer Challenges to U.S. Export Control Policy," remarks delivered to the Center for Strategic and International Studies Project on Nuclear Issues, Los Alamos, New Mexico, July 11, 2018, <https://www.state.gov/remarks-and-releases-bureau-of-international-security-and-nonproliferation/chinese-technology-transfer-challenges-to-u-s-export-control-policy/> (accessed July 18, 2019).
29. Mark Pomerleau, "Is the Defense Department's Entire Vision of Cybersecurity Wrong?" *Fifth Domain*, November 14, 2018, <https://www.fifthdomain.com/dod/2018/11/14/is-the-defense-departments-entire-vision-of-cybersecurity-wrong/> (accessed June 13, 2019).
30. World Bank Group, "China at-a-Glance: Overview," last updated April 8, 2019, <https://www.worldbank.org/en/country/china/overview> (accessed June 13, 2019).
31. Ibid.
32. Salvatore Babones, "China's Economy: Not So Big After All," *The National Interest*, March 12, 2019, <https://nationalinterest.org/feature/chinas-economy-not-so-big-after-all-46887> (accessed June 13, 2019).
33. Samantha F. Ravich and Annie Fixler, "Framework and Terminology for Understanding Cyber-Enabled Economic Warfare," Foundation for Defense of Democracies, Center on Sanctions and Illicit Finance *Resource Document*, February 22, 2017, [https://s3.us-east-2.amazonaws.com/defenddemocracy/uploads/documents/MEMO\\_CyberDefinitions\\_07.pdf](https://s3.us-east-2.amazonaws.com/defenddemocracy/uploads/documents/MEMO_CyberDefinitions_07.pdf) (accessed June 13, 2019).
34. Simon Atkinson, "Is China Retaliating Against Lotte Missile Deal?" BBC News, March 6, 2017, <http://www.bbc.com/news/business-39176388> (accessed June 13, 2019); Joyce Lee and Adam Jourdan, "South Korea's Lotte Reports Store Closures in China amid Political Stand-off," Reuters, March 5, 2017, <https://www.reuters.com/article/us-southkorea-china-lotte/south-koreas-lotte-says-four-retail-stores-in-china-closed-after-inspections-idUSKBN16D03U> (accessed June 13, 2019); and Bill Ide, "Chinese Media Call for Boycott of South Korean Goods," Voice of America, March 2, 2017, <https://www.voanews.com/a/chinese-media-call-for-boycott-of-south-korean-goods/3746701.html> (accessed June 13, 2019).
35. David Josef Volodzko, "China Wins Its War Against South Korea's US THAAD Missile Shield—Without Firing a Shot," *South China Morning Post*, November 18, 2017, <https://www.scmp.com/week-asia/geopolitics/article/2120452/china-wins-its-war-against-south-koreas-us-thaad-missile> (accessed June 13, 2019).
36. Zack Cooper, "Understanding the Chinese Communist Party's Approach to Cyber-Enabled Economic Warfare," Foundation for Defense of Democracies, September 2018, [https://s3.us-east-2.amazonaws.com/defenddemocracy/uploads/documents/REPORT\\_China\\_CEEW.pdf](https://s3.us-east-2.amazonaws.com/defenddemocracy/uploads/documents/REPORT_China_CEEW.pdf) (accessed June 13, 2019), and U.S. Department of Defense, Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2017*, May 15, 2017, pp. 59–60, [https://www.defense.gov/Portals/1/Documents/pubs/2017\\_China\\_Military\\_Power\\_Report.PDF](https://www.defense.gov/Portals/1/Documents/pubs/2017_China_Military_Power_Report.PDF) (accessed June 13, 2019).

37. John C. Demers, Assistant Attorney General, National Security Division, U.S. Department of Justice, statement before the Committee on the Judiciary, United States Senate, for a hearing on “China’s Non-Traditional Espionage Against the United States: The Threat and Potential Policy Responses,” December 12, 2018, p. 5, <https://www.judiciary.senate.gov/imo/media/doc/12-12-18%20Demers%20Testimony.pdf> (accessed June 13, 2019).
38. Press release, “Chinese Intelligence Officers and Their Recruited Hackers and Insiders Conspired to Steal Sensitive Commercial Aviation and Technological Data for Years,” U.S. Department of Justice, October 30, 2018, <https://www.justice.gov/opa/pr/chinese-intelligence-officers-and-their-recruited-hackers-and-insiders-conspired-steal> (accessed June 13, 2019).
39. Commission on the Theft of American Intellectual Property, *Update to the IP Commission Report: The Theft of American Intellectual Property: Reassessments of the Challenge and United States Policy*, National Bureau of Asian Research, February 2017, p. 7, [http://www.ipcommission.org/report/IP\\_Commission\\_Report\\_Update\\_2017.pdf](http://www.ipcommission.org/report/IP_Commission_Report_Update_2017.pdf) (accessed June 13, 2019). For the commission’s original report, see Commission on the Theft of American Intellectual Property, *The IP Commission Report: The Report of the Commission on the Theft of American Intellectual Property*, National Bureau of Asian Research, May 2013, [http://www.ipcommission.org/report/IP\\_Commission\\_Report\\_052213.pdf](http://www.ipcommission.org/report/IP_Commission_Report_052213.pdf) (accessed June 13, 2019).
40. U.S. International Trade Commission, *China: Effects of Intellectual Property Infringement and Indigenous Innovation Policies on the U.S. Economy*, Investigation No. 332-519, May 2011, pp. xviii–xx, <https://www.usitc.gov/publications/332/pub4226.pdf> (accessed June 13, 2019).
41. Press release, “Chinese Company Sinovel Wind Group Convicted of Theft of Trade Secrets,” U.S. Department of Justice, January 24, 2018, <https://www.justice.gov/opa/pr/chinese-company-sinovel-wind-group-convicted-theft-trade-secrets> (accessed June 13, 2019).
42. Lorand Laskai, “Civil–Military Fusion and the PLA’s Pursuit of Dominance in Emerging Technologies,” *The Jamestown Foundation China Brief*, Vol. 18, Issue 6 (April 9, 2018), <https://jamestown.org/program/civil-military-fusion-and-the-plas-pursuit-of-dominance-in-emerging-technologies/> (accessed June 13, 2019).
43. Xinhua, “Xi Calls for Deepened Military–Civil Integration,” March 12, 2018, [http://www.xinhuanet.com/english/2018-03/12/c\\_137034168.htm](http://www.xinhuanet.com/english/2018-03/12/c_137034168.htm) (accessed June 13, 2019).
44. Michael Brown and Pavneet Singh, “China’s Technology Transfer Strategy: How Chinese Investments in Emerging Technology Enable a Strategic Competitor to Access the Crown Jewels of U.S. Innovation,” Defense Innovation Unit Experimental, January 2018, p. 3, [https://admin.govexec.com/media/diux\\_chinatechnologytransferstudy\\_jan\\_2018\\_\(1\).pdf](https://admin.govexec.com/media/diux_chinatechnologytransferstudy_jan_2018_(1).pdf) (accessed June 13, 2019).
45. U.S. Department of Defense, Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People’s Republic of China 2019*, May 2, 2019, pp. 101–102, [https://media.defense.gov/2019/May/02/2002127082/-1/-1/1/2019\\_CHINA\\_MILITARY\\_POWER\\_REPORT.pdf](https://media.defense.gov/2019/May/02/2002127082/-1/-1/1/2019_CHINA_MILITARY_POWER_REPORT.pdf) (accessed June 13, 2019).
46. Nicholas Eftimiades, “Uncovering Chinese Espionage in the US,” *The Diplomat*, November 28, 2018, <https://thediplomat.com/2018/11/uncovering-chinese-espionage-in-the-us/> (accessed June 13, 2019).
47. Cooper, “Understanding the Chinese Communist Party’s Approach to Cyber-enabled Economic Warfare,” p. 19; Office of the National Counterintelligence Executive, *Foreign Spies Stealing US Economic Secrets in Cyberspace: Report to Congress on Foreign Economic Collection and Industrial Espionage, 2009–2011*, October 2011, [https://www.dni.gov/files/documents/Newsroom/Reports%20and%20Pubs/20111103\\_report\\_fecie.pdf](https://www.dni.gov/files/documents/Newsroom/Reports%20and%20Pubs/20111103_report_fecie.pdf) (accessed June 13, 2019); and Executive Office of the President, Office of the United States Trade Representative, *Findings of the Investigation into China’s Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation Under Section 301 of The Trade Act of 1974*, March 22, 2018, pp. 167–168, <https://ustr.gov/sites/default/files/Section%20301%20FINAL.PDF> (accessed June 13, 2019).
48. Laura Sullivan and Cat Schuknecht, “As China Hacked, U.S. Businesses Turned a Blind Eye,” NPR, April 12, 2019, <https://www.npr.org/2019/04/12/711779130/as-china-hacked-u-s-businesses-turned-a-blind-eye> (accessed June 13, 2019).
49. Press release, “Chinese Intelligence Officers and Their Recruited Hackers and Insiders Conspired to Steal Sensitive Commercial Aviation and Technological Data for Years.”
50. Dustin Volz, “Chinese Hackers Target Universities in Pursuit of Maritime Military Secrets,” *The Wall Street Journal*, updated March 5, 2019, <https://www.wsj.com/articles/chinese-hackers-target-universities-in-pursuit-of-maritime-military-secrets-11551781800> (accessed June 13, 2019), and Gordon Lubold and Dustin Volz, “Chinese Hackers Breach U.S. Navy Contractors,” *The Wall Street Journal*, updated December 14, 2018, [https://www.wsj.com/articles/u-s-navy-is-struggling-to-fend-off-chinese-hackers-officials-say-11544783401?mod=article\\_inline](https://www.wsj.com/articles/u-s-navy-is-struggling-to-fend-off-chinese-hackers-officials-say-11544783401?mod=article_inline) (accessed June 13, 2019).
51. Press release, “Chinese Intelligence Officer Charged with Economic Espionage Involving Theft of Trade Secrets from Leading U.S. Aviation Companies,” U.S. Department of Justice, October 10, 2018, <https://www.justice.gov/opa/pr/chinese-intelligence-officer-charged-economic-espionage-involving-theft-trade-secrets-leading> (accessed June 13, 2019).
52. Brown and Singh, “China’s Technology Transfer Strategy,” p. 2.

53. U.S. Department of Defense, Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2019*, p. 65.
54. Ellen Nakashima, "Top FBI Official Warns of Strategic Threat from China Through Economic and Other Forms of Espionage," *The Washington Post*, December 12, 2018, [https://www.washingtonpost.com/world/national-security/top-fbi-official-warns-of-strategic-threat-from-china-through-economic-and-other-forms-of-espionage/2018/12/12/38067ee2-fe36-11e8-83c0-b06139e540e5\\_story.html?utm\\_term=.1996dd45ec2c](https://www.washingtonpost.com/world/national-security/top-fbi-official-warns-of-strategic-threat-from-china-through-economic-and-other-forms-of-espionage/2018/12/12/38067ee2-fe36-11e8-83c0-b06139e540e5_story.html?utm_term=.1996dd45ec2c) (accessed June 13, 2019).
55. Jason Miller, "Why the Navy Is Giving Agencies, Industry a Much-Needed Wake-up Call on Supply Chain Risks," Federal News Network, April 4, 2019, <https://federalnewsnetwork.com/acquisition/2019/04/navy-giving-agencies-industry-much-needed-wake-up-call-on-supply-chain-risks/> (accessed June 13, 2019).
56. Evan S. Medeiros, Roger Cliff, Keith Crane, and James C. Mulvenon, *A New Direction for China's Defense Industry* (Santa Monica: RAND Corporation, Project Air Force, 2005), pp. 217–218, [https://www.rand.org/content/dam/rand/pubs/monographs/2005/RAND\\_MG334.pdf](https://www.rand.org/content/dam/rand/pubs/monographs/2005/RAND_MG334.pdf) (accessed June 13, 2019).
57. Bruce Gilley, "Huawei's Fixed Line to Beijing," *Far Eastern Economic Review*, December 28, 2000–January 4, 2001, p. 94, [http://www.web.pdx.edu/~gilleyb/Huawei\\_FEER28Dec2000.pdf](http://www.web.pdx.edu/~gilleyb/Huawei_FEER28Dec2000.pdf) (accessed June 13, 2019).
58. Chairman Mike Rogers and Ranking Member C. A. Dutch Ruppersberger, *Investigative Report on the U.S. National Security Issues Posed by Chinese Telecommunications Companies Huawei and ZTE*, Permanent Select Committee on Intelligence, U.S. House of Representatives, 112th Cong., October 8, 2012, p. 21, [https://republicans-intelligence.house.gov/sites/intelligence.house.gov/files/documents/huawei-zte%20investigative%20report%20\(final\).pdf](https://republicans-intelligence.house.gov/sites/intelligence.house.gov/files/documents/huawei-zte%20investigative%20report%20(final).pdf) (accessed June 13, 2019).
59. Raymond Zhong, "Who Owns Huawei? The Company Tried to Explain. It Got Complicated," *The New York Times*, April 25, 2019, <https://www.nytimes.com/2019/04/25/technology/who-owns-huawei.html> (accessed June 13, 2019).
60. Lucy Fisher and Michael Evans, "CIA Warning over Huawei," *The Times*, April 20, 2019, <https://www.thetimes.co.uk/edition/news/cia-warning-over-huawei-rz6xc8kzk> (accessed June 13, 2019).
61. Rogers and Ruppersberger, *Investigative Report on the U.S. National Security Issues Posed by Chinese Telecommunications Companies Huawei and ZTE*, p. 31.
62. Erik Schatzker, "Huawei Sting Offers Rare Glimpse of the U.S. Targeting a Chinese Giant," *Bloomberg Businessweek*, February 4, 2019, <https://www.bloomberg.com/news/features/2019-02-04/huawei-sting-offers-rare-glimpse-of-u-s-targeting-chinese-giant> (accessed June 13, 2019), and Laurel Wamsley, "A Robot Named 'Tappy': Huawei Conspired to Steal T-Mobile's Trade Secrets, Says DOJ," NPR, January 29, 2019, <https://www.npr.org/2019/01/29/689663720/a-robot-named-tappy-huawei-conspired-to-steal-t-mobile-s-trade-secrets-says-doj> (accessed June 13, 2019).
63. U.S. Department of Commerce, "U.S. Secretary of Commerce Delivers Major Policy Address on Semiconductors at Center for Strategic and International Studies," remarks as prepared for delivery, November 2, 2016, <https://2014-2017.commerce.gov/news/secretary-speeches/2016/11/us-secretary-commerce-penny-pritzker-delivers-major-policy-address.html> (accessed July 23, 2019). See also Clay Chandler, "Why China Is Emerging as a Tech Superpower to Rival the U.S.," *Fortune*, November 21, 2017, <http://fortune.com/2017/11/21/china-innovation-dji/> (accessed June 13, 2019).
64. Semiconductor Industry Association, "Winning the Future: A Blueprint for Sustained U.S. Leadership in Semiconductor Technology," April 2019, p. 3, <https://www.semiconductors.org/wp-content/uploads/2019/04/FINAL-SIA-Blueprint-for-web.pdf> (accessed June 13, 2019).
65. Alan Rappeport, "U.S. to Block Sales to Chinese Tech Company over Security Concerns," *The New York Times*, October 29, 2018, <https://www.nytimes.com/2018/10/29/us/politics/fujian-jinhua-china-sales.html> (accessed June 13, 2019).
66. Press release, "PRC State-Owned Company, Taiwan Company, and Three Individuals Charged with Economic Espionage," U.S. Department of Justice, November 1, 2018, <https://www.justice.gov/opa/pr/prc-state-owned-company-taiwan-company-and-three-individuals-charged-economic-espionage> (accessed June 13, 2019).
67. Press release, "Addition of Fujian Jinhua Integrated Circuit Company, Ltd (Jinhua) to the Entity List," U.S. Department of Commerce, October 29, 2018, <https://www.commerce.gov/news/press-releases/2018/10/addition-fujian-jinhua-integrated-circuit-company-ltd-jinhua-entity-list> (accessed June 14, 2019).
68. Paul Mozur, "Inside a Heist of American Chip Designs, as China Bids for Tech Power," *The New York Times*, June 22, 2018, <https://www.nytimes.com/2018/06/22/technology/china-micron-chips-theft.html?module=inline> (accessed June 14, 2019).
69. David Ignatius, "America's Overt Payback for China's Covert Espionage," RealClearPolitics, November 16, 2018, [https://www.realclearpolitics.com/articles/2018/11/16/americas\\_overt\\_payback\\_for\\_chinas\\_covert\\_espionage\\_138675.html](https://www.realclearpolitics.com/articles/2018/11/16/americas_overt_payback_for_chinas_covert_espionage_138675.html) (accessed June 14, 2019).

70. Toby Sterling and Anthony Deutsch, "ASML Says It Suffered Intellectual Property Theft, Rejects 'Chinese' Label," Reuters, April 11, 2019, <https://www.reuters.com/article/us-asml-china-spying/asml-falls-victim-to-corporate-theft-plays-down-impact-idUSKCNIRN0DK> (accessed June 14, 2019).
71. Press release, "U.S. Charges Five Chinese Military Hackers for Cyber Espionage Against U.S. Corporations and a Labor Organization for Commercial Advantage," U.S. Department of Justice, May 19, 2014, <https://www.justice.gov/opa/pr/us-charges-five-chinese-military-hackers-cyber-espionage-against-us-corporations-and-labor> (accessed June 14, 2019).
72. Kevin L. Kearns, "U.S. Steel's Costly Battle Against China's Cyber-Hacking," *The Hill*, March 13, 2017, <https://thehill.com/blogs/pundits-blog/technology/323738-us-steels-costly-battle-against-chinas-cyber-hacking> (accessed June 14, 2019).
73. Camille A. Stewart, "Full Court Press: Preventing Foreign Adversaries from Exfiltrating National Security Technologies Through Bankruptcy Proceedings," *Journal of National Security Law & Policy*, forthcoming 2019.
74. Patrick Fitzgerald, Mike Ramsey, Mike Spector, and Ryan Tracy, "Battery Maker Files for Bankruptcy," *The Wall Street Journal*, updated October 16, 2012, <https://www.wsj.com/articles/SB10000872396390443854204578060433271656440> (accessed June 14, 2019).
75. Brad Plumer, "A123 Systems Files for Bankruptcy: Here's What You Need to Know," *The Washington Post*, October 16, 2012, [https://www.washingtonpost.com/news/wonk/wp/2012/10/16/a123-systems-files-for-bankruptcy-heres-what-you-need-to-know/?utm\\_term=.9f05ef7e3b60](https://www.washingtonpost.com/news/wonk/wp/2012/10/16/a123-systems-files-for-bankruptcy-heres-what-you-need-to-know/?utm_term=.9f05ef7e3b60) (accessed June 14, 2019); Charles Ridley, "China's Wanxiang Wins Auction for A123," CNN, December 10, 2012, <https://money.cnn.com/2012/12/10/news/wanxiang-a123-auction/index.html> (accessed June 14, 2019); and Tom Hals and Ben Klayman, "Chinese Firm Wins A123 Despite U.S. Tech Transfer Fears," Reuters, January 29, 2013, <https://www.reuters.com/article/us-a123-wanxiang-approval/chinese-firm-wins-a123-despite-u-s-tech-transfer-fears-idUSBRE90S0JN20130129> (accessed June 14, 2019).
76. Motion of Avatar Integrated Systems, Inc. for Protective Order, United States Bankruptcy Court for the District of Delaware, In re: ATopTech, Inc., Chapter 11 Case No. 17-10111 (MFW), Ref. D.I. 275, <http://bankrupt.com/misc/deb17-10111-305.pdf> (accessed June 14, 2019).
77. Cory Bennett and Bryan Bender, "How China Acquires 'the Crown Jewels' of U.S. Technology," *Politico*, May 22, 2018, <https://www.politico.com/story/2018/05/22/china-us-tech-companies-cfius-572413> (accessed June 14, 2019), and Elsa B. Kania, "China's Threat to American Government and Private Sector Research and Innovation Leadership: Testimony before the House Permanent Select Committee on Intelligence," Center for a New American Security, July 19, 2018, <https://www.cnas.org/publications/congressional-testimony/testimony-before-the-house-permanent-select-committee-on-intelligence#fn91> (accessed June 14, 2019).
78. Sean O'Connor, "How Chinese Companies Facilitate Technology Transfer from the United States," U.S. -China Economic and Security Review Commission *Staff Research Report*, May 6, 2019, p. 3, <https://www.uscc.gov/sites/default/files/Research/How%20Chinese%20Companies%20Facilitate%20Tech%20Transfer%20from%20the%20US.pdf> (accessed June 14, 2019).
79. Brown and Singh, "China's Technology Transfer Strategy," p. 6.
80. *Ibid.*, p. 7.
81. James Mattis, Secretary of Defense, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge*, U.S. Department of Defense, p. 3, <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf> (accessed June 14, 2019).
82. Executive Office of the President, Office of the United States Trade Representative, *Findings of the Investigation into China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation Under Section 301 of The Trade Act of 1974*, p. 19.
83. Jethro Mullen, "How China Squeezes Tech Secrets from U.S. Companies," CNN, August 14, 2017, <https://money.cnn.com/2017/08/14/news/economy/trump-china-trade-intellectual-property/index.html> (accessed June 14, 2019).
84. Julie Wernau, "Forced Tech Transfers Are on the Rise in China, European Firms Say," *The Wall Street Journal*, May 20, 2019, <https://www.wsj.com/articles/forced-tech-transfers-are-on-the-rise-in-china-european-firms-say-11558344240> (accessed June 14, 2019).
85. Cooper, "Understanding the Chinese Communist Party's Approach to Cyber-Enabled Economic Warfare," p. 9.
86. David Hendee, "D-Day: 'The Boat That Won the War' Was Designed by a Nebraskan," *Omaha World Herald*, May 26, 2014, [https://www.omaha.com/news/military/d-day-the-boat-that-won-the-war-was-designed/article\\_a8d954bf-ed88-5881-8872-9090203a5569.html](https://www.omaha.com/news/military/d-day-the-boat-that-won-the-war-was-designed/article_a8d954bf-ed88-5881-8872-9090203a5569.html) (accessed June 14, 2019). See also S. 991, Andrew Jackson Higgins Gold Medal Act, 107th Cong., 1st Sess., June 6, 2001, <https://www.govinfo.gov/content/pkg/BILLS-107s991is/pdf/BILLS-107s991is.pdf> (accessed June 14, 2019).
87. H.R. 3364, Countering America's Adversaries Through Sanctions Act, Public Law 115-44, 115th Cong., August 2, 2017, § 274, <https://www.congress.gov/bill/115th-congress/house-bill/3364/text> (accessed June 14, 2019).

88. Tony Romm, "U.S. Blocks Chinese State-Owned Telecom Giant out of Security Concerns," *The Washington Post*, May 9, 2019, [https://www.washingtonpost.com/technology/2019/05/09/us-blocks-chinese-state-owned-telecom-giant-out-security-concerns-threatens-more-scrutiny/?utm\\_term=.fb9d010a9277](https://www.washingtonpost.com/technology/2019/05/09/us-blocks-chinese-state-owned-telecom-giant-out-security-concerns-threatens-more-scrutiny/?utm_term=.fb9d010a9277) (accessed June 14, 2019), and Sasha Ingber, "FCC Blocks Chinese Company's Bid for International Phone Services in the U.S.," NPR, May 9, 2019, <https://www.npr.org/2019/05/09/721772856/fcc-blocks-chinese-companys-bid-for-international-phone-services-in-the-u-s> (accessed June 14, 2019).
89. Fact sheet, "Denial of International Section 214 Authority for China Mobile International (USA) Inc.: Memorandum Opinion and Order—IBFS File No. ITC-214-20110901-00289," Federal Communications Commission, April 18, 2019, p. 5, <https://docs.fcc.gov/public/attachments/DOC-357087A1.pdf> (accessed June 14, 2019), and Ajit Pai, "Fast, Reliable, and Secure," Federal Communications Commission, April 17, 2019, <https://www.fcc.gov/news-events/blog/2019/04/17/fast-reliable-and-secure> (accessed June 14, 2019).
90. Federal Communications Commission, "Chairman Pai Statement on Proposal to Help Protect Security of U.S. Communications Networks and Their Supply Chains," March 26, 2018, [https://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2018/db0326/DOC-349894A1.pdf](https://transition.fcc.gov/Daily_Releases/Daily_Business/2018/db0326/DOC-349894A1.pdf) (accessed June 14, 2019).
91. Mariam Baksh, "FCC, in Crafting Supply-Chain Proposal, Awaits Commerce Dept. 'List of Entities' Posing National Security Threat," *Inside Cybersecurity*, May 10, 2019, <https://insidecybersecurity.com/daily-news/fcc-crafting-supply-chain-proposal-awaits-commerce-dept-list-entities-posing-national> (accessed June 14, 2019).
92. U.S. Department of Commerce, Bureau of Industry and Security, "Review of Controls for Certain Emerging Technologies," *Federal Register*, Vol. 83, No. 223 (November 19, 2018), pp. 58201–58202, <https://www.govinfo.gov/content/pkg/FR-2018-11-19/pdf/2018-25221.pdf> (accessed June 14, 2019).
93. Donald J. Trump, "Executive Order on Securing the Information and Communications Technology and Services Supply Chain," The White House, May 15, 2019 <https://www.whitehouse.gov/presidential-actions/executive-order-securing-information-communications-technology-services-supply-chain/> (accessed June 14, 2019).
94. Damian Paletta, Ellen Nakashima, and David J. Lynch, "Trump Administration Cracks Down on Giant Chinese Tech Firm, Escalating Clash with Beijing," *The Washington Post*, May 16, 2019, [https://www.washingtonpost.com/world/national-security/trump-signs-order-to-protect-us-networks-from-foreign-espionage-a-move-that-appears-to-target-china/2019/05/15/d982ec50-7727-11e9-bd25-c989555e7766\\_story.html?utm\\_term=.f3ef468f067e](https://www.washingtonpost.com/world/national-security/trump-signs-order-to-protect-us-networks-from-foreign-espionage-a-move-that-appears-to-target-china/2019/05/15/d982ec50-7727-11e9-bd25-c989555e7766_story.html?utm_term=.f3ef468f067e) (accessed June 14, 2019).
95. Press release, "Department of Commerce Announces the Addition of Huawei Technologies Co. Ltd. to the Entity List," U.S. Department of Commerce, May 15, 2019, <https://www.commerce.gov/news/press-releases/2019/05/department-commerce-announces-addition-huawei-technologies-co-ltd> (accessed June 14, 2019), and Annie Fixler and Mathew Ha, "Washington's Huawei Ban Combats Chinese Espionage Threat," *Foundation for Defense of Democracies Policy Brief*, May 16, 2019, <https://www.fdd.org/analysis/2019/05/16/washingtons-huawei-ban-combats-chinese-espionage-threat/> (accessed June 14, 2019).
96. Christopher Krebs, Director, Cybersecurity and Infrastructure Security Agency, U.S. Department of Homeland Security, statement on "5G: The Impact on National Security, Intellectual Property, and Competition" before the Committee on the Judiciary, U.S. Senate, May 14, 2019, pp. 5–6, <https://www.judiciary.senate.gov/imo/media/doc/Krebs%20Testimony.pdf> (accessed June 14, 2019).
97. "Statement from the Press Secretary," The White House, May 3, 2019, [https://www.whitehouse.gov/briefings-statements/statement-press-secretary-54/?wpisrc=nl\\_cybersecurity202&wpm=1](https://www.whitehouse.gov/briefings-statements/statement-press-secretary-54/?wpisrc=nl_cybersecurity202&wpm=1) (accessed June 14, 2019).
98. U.S. Department of Defense, *Summary: Department of Defense Cyber Strategy 2018*, p. 1, [https://media.defense.gov/2018/Sep/18/2002041658/-1/-1/1/CYBER\\_STRATEGY\\_SUMMARY\\_FINAL.PDF](https://media.defense.gov/2018/Sep/18/2002041658/-1/-1/1/CYBER_STRATEGY_SUMMARY_FINAL.PDF) (accessed June 14, 2019).
99. See, for example, U.S. Department of Defense, Defense Science Board, *Task Force on Cyber Deterrence*, February 2017, [https://www.acq.osd.mil/dsb/reports/2010s/dsb-cyberdeterrencereport\\_02-28-17\\_final.pdf](https://www.acq.osd.mil/dsb/reports/2010s/dsb-cyberdeterrencereport_02-28-17_final.pdf) (accessed June 14, 2019).



# The Competitive Advantages and Risks of Alliances

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Winston Churchill once famously quipped, “There is only one thing worse than fighting with allies, and that is fighting without them.” So it goes for the complex web of security relationships that the United States maintains with states around the globe. Alliances and partnerships between sovereign states are often exasperatingly difficult to manage; domestic politics, burden sharing, and diverging strategic considerations create friction points that threaten to collapse them altogether.<sup>2</sup>

Despite the enormous amount of time and attention that U.S. leaders devote to maintaining alliances, allies and partners often make policy choices that are at odds with U.S. foreign and national security priorities. Further, the Founders admonished us to beware of “entangling alliances” that could embroil the United States in conflicts and conflagrations that were not necessarily in our interest.<sup>3</sup> It is hardly surprising, therefore, that successive Administrations going back at least to 1949 have grumbled about equitable sharing of the security burden and have approached the topic of alliances overall with a note of ambivalence.

Yet since the end of World War II, successive Administrations have also determined that, despite these philosophical reservations and everyday frustrations, the contemporary system of U.S. alliances and cooperative security partnerships has conferred a number of strategic advantages that make the hassle worth its attendant risks. This “hub-and-spoke”

alliance system is unique in human history; it has evolved into an unprecedented set of institutions and collaborative patterns that undergird a higher degree of global stability among sovereign states than history might otherwise have predicted.<sup>4</sup>

Militarily, the system allows the United States to advance its interests, perform expeditionary operations, and “defend in depth” at considerably lower cost than would otherwise be possible. Economically, it has allowed the United States to set the rules of international trade and finance and, on balance, remain well positioned to reap the advantages of that system. In aggregate, the system of alliances and security partnerships that the United States currently leads has afforded enormous strategic advantages to both the U.S. and those states that participate in it.

## Evolution of the U.S.-Led International Security System

To understand alliances today, we need first to understand how we got here. Thucydides tells us that alliances have been an enduring feature of war and conflict for thousands of years.<sup>5</sup> Multilateral military arrangements allow states (and their historical analogues) to aggregate their capabilities and collaborate on common security challenges.

Since the signing of the Treaty of Tordesillas between Spain and Portugal in 1494—an event that some strategic scholars point to

as the beginning of the modern global system<sup>6</sup>—alliances have been formed between nation-states and their proxies in order to wage war against common adversaries. Alliances at that time were essentially agreements by European empires to combine military and economic assets in pursuit of political objectives. The European continent was the stage for many of these conflicts between states. However, colonies provided both critical resources as well as logistical bases for European capitals, and as global empires gradually expanded and grew in strategic importance, European territories around the world were drawn into supporting these alliances and were themselves made the subject of imperial competition.

The world wars during the first half of the 20th century brought the imperial system of global order crashing down. The European colonial powers no longer had the wherewithal either to maintain their global possessions or to lead the international system. As the United States became the dominant global power in the wake of those wars, it shaped the global system in a manner more consistent with its own anti-imperial values.<sup>7</sup> It did this by building its security and strategic relationships in two primary ways: through formal strategic-political institutions such as the United Nations and the North Atlantic Treaty Organization (NATO) and by working with newly sovereign states rather than by taking over the possession of colonial territories.

In the aftermath of World War II and as the Cold War with the Union of Soviet Socialist Republics (USSR) took shape, the U.S. and its security partners decided to integrate economic instruments into their security calculations.<sup>8</sup> As the theory went, doing so would make states more resilient against the specter of Communism and Soviet expansionism. Hence, European reconstruction was accompanied by the Marshall Plan and NATO. NATO itself was designed with the economic and social policy compatibility of its member states in mind.

Globally, the Bretton-Woods system, including the World Bank Group and the International Monetary Fund (IMF), would help to

reconstruct European economies, facilitate trade among free-market economies, and, when possible, help newly independent states transform themselves from colonial territories to full-fledged participants in the international economy.<sup>9</sup> Security relationships with the United States, including the U.S. extended nuclear deterrence umbrella, helped to make allies in Europe and Asia capable of withstanding Soviet influence operations.<sup>10</sup>

The design of an international system that benefited a wide variety of stakeholders was not an entirely altruistic calculation by U.S. post-World War II leaders. The war and the nuclear age that followed it underscored the fact that the continental United States was no longer protected by the Atlantic and Pacific Oceans.

Looking to the experience of Europe and Asia during the war and anxious to avoid a conflict that would comparably damage the American homeland, defense planners pursued a strategy of “defense in depth.”<sup>11</sup> By positioning U.S. forces and capabilities forward in territories closer to adversaries, conflicts could be fought and won without directly affecting the continental United States. Basing agreements and alliance commitments, enabled in part by friendly economic relations and a common desire to contain the spread of Communism, were reached between the United States and a variety of countries in order to implement this defense-in-depth strategy. By the end of the Cold War, the United States had constructed a network of security relationships with sovereign states that was generally supportive of U.S. leadership of that system.

The end of the Cold War and the collapse of the Soviet threat around which the U.S. security system was organized led to a degree of soul-searching among scholars and policymakers: Why maintain these alliances and security relationships absent the threat they were designed to counter?<sup>12</sup> These concerns proved short-lived, however, as allies and partners began to organize their security relationships and priorities around the collective management of regional crises and threats,



particularly in the Middle East, Africa, and Southeastern Europe.

The United States used its existing alliance and security partnerships to adopt an expeditionary defense posture, retaining some key sites abroad that were critical for force projection (such as Ramstein Air Force Base in Germany) while closing bases and infrastructure that were no longer deemed necessary. (Such overseas bases have also been critical to managing regional “rogue” states such as Iraq, North Korea, and Iran—the latter two primarily through deterrence and forward-stationed troops and the former through active containment measures such as no-fly zones.)

The terrorist attacks of September 11, 2001, brought home the fact that there were key threats to the U.S. homeland that were not state-based: Ungoverned spaces provided the terrain for violent extremist groups to organize and metastasize into threats with a global reach. As the United States, in response, began to wage campaigns in Afghanistan, Iraq, and eventually Syria, the Department of Defense (DOD) subsequently expanded its programs to “build partner capacity” by working with fragile states in order to help them expand their capacity to govern and also, critically, their ability to eliminate threats posed by violent extremist organizations within their territory. As then-Secretary of Defense Robert Gates noted:

Building the governance and security capacity of other countries was a critical element of our strategy in the Cold War.... But it is even more urgent in a global security environment where, unlike the Cold War, the most likely and lethal threats—an American city poisoned or reduced to rubble—will likely emanate from fractured or failing states, rather than aggressor states.<sup>13</sup>

The American expeditionary military posture, including key staging and logistical sites, has remained critical to enabling U.S. counterterrorism and capacity-building operations in theaters around the world. The

security networks that the United States constructed as part of this strategic shift have also helped the U.S. to achieve other transnational security objectives, including nuclear counterproliferation.

The Russian annexation of Ukraine’s Crimean Peninsula in 2014, along with near-simultaneous island building by China in the South China Sea, led U.S. policymakers to conclude that these powers are willing to use military tools to advance their strategic objectives and, in the process, damage the interests of the United States and its allies and partners. This emerging “strategic competition” with other powers has added to the scope and scale of the challenges with which the U.S.-led security order—already busy managing North Korea and Iran and countering violent extremists—must grapple. As the 2017 National Security Strategy notes:

China and Russia challenge American power, influence, and interests, attempting to erode American security and prosperity. They are determined to make economies less free and less fair, to grow their militaries, and to control information and data to repress their societies and expand their influence. At the same time, the dictatorships of the Democratic People’s Republic of Korea and the Islamic Republic of Iran are determined to destabilize regions, threaten Americans and our allies, and brutalize their own people. Transnational threat groups, from jihadist terrorists to transnational criminal organizations, are actively trying to harm Americans. While these challenges differ in nature and magnitude, they are fundamentally contests between those who value human dignity and freedom and those who oppress individuals and enforce uniformity.<sup>14</sup>

This has led to a hybrid of the defense in depth and expeditionary military postures. The European Deterrence Initiative (EDI), for example, is a U.S.-led effort to:

1. Continue to enhance our deterrent and defense posture throughout the theater by positioning the right capabilities in key locations in order to respond to adversarial threats in a timely manner.
2. Assure our NATO allies and partners of the United States' commitment to Article 5 and the territorial integrity of all NATO nations.
3. Increase the capability and readiness of U.S. Forces, NATO allies, and regional partners, allowing for a faster response in the event of any aggression by an adversary against the sovereign territory of NATO nations.<sup>15</sup>

Simultaneously, the U.S. has conducted counterterrorism and capacity-building operations in Afghanistan, in Iraq, and to some extent in Syria, using logistical infrastructure in Europe and the Middle East. None of this would be possible were it not for robust U.S. strategic and security relationships with allies around the world.

In summary, since the end of World War II, the United States—in contrast to the global powers that preceded America's rise—has worked to establish an international security system of sovereign states and international institutions rooted in relatively advantageous economic relationships. After the end of the Cold War, that system adapted to perform crisis management tasks. In the wake of the September 11 attacks, the system broadened still further as the United States partnered with fragile, weak, and failing states to improve the capacity of their security institutions to manage threats emanating from their territories before they could become global threats. In this network of formal and informal security relationships, the U.S. serves as the central foundation (the hub) for a global defense and military architecture (the spokes) that manages regional and international security challenges.<sup>16</sup>

## Defining Alliances

Given the centrality of alliances to United States defense and security planning, as well as to grand strategy in general, it is somewhat surprising that contemporary examples of alliances remain rather poorly understood. Part of the confusion stems from the variety of ways in which scholars define the term “alliances.”<sup>17</sup> Insofar as there is consensus, it is generally held that alliances are some sort of agreements between states to render military support against an external threat under predetermined conditions.<sup>18</sup> It is also generally understood that states make alliances in order to aggregate their military capabilities relative to external threats.

All of this makes sense to some degree: The overwhelming bulk of analyses of alliance structures, processes, formation, and so on have been derived primarily from cases involving Western European states, their empires,<sup>19</sup> or both and often focus on historical periods up to the end of the Cold War, with comparatively little attention paid to alliances in the period following the Cold War.<sup>20</sup>

Thus, confusion surrounding the definition of “alliances,” coupled with a lack of analysis of military alliances in the post-Cold War era, has limited our understanding of contemporary multilateral military alignments, contributing to an overall confusion about the utility and risks of the U.S.-led global security system. For example, up until the end of World War II, the terms “alliance” and “coalition” were interchangeable, as both referred to acts by states to prosecute military operations jointly against a common threat.<sup>21</sup>

Parsing out coalitions from alliances has not always been a terribly important distinction to make: Alliances were often formed with the specific intention of prosecuting immediate or prospective coalition warfare or to prepare for the eventuality that warfare might occur. Furthermore, alliances, particularly during the Cold War, had a sense of unanimity to them; it was unthinkable that not all NATO allies might respond to an incursion by the Warsaw Pact, vagaries in Article V notwithstanding.

This is not generally the case today. Contemporary international organizations and alliances are often formed without the specific goal of collaboratively conducting military operations, and when international organizations or other institutions *do* decide to undertake multilateral military operations, they often do so utilizing a subset of their membership. Not all NATO members have participated in all of NATO's post-Cold War operations.

Today, this U.S.-led hub-and-spoke system includes a variety of different strategic arrangements, most of which do not fit commonly accepted definitions of alliances. These arrangements include:

- International institutions, such as the United Nations Security Council and the Organization for Security and Cooperation in Europe (OSCE), to contend with security challenges;
- Multilateral military organizations like the North Atlantic Treaty Organization (NATO) alliance itself;
- Explicit agreements between states, such as the mutual defense pact between the United States and the Republic of Korea, to provide mutual military support in times of crisis;
- Participation by states, such as those that contributed to the International Security Assistance Force in Afghanistan, in military coalitions;
- Strategic alignments between states, such as the U.S. relationship with Israel, that are not underpinned by a treaty arrangement; and
- Bilateral, informal partnerships with other states.

It is difficult to determine the utility of these multilateral alignments without an appreciation of their various forms and how they

contribute overall to U.S. and global security. In the first instance, motivations for different states' participation in this system vary, which is why these relationships range from highly formalized treaty-established agreements on the one end to informal security cooperative arrangements on the other. Some are designed to assist states as they grapple with internal security challenges. Others are focused on deterring and, if necessary, defeating an external threat.

Some states with adversarial relationships join multilateral security institutions at least in part in order to tether (and be tethered to) their adversaries, thereby (counterintuitively) advancing their own national security interests. The involvement of Greece and Turkey in NATO is one such example.<sup>22</sup> Some states choose to participate in multinational military coalitions in order to advance interests that have little to do with the mission or operation in question.<sup>23</sup> A variety of states participating in the NATO-led International Security Assistance Force in Afghanistan, for example, did so in order to affirm their solidarity with other NATO countries or their bilateral relationships with the United States.<sup>24</sup>

From a policymaking standpoint, understanding this wide variety of motivations is critical. Without an appreciation for why and how states join these arrangements in the first place, it is difficult to make policy judgements about the level of risk they might be willing to shoulder in the event of multilateral military operations or other activities—or, indeed, for what type of security challenges they would consider employing military force at all.

Our standard conception of alliances and their *de facto* focus on military aspects of statecraft are becoming dangerously outdated, in part because they are rooted in *realpolitik*-inspired notions of military strength and capability aggregation. While these are, of course, essential aspects of alliances, they by no means capture the sum total of the role alliances play in contemporary international relations and strategic policymaking. As noted, more often than not, formal alliances are undergirded by

close economic and political ties that serve as a key way to ensure the continued harmonization of the signatory parties' overall political and strategic views. The more formal the alliance arrangement is, the more likely it is to be complemented by a trade agreement or close economic ties, many of which arguably benefit the United States.<sup>25</sup> While most NATO-watchers are well versed in that alliance's Article 4 (crisis planning) or Article 5 (collective defense) Treaty of Washington provisions, Article 2 has been all but forgotten:

The Parties will contribute toward the further development of peaceful and friendly international relations by strengthening their free institutions, by bringing about a better understanding of the principles upon which these institutions are founded, and by promoting conditions of stability and well-being. *They will seek to eliminate conflict in their international economic policies and will encourage economic collaboration between any or all of them.*<sup>26</sup>

This logic—that economic interdependence must underpin security institutions for them to be successful in the long term—is arguably why the U.S. sought the development of trade relationships among postwar democracies.<sup>27</sup> It is also why global economic institutions such as the World Bank and IMF were established alongside the United Nations Security Council.<sup>28</sup> Less formal security arrangements are generally accompanied by sales of U.S. defense equipment and other matériel to partner countries; in fact, foreign military sales were at one time a gauge by which U.S. versus Soviet global influence was measured.<sup>29</sup>

This aspect of international relations does not always function perfectly (hence the trade wars with Japan in the late 20th century), but on balance, it has served to create an interdependent group of states, led by the United States, that resolve issues among each other in a peaceful manner. It has also created a series of relationships that, although challenging to

manage on a day-to-day basis, are surprisingly durable in the long run. Whether this will continue to be the case in the future is a major question among strategists today.

### The Contemporary Hub-and-Spoke Security System: Risks and Advantages

The alliance system that the U.S. began to construct at the end of World War II is unique in human history and has afforded the United States a number of important strategic and economic advantages. If today's world is characterized by strategic competitions with other great powers, however, as the 2017 U.S. National Security Strategy suggests, the question becomes whether the U.S. will continue to find that the advantages of the hub-and-spoke system are enough to justify its perpetuation.

The hub-and-spoke system possesses both risks and advantages to the United States that policymakers must consider as they evaluate its contemporary and future utility. The key risks include:

- **Burden-sharing.** Questions about whether allies are truly shouldering their collective security responsibilities are perennial in alliance management. In a NATO context, such questions have been raised since the founding of the alliance in 1949. Very few states today spend as much on their defense programs as the United States does, and many NATO allies struggle to meet an agreed-upon goal of 2 percent of gross domestic product (GDP) on defense.<sup>30</sup>

Some would ask what use an alliance is if other states do not have sufficient military capabilities to advance common objectives? Others contend, however, that earlier NATO discussions of burden sharing included the moral dimensions of allied solidarity in the face of an existential expansive Communist threat. According to this view, today's debates would therefore be better characterized as debates about cost sharing rather than burden sharing.

In any event, debates swirl around whether allies are paying their fair share.

- **Entanglement.** Within asymmetric alliances, most allies are fearful that the United States will either abandon them in a crisis (abandonment) or involve them in a crisis in a manner that they would not otherwise choose (entrapment). As the Founders warned, entanglement in the affairs of other states and their security challenges is a concern for the United States as well. To what extent are U.S. views of strategy and foreign policy choices influenced by allies and partners? Might we have the same perception of the Russian or Iranian threat were it not for our close allies in those regions? What are the risks of being drawn into a conflict that might prompt nuclear escalation?
- **Inappropriate Security Partnerships.** As the hub-and-spoke network of security relationships has expanded in order to prosecute counterterrorism and capacity-building strategies since September 11, 2001, questions have arisen regarding the efficacy of many of these partnerships. At the heart of the issue is whether building security forces in states with fragile governments—by, for example, providing training, equipment, and institutional support—might actually make the United States *less* secure in the long term.

For one thing, partners on the ground may have short-term and long-term interests that are very different from those of the United States and may use their enhanced military capabilities to go beyond the objectives for which the assistance was intended. U.S. security assistance to Mali led to the provision of professional military education and training. A separatist rebellion launched in late 2011 by members of the minority ethnic Tuareg community aggravated intramilitary and political tensions in the country, leading to a military

coup by junior officers in March 2012 that was spearheaded by Captain Amadou Sonogo, who had been a recipient of that training.<sup>31</sup>

- **Strategic Insolvency.** Some observers of U.S. defense policy are increasingly concerned that the gap between America's defense spending and its global responsibilities is widening. According to this view, budget unpredictability exacerbated by the 2011 Budget Control Act (“sequestration”), along with readiness issues, nearly two decades of war, personnel retention, and other factors, has left the DOD ill prepared to meet its own goals as articulated in the 2018 National Defense Strategy. Elements of this argument can be found in theories of imperial overstretch,<sup>32</sup> the National Defense Strategy Commission (NDSC) calls it a possibility of “strategic insolvency.”<sup>33</sup> Within the foreseeable future, the U.S. may no longer have the capabilities to defend its allies in more than one theater without significantly reinvesting in its defense program, significantly scaling back its level of ambition, or both.<sup>34</sup>

The principal advantages of the hub-and-spoke system include:

- **Global Reach.** One of the key reasons for building the U.S.-led defense architecture in the first place was to be able to fight the nation's wars far away from the American homeland. This rationale still holds. The United States would not have been able to plan and execute operations around the world like its move into Afghanistan, which occurred within a month after the September 11 terrorist attacks, were it not for its network of military bases and access agreements in the U.S. European Command and U.S. Central Command areas of responsibility.<sup>35</sup>
- **Lower Costs.** Despite the considerable amount of political hay being made from

burden-sharing issues, the financial costs that the U.S. would have to shoulder to accomplish its strategic objectives absent its hub-and-spoke system would likely be significantly higher. Allies often facilitate the presence of U.S. forces stationed on their soil through in-kind payments. South Korea, for example, contributed the lion's share of the costs associated with building Camp Humphreys (\$9.7 billion of a \$10.8 billion project) and annually pays approximately 50 percent of the nonpersonnel costs for the stationing of U.S. troops.<sup>36</sup> Further, historically speaking, imperial predecessors appear to have spent a considerably larger share of their annual budgets on the maintenance of their global military posture.

While not a perfect comparison, it is still worth observing that by some estimates, the United Kingdom spent upwards of 37 percent of its annual governmental budget on its military between 1860 and 1914.<sup>37</sup> During the same period, the majority of Western European countries, Russia, the U.S., and Japan spent, on average, 32 percent of their annual governmental budgets on their militaries.<sup>38</sup> In other words, “[t]axes collected by the British government were used basically to defray military expenditure and to pay interest on a national debt which had accumulated as a consequence of past wars fought to acquire and defend the empire.”<sup>39</sup> By comparison, the U.S. spent 14.75 percent of its annual budget (both mandatory and discretionary) on the defense program in 2017.<sup>40</sup>

- **Exercises and Interoperability.** The hub-and-spoke system has created a wide variety of opportunities for U.S. servicemembers to engage with their foreign counterparts to advance strategic, operational, and tactical interests collectively and ensure that servicemembers from different countries can fight together

effectively. NATO, for example, has the International Military Staff (IMS) and a series of standardization agreements and exercises that help to improve interoperability among member states and partners. These preparations during peacetime help to build meaningful capabilities that can be drawn upon during crises and conflict.

Even though Operation Iraqi Freedom was an ad-hoc coalition, for example, most experts agree that it would not have been possible to operate coherently were it not for NATO's decades of efforts to improve interoperability among its members, many of which participated in that coalition. Also, many multilateral military exercises occur outside of U.S. territories, which has the additional advantage of giving U.S. servicemembers key opportunities to understand the contours of a theater or battlespace before conflict occurs, which in turn enables better planning and preparation for an outbreak of hostilities.

- **Coalition Participants.** Another proven benefit of the hub-and-spoke system has been the willingness of other states to contribute troops, financial resources, or both to U.S.-led military coalitions. At the height of the Afghanistan campaign, 50 nations contributed troops to the International Security Assistance Force.<sup>41</sup> Similarly, allies and partners have contributed to U.S.-led wars and operations in Korea, Vietnam, the Persian Gulf, Somalia, the Balkans, Libya, Iraq, and Syria. In addition to defraying the costs in terms of both blood and treasure that are associated with prosecuting these missions, these contributions have also served to underscore their international legitimacy.<sup>42</sup>

Given this balance sheet of risks and advantages, successive U.S. Administrations have determined that reinvesting in this hub-and-spoke system continues to benefit American interests. The amount of time and attention

that day-to-day management of this system entails—on any given day, dozens of tactical-level and strategic-level issues between sovereign states must be juggled based on shifting notions of security and defense that change over time along with strategic circumstances—might suggest to a casual observer that these relationships are fragile, but the historical track record suggests the opposite. The dissolution of the Soviet Union actually led to an *expansion* of the hub-and-spoke system and has enabled the United States to prosecute expeditionary operations alongside a wide variety of coalition partners.

Looking to the future, however, there are reasons for concern. The U.S.'s key competitors have studied America's defense strategy or approach to waging war and appear to have concluded that fighting the United States conventionally is a losing proposition. Instead, Russia and China appear to be using a combination of military and nonmilitary tools (such as, for example, Moscow's seizure of the Crimean Peninsula and Beijing's assertion of a claim to the nine-dash line territories in the South China Sea) to achieve their objectives.

Another key tactic that these adversaries appear to be using is an attempt to disrupt the U.S.-led hub-and-spoke security network. Due to China's coercive economic policies, combined with its military reforms and expeditionary presence, some of America's allies such as Australia are facing a stark strategic choice: whether to invest in a relationship with China or with the United States.<sup>43</sup> Others, such as Italy, have determined that no apparent conflict exists between embracing Chinese Belt and Road investments and observing their obligations to the European Union (EU) and NATO.<sup>44</sup> Likewise, Russia's disinformation operations appear to be designed, among other things, to sow doubt in European capitals as to the utility of the institutions that the U.S. has helped to create since World War II, including NATO and the EU.<sup>45</sup>

Complicating matters, Moscow and Beijing appear to be collaborating to achieve their shared objective of displacing the United

States as the center of the hub-and-spoke system. As the 2019 Worldwide Threat Assessment released by the Director of National Intelligence notes, "Russia and China seek to shape the international system and regional security dynamics and exert influence over the politics and economies of states in all regions of the world and especially in their respective backyards."<sup>46</sup>

Their apparent objective in doing so is to advance an authoritarian vision of governance and world order.<sup>47</sup> This stands in stark contrast to the international order that the United States has fought hard to achieve over the past 70 years and that, on balance, takes human freedom and individual liberty as a starting point for political organization. From this perspective, the strategic stakes could hardly be higher.

## Conclusion

Both nature and power abhor a vacuum, and both Beijing and Moscow appear to be happy to fill any space created by a U.S. retrenchment—perceived or actual—from the hub-and-spoke system. The United States therefore appears to be at a crossroads. It can either continue to view its complex network of security relationships through a transactional, cost-sharing lens, or it can instead reconsider the broader strategic value of the hub-and-spoke network as the key mechanism through which Washington can counter its great-power competitors.

Indeed, allies contribute to the U.S. and the furtherance of its interests in any number of ways, and their contributions go beyond mere dollars and cents. Regional access, prepositioning of forces and supplies, political-strategic relationships, and interoperable forces together create a "warm start" in the event of a crisis. Further, the U.S. gains intelligence and situational awareness from its global security relationships that it would not otherwise have.

Perhaps most important, however, by reinvesting in its global web of security relationships, the U.S. simultaneously is sending a message to its competitors that they will not

be able to pursue their own arguably coercive agendas unchallenged. Should the U.S. let the hub-and-spoke system languish, the costs of acting alone—in diplomatic, military, and economic terms—are likely to be prohibitive. Compounding the problem, adversaries would likely take advantage of an erosion of U.S. security relations to strengthen their positions at America’s expense.

Despite the hub-and-spoke network’s advantages, just as questions about the appropriate U.S. role in the world remain up in the air, so too does the question of retrenchment from this system versus reinvigoration of it also remain unsettled. At least for now, however, the hub-and-spoke system will undoubtedly remain a foundational element of American strategy—if we choose to keep it.



## Endnotes

1. Any views expressed in this article are strictly those of the author and do not represent the views of any organization with which she is affiliated.
2. Dwight D. Eisenhower, *Crusade in Europe* (New York: Doubleday, 1948), p. 4, as quoted in Robert H. Scales, Jr., “Trust, Not Technology, Sustains Coalitions,” *Parameters*, Vol. 28, No. 4 (Winter 1998–99), <https://ssi.armywarcollege.edu/pubs/parameters/articles/98winter/scales1.htm> (accessed July 13, 2019).
3. David Fromkin, “Entangling Alliances,” *Foreign Affairs*, Vol. 48, No. 4 (July 1970), pp. 688–700, <https://www.foreignaffairs.com/articles/1970-07-01/entangling-alliances> (accessed July 13, 2019).
4. “Hub-and-spoke” is often used to describe the U.S. system of bilateral alliances in Asia, while NATO is referred to as a “multilateral” system. These terms generally refer to formal alliance relationships; as this essay considers the totality of U.S. global security arrangements and how they have evolved over time, “hub-and-spoke” is an appropriate metaphor to describe this complex network of security relationships that has the United States at its center.
5. Thucydides, *The History of the Peloponnesian War*, trans. Richard Crawley (London: J.M. Dent, 1910).
6. George Modelski, “The Long Cycle of Global Politics and the Nation State,” *Comparative Studies in Society and History*, Vol. 20, No. 2 (April 1978), pp. 214–235.
7. Kori Schake, *Safe Passage: The Transition from British to American Hegemony* (Cambridge, MA: Harvard University Press, 2017), esp. Chapter One. The United States has, of course, been imperfect in its application of these values and principles; the U.S. annexed Hawaii, for example.
8. “It is imperative that [there be] a much more rapid and concerted build-up of the actual strength of both the United States and the other nations of the free world. ¶ The execution of such a build-up, however, requires that the United States have an affirmative program beyond the solely defensive one of countering the threat posed by the Soviet Union. This program must light the path to peace and order among nations in a system based on freedom and justice.... Further, it must envisage the political and economic measures with which and the military shield behind which the free world can work to frustrate the Kremlin design by the strategy of the cold war.... The only sure victory lies in the frustration of the Kremlin design by the steady development of the moral and material strength of the free world and its projection into the Soviet world in such a way as to bring about an internal change in the Soviet system.... ¶ In summary, we must, by means of a rapid and sustained build-up of the political, economic and military strength of the free world, and by means of an affirmative program intended to wrest the initiative from the Soviet Union, confront it with convincing evidence of the determination and ability of the free world to frustrate the Kremlin design of a world dominated by its will....” “Conclusions and Recommendations” in *NSC 68: United States Objectives and Programs for National Security (April 14, 1950): A Report to the President Pursuant to the President’s Directive of January 31, 1950*, National Security Council, April 7, 1950, <https://fas.org/irp/offdocs/nsc-hst/nsc-68.htm> (accessed July 15, 2019).
9. World Bank, “History,” <http://www.worldbank.org/en/about/archives/history> (accessed July 15, 2019), and International Monetary Fund, “History: Cooperation and Reconstruction (1944–71),” <https://www.imf.org/external/about/histcoop.htm> (accessed July 15, 2019).
10. *NSC 68: United States Objectives and Programs for National Security*, p. 68.
11. Stacie L. Pettyjohn, *U.S. Global Defense Posture, 1783–2011* (Santa Monica, CA: RAND Corporation, 2012), pp. 49–96, [https://www.rand.org/content/dam/rand/pubs/monographs/2012/RAND\\_MG1244.pdf](https://www.rand.org/content/dam/rand/pubs/monographs/2012/RAND_MG1244.pdf) (accessed July 15, 2019). Prepared for the U.S. Air Force by RAND Project Air Force.
12. Wallace J. Thies, *Why NATO Endures* (New York: Cambridge University Press, 2009).
13. U.S. Department of Defense, “Remarks as Delivered by Secretary of Defense Robert M. Gates, The Nixon Center, Washington, D.C., Wednesday, February 24, 2010,” <http://archive.defense.gov/speeches/speech.aspx?speechid=1425> (accessed June 17, 2019).
14. *National Security Strategy of the United States of America*, The White House, December 2017, pp. 2–3, <https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf> (accessed July 15, 2019).
15. U.S. Department of Defense, Office of the Undersecretary of Defense (Comptroller), *Department of Defense Budget Fiscal Year (FY) 2020: European Deterrence Initiative*, March 2019, p. 1, [https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/fy2020\\_EDJ\\_JBook.pdf](https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/fy2020_EDJ_JBook.pdf) (accessed June 17, 2019).
16. See note 4, *supra*.

17. Compounding the confusion, different scholars have sought to categorize them in different, often overlapping ways. Bruce Russett captures this ambiguity well when he lays out how different scholars—Hans Morgenthau and Kalevi J. Holsti—approach the topic of alliances. He explains that Morgenthau categorizes alliances according to whether they are (1) mutual or unilateral; (2) temporary or permanent; (3) operative or inoperative, depending on their ability to coordinate members' policies; (4) general or limited in their distribution of benefits; and (5) complementary, identical, or ideological in their scope of interest. Holsti, by contrast, organizes alliances along the following lines: (1) the situation in which commitments are to become operational, (2) the type of commitments undertaken, (3) the degree of military cooperation or integration, and (4) the geographic scope of the treaty. Bruce M. Russett, "An Empirical Typology of International Military Alliances," *Midwest Journal of Political Science*, Vol. 15, No. 2 (May 1971), p. 264.
18. Stephen M. Walt, *The Origin of Alliances* (Ithaca, NY: Cornell University Press, 1987), pp. 12–13, and Glenn H. Snyder, *Alliance Politics* (Ithaca, NY: Cornell University Press, 2007), p. 4. In Walt's conception, they can be formal or informal; in Snyder's, they are formal arrangements.
19. The major exception to this is Walt's *The Origin of Alliances*, which looks at alliance formation in the Middle East from 1955–1979.
20. There is, of course, an enormous body of post–Cold War work exploring the particular policy and strategic dimensions of key alliance relationships, such as NATO or U.S. bilateral defense relationships in Asia. Yet the insights and assumptions regarding the formation and maintenance of those alliances are often informed by studies of alliances that predate the end of the Cold War (or, in the case of constructivism, very shortly thereafter).
21. Brett Ashley Leeds, Jeffrey M. Ritter, Sara McLaughlin Mitchell, and Andrew G. Long, "Alliance Treaty Obligations and Provisions, 1815–1944," *International Interactions*, Vol. 28, No. 3 (July 2002), pp. 237–260, (accessed July 15, 2019).
22. Patricia Weitsman, *Dangerous Alliances: Proponents of Peace, Weapons of War* (Stanford: Stanford University Press, 2004).
23. Kathleen J. McInnis, *How and Why States Defect from Contemporary Military Coalitions* (New York: Palgrave Macmillan, 2019).
24. *Ibid.*
25. Glenn Snyder refers to this as the "political penumbra" of alliances. Further, a RAND study notes, "In our analysis of aggregate U.S. bilateral trade, we find solid evidence that U.S. security commitments have significantly positive effects on U.S. bilateral trade. For example...a doubling of U.S. personnel commitments overseas could increase U.S. bilateral trade by as much as 15 percent, depending on the service, while a doubling of treaties could expand U.S. bilateral trade by 34 percent overall." Daniel Engel, Adam R. Grissom, John P. Godges, Jennifer Kavanagh, and Howard J. Schatz, *Estimating the Value of Overseas Security Commitments* (Santa Monica, CA: RAND Corporation, 2016), p. x, [https://www.rand.org/content/dam/rand/pubs/research\\_reports/RR500/RR518/RAND\\_RR518.pdf](https://www.rand.org/content/dam/rand/pubs/research_reports/RR500/RR518/RAND_RR518.pdf) (accessed July 15, 2019).
26. North Atlantic Treaty, Article 2, April 4, 1949, last updated April 10, 2019, [https://www.nato.int/cps/en/natolive/official\\_texts\\_17120.htm](https://www.nato.int/cps/en/natolive/official_texts_17120.htm) (accessed July 15, 2019). Emphasis added.
27. G. John Ikenberry, *After Victory: Institutions, Strategic Restraint, and the Rebuilding of Order After Major Wars* (Princeton, NJ: Princeton University Press, 2001) pp. 162–214.
28. *Ibid.* See also I. M. Destler, "America's Uneasy Relationship with Free Trade," *Harvard Business Review*, April 28, 2016, <https://hbr.org/2016/04/americas-uneasy-history-with-free-trade> (accessed June 18, 2019).
29. Robert E. Harkavy, *Bases Abroad: The Global Foreign Military Presence* (Stockholm: Stockholm International Peace Research Institute, 1989), p. 5.
30. Press release, "Wales Summit Declaration Issued by the Heads of State and Government Participating in the Meeting of the North Atlantic Council in Wales," North Atlantic Treaty Organization, September 5, 2014, [https://www.nato.int/cps/en/natohq/official\\_texts\\_112964.htm#def-exp](https://www.nato.int/cps/en/natohq/official_texts_112964.htm#def-exp) (accessed June 18, 2019).
31. Martin Vogl, "Mali Coup Leaders Partially Reopen Airport," Associated Press, March 26, 2012, [http://archive.boston.com/news/world/africa/articles/2012/03/26/mali\\_protesters\\_seek\\_return\\_to\\_order\\_after\\_coup/](http://archive.boston.com/news/world/africa/articles/2012/03/26/mali_protesters_seek_return_to_order_after_coup/) (accessed July 15, 2019), and Simon J. Powelson, *Enduring Engagement Yes, Episodic Engagement No: Lessons for SOF from Mali*, Thesis, Naval Postgraduate School, Monterey, California, December 2013, p. 56, [https://calhoun.nps.edu/bitstream/handle/10945/38996/13Dec\\_Powelson\\_Simon.pdf?sequence=1&isAllowed=y](https://calhoun.nps.edu/bitstream/handle/10945/38996/13Dec_Powelson_Simon.pdf?sequence=1&isAllowed=y) (accessed June 18, 2019).
32. Paul Kennedy, *The Rise and Fall of the Great Powers* (New York: Random House, 1987).
33. National Defense Strategy Commission, *Providing for the Common Defense: The Assessment and Recommendations of the National Defense Strategy Commission*, released November 14, 2018, p. xii, <https://www.usip.org/sites/default/files/2018-11/providing-for-the-common-defense.pdf> (accessed July 15, 2019).

34. Rick Berger and Mackenzie Eaglen, "'Hard Choices' and Strategic Insolvency: Where the National Defense Strategy Falls Short," *War on the Rocks*, May 16, 2019. <https://warontherocks.com/2019/05/hard-choices-and-strategic-insolvency-where-the-national-defense-strategy-falls-short/> (accessed July 15, 2019).
35. Council on Foreign Relations, "The U.S. War in Afghanistan: 1999–2019," *CFR Timeline*, <https://www.cfr.org/timeline/us-war-afghanistan> (accessed July 15, 2019).
36. Mark E. Manyin, Emma Chanlett-Avery, and Brock R. Williams, "South Korea: Background and U.S. Relations," Congressional Research Service *In Focus* No. 10165, updated May 20, 2019, <https://fas.org/sgp/crs/row/IF10165.pdf> (accessed June 18, 2019), and Christine Kim, "US Forces Chief Says South Korea Paid for 90 Percent of Biggest Overseas Base," *Reuters*, June 28, 2018, <https://www.reuters.com/article/us-usa-southkorea-base/u-s-forces-chief-says-south-korea-paid-for-90-percent-of-biggest-overseas-base-idUSKBN1JP09X> (accessed June 18, 2019).
37. Patrick K. O'Brien, "The Costs and Benefits of British Imperialism 1846–1914," *Past & Present*, Vol. 120, No. 1 (August 1988), p. 187.
38. *Ibid.*
39. *Ibid.*
40. Congressional Budget Office, "The Federal Budget in 2017: An Infographic," March 2018, <https://www.cbo.gov/publication/53624> (accessed July 13, 2019). Figure derived from calculating the amount of defense spending in 2017 (\$590 billion) as a percentage of an overall federal budget of \$4 trillion.
41. North Atlantic Treaty Organization, International Security Assistance Force, "International Security Assistance Force (ISAF): Key Facts and Figures," October 8, 2012, [https://www.nato.int/isaf/placemats\\_archive/2012-10-08-ISAF-Placemat.pdf](https://www.nato.int/isaf/placemats_archive/2012-10-08-ISAF-Placemat.pdf) (accessed June 18, 2019).
42. Olivier Schmitt refers to this as "legitimacy aggregation." Olivier Schmitt, *Allies that Count: Junior Partners in Coalition Warfare* (Washington: Georgetown University Press, 2011).
43. Neil Irwin, "Australia and the U.S. Are Old Allies. China's Rise Changes the Equation," *The New York Times*, May 11, 2019, <https://www.nytimes.com/2019/05/11/upshot/australia-relationship-china-us-trade.html> (accessed July 15, 2019).
44. Andrew Chatzky, "China's Belt and Road Gets a Win in Italy," Council on Foreign Relations, March 27, 2019, <https://www.cfr.org/article/chinas-belt-and-road-gets-win-italy> (accessed July 15, 2019).
45. Daniel R. Coats, Director of National Intelligence, "Worldwide Threat Assessment of the US Intelligence Community," statement before the Select Committee on Intelligence, U.S. Senate, January 29, 2019, pp. 5–6, <https://www.dni.gov/files/ODNI/documents/2019-ATA-SFR---SSCI.pdf> (accessed July 15, 2019). See also Todd C. Helmus, Elizabeth Bodine-Baron, Andrew Radin, Madeline Magnuson, Joshua Mendelsohn, William Marcellino, Andriy Bega, and Zev Winkelman, *Russian Social Media Influence: Understanding Russian Propaganda in Eastern Europe* (Santa Monica, CA: RAND Corporation, 2018), [https://www.rand.org/content/dam/rand/pubs/research\\_reports/RR2200/RR2237/RAND\\_RR2237.pdf](https://www.rand.org/content/dam/rand/pubs/research_reports/RR2200/RR2237/RAND_RR2237.pdf) (accessed July 15, 2019).
46. Coats, "Worldwide Threat Assessment of the US Intelligence Community," p. 4.
47. *Ibid.*, pp. 4 and 25.



# Global Operating Environment



# Assessing the Global Operating Environment

Measuring the “strength” of a military force—the extent to which that force can accomplish missions—requires examination of the environments in which the force operates. Aspects of one environment may facilitate military operations; aspects of another may work against them. A favorable operating environment presents the U.S. military with obvious advantages; an unfavorable operating environment may limit the effect of U.S. military power. Any decision as to whether an operating environment can or cannot support U.S. military operations depends on several factors: the capabilities and assets of U.S. allies, the strength of foes, the region’s geopolitical environment, and the availability of forward facilities and logistics infrastructure.

When assessing an operating environment, one must pay particular attention to any U.S. treaty obligations with countries in the region. A treaty defense obligation ensures that the legal framework is in place for the United States to maintain and operate a military presence in a particular country. In addition, a treaty partner usually yields regular training exercises and interoperability as well as political and economic ties.

Additional factors—including the military capabilities of allies that might be useful to U.S. military operations; the degree to which the U.S. and allied militaries in the region are

interoperable and can use, for example, common means of command, communication, and other systems; and whether the U.S. maintains key bilateral alliances with nations in the region—also affect the operating environment. Similarly, nations where the U.S. has already stationed assets or permanent bases and countries from which the U.S. has launched military operations in the past may provide needed support to future U.S. military operations. The relationships and knowledge gained through any of these factors would undoubtedly facilitate future U.S. military operations in a region and contribute greatly to a positive operating environment.

In addition to U.S. defense relations within a region, additional criteria—including the quality of the local infrastructure, the political stability of the area, whether or not a country is embroiled in any conflicts, and the degree to which a nation is economically free—should also be considered.

Each of these factors contributes to an informed judgment as to whether a particular operating environment is favorable or unfavorable to future U.S. military operations. The operating environment assessment is meant to add critical context to complement the threat environment and U.S. military power assessments that are detailed in subsequent sections of the *Index*.

Note: This *Index* refers to all disputed territories by the name employed by the United States Department of State and should not be seen as reflecting a position on any of these disputes.





# Europe

America's reengagement with Europe continues. The resurgence of Russia, fomenting instability from the Arctic to the Baltics, the Black Sea and South Caucasus, and increasingly the Mediterranean Sea, has brought Europe back into the top tier of U.S. international interests.

The 51 countries in the U.S. European Command (USEUCOM) area of responsibility include approximately one-fifth of the world's population, 10.7 million square miles of land, and 13 million square miles of ocean. Some of America's oldest (France) and closest (the United Kingdom) allies are found in Europe. The U.S. and Europe share a strong commitment to the rule of law, human rights, free markets, and democracy. During the 20th century, millions of Americans fought alongside European allies in defense of these shared ideals—the foundations on which America was built.

America's economic ties to the region are likewise important. A stable, secure, and economically viable Europe is in America's economic interest. For more than 70 years, the U.S. military presence has contributed to regional security and stability, economically benefiting both Europeans and Americans. The economies of the member states of the European Union (EU), now 28 but soon to be 27,<sup>1</sup> along with the United States, account for approximately half of the global economy. In addition, the U.S. and the EU's member countries are each other's principal trading partners.

Europe is also important to the U.S. because of its geographical proximity to some of the world's most dangerous and contested regions.

From the eastern Atlantic Ocean to the Middle East, up to the Caucasus through Russia, and into the Arctic, Europe is enveloped by an arc of instability. The European region also has some of the world's most vital shipping lanes, energy resources, and trade choke points.

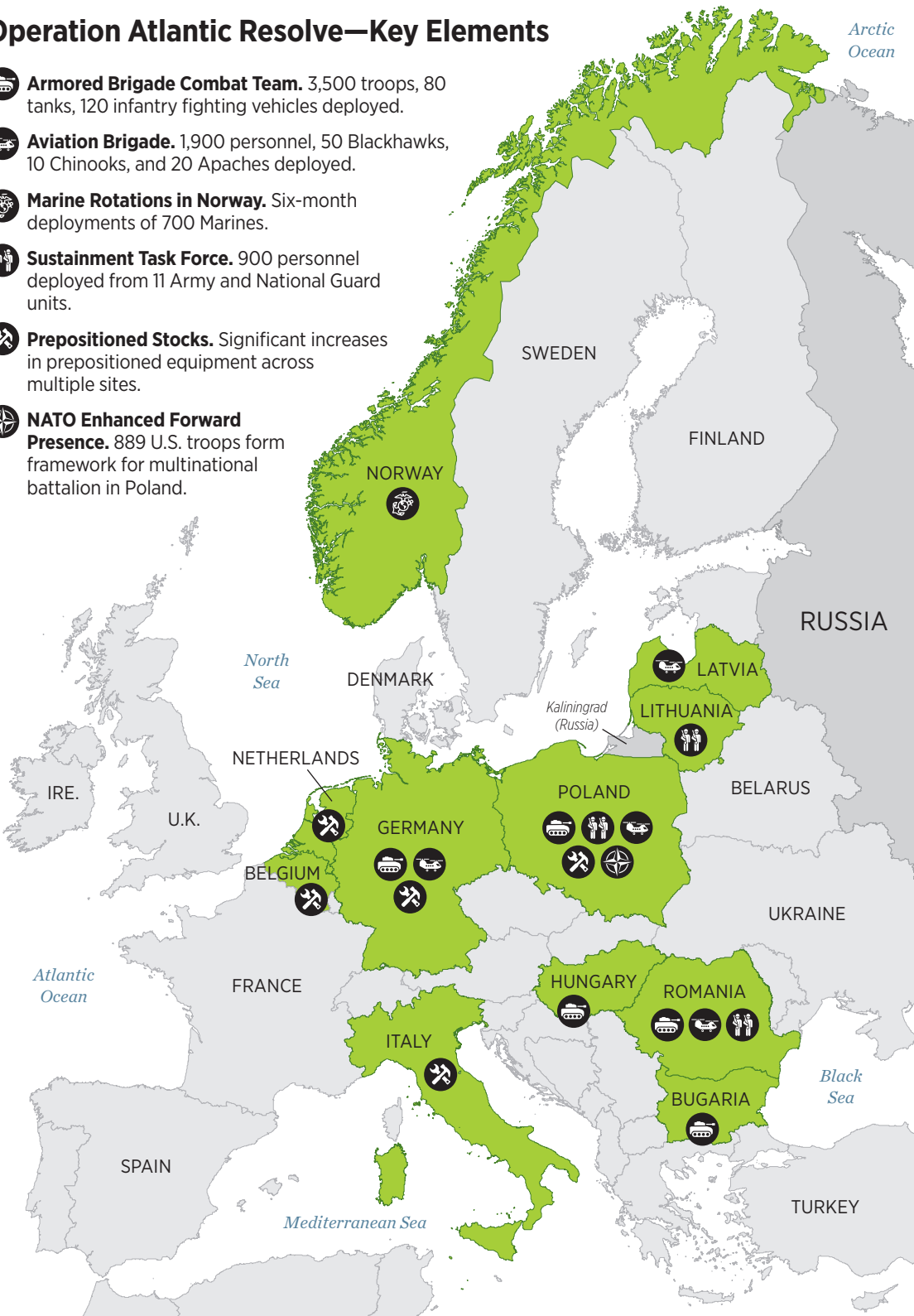
European basing for U.S. forces provides the ability to respond robustly and quickly to challenges to U.S. economic and security interests in and near the region. Russian naval activity in the North Atlantic and Arctic has necessitated a renewed focus on regional command and control and has led to increased operations by U.S. and allied air and naval assets in the Arctic, and Russia's strengthened position in Syria has led to a resurgence of Russian naval activity in the Mediterranean that has contributed to "congested" conditions.<sup>2</sup>

Speaking at an Atlantic Council meeting in March 2019, General Joseph F. Dunford, Chairman of the U.S. Joint Chiefs of Staff, explained that the U.S. has two key advantages over adversaries: "our network of allies and partners, and the ability to project power where and when necessary to advance our national interest."<sup>3</sup> Nowhere is the value of allies and U.S. basing more apparent than in the European operating environment.

**U.S. Reinvestment in Europe.** Russia's continued aggression in the region has caused the U.S. to reinvest in military capabilities on the continent. General Curtis M. Scaparrotti, former Supreme Allied Commander, Europe, and Commander, U.S. European Command, has described the change as "returning to our historic role as a warfighting command focused on deterrence and defense."<sup>4</sup>

# Operation Atlantic Resolve—Key Elements

-  **Armored Brigade Combat Team.** 3,500 troops, 80 tanks, 120 infantry fighting vehicles deployed.
-  **Aviation Brigade.** 1,900 personnel, 50 Blackhawks, 10 Chinooks, and 20 Apaches deployed.
-  **Marine Rotations in Norway.** Six-month deployments of 700 Marines.
-  **Sustainment Task Force.** 900 personnel deployed from 11 Army and National Guard units.
-  **Prepositioned Stocks.** Significant increases in prepositioned equipment across multiple sites.
-  **NATO Enhanced Forward Presence.** 889 U.S. troops form framework for multinational battalion in Poland.



SOURCE: Heritage Foundation research.

 heritage.org

In April 2014, the U.S. launched Operation Atlantic Resolve (OAR), a series of actions meant to reassure U.S. allies in Europe, particularly those bordering Russia. Under OAR and funded through the European Deterrence Initiative (EDI), the U.S. has increased its forward presence in Europe (around 6,000 soldiers take part in OAR missions at any one time);<sup>5</sup> invested in European basing infrastructure and prepositioned stocks and equipment and supplies; engaged in enhanced multinational training exercises; and negotiated agreements for increased cooperation with NATO allies.

*European Deterrence Initiative.* Under President Donald Trump, EDI funding has nearly doubled from the final year of the Obama Administration, with more than \$6.5 billion in funding enacted for the initiative in fiscal year (FY) 2019.<sup>6</sup> The FY 2020 Department of Defense budget requests \$5.9 billion for EDI,<sup>7</sup> roughly 10 percent less than the enacted amount for FY 2019.<sup>8</sup> Of EDI's five lines of effort, Enhanced Prepositioning and Improved Infrastructure would see decreases under the FY 2020 budget request. In March 2019, acting DOD Comptroller Elaine McCusker explained that the decreases resulted from the amount of infrastructure and prepositioning work that has already been completed.<sup>9</sup> Under the FY 2020 request, funds for presence and building partnership capacity would be increased, with funds for exercises and training more than doubled.<sup>10</sup>

Testifying in March 2019, General Scaparrotti was clear about the importance of EDI funding in returning the United States to a posture of deterrence:

The European Deterrence Initiative (EDI) provides funding to improve our deterrence posture and execute our deterrent initiatives and activities. First, EDI ensures that we position the right capabilities and refine the necessary infrastructure to respond to adversaries in a timely manner. Second, it underwrites our commitment to Article 5 and to the territorial integrity of all NATO nations. Third, EDI increases

the capability and readiness of U.S. Forces, NATO allies, and regional partners so we can effectively deter adversary aggression and adventurism. USEUCOM has remained disciplined in nominating EDI projects that are consistent with Congressional guidance and follow five distinct lines of effort: increased presence, exercises and training, enhanced prepositioning, improved infrastructure, and building partnership capacity.<sup>11</sup>

EDI has supported infrastructure improvements across the region. One major EDI-funded project is a replacement hospital at Landstuhl, Germany. When completed in 2022, the new permanent facility “will provide state-of-the-art combat and contingency medical support to service members from EUCOM, AFRICOM and CENTCOM.”<sup>12</sup> EDI funds are also contributing to the creation of the Joint Intelligence Analysis Center, which will consolidate intelligence functions formerly spread across multiple bases and “strengthen EUCOM, NATO and UK intelligence relationships.”<sup>13</sup>

*Forward Presence.* In January 2019, the 1st Armored Brigade Combat Team (ABCT) of the 1st Infantry Division from Fort Riley, Kansas, replaced the outgoing BCT in the “fourth rotation of an armored brigade combat team in support of Atlantic Resolve.” The BCT, consisting in part of 3,500 troops, 80 tanks, and 120 infantry fighting vehicles, deployed to sites across Bulgaria, Hungary, Poland, and Romania, with the largest portion of the forces stationed in Poland.<sup>14</sup>

Former Army Chief of Staff General Mark Milley has emphasized the value of ground forces in deterrence: “The air [and] maritime capabilities are very important, but I would submit that ground forces play an outsize role in conventional deterrence and conventional assurance of allies. Because your physical presence on the ground speaks volumes.”<sup>15</sup> In April 2018, a U.S. Armored BCT exercised a road march on public roadways with 700 vehicles in Germany, the first time such a brigade-level moment had been conducted in 15 years.<sup>16</sup>

In addition to back-to-back rotations of armor, the U.S. has maintained a rotational aviation brigade in Europe since February 2017.<sup>17</sup> The majority of the aviation brigade is located in Illesheim and Vilseck, Germany. Additionally, 13 helicopters and 60 soldiers are deployed to Lielvārde, Latvia; 17 helicopters and 150 soldiers are deployed to Powidz, Poland; and 14 helicopters and 100 soldiers are deployed to Mihail Kogălniceanu Air Base in Romania. The 1st Combat Aviation Brigade, 1st Infantry Division, took over the aviation brigade mission in February 2019.<sup>18</sup>

The U.S. has beefed up its presence in Norway as well. Rotation of 330 marines to Norway for six-month deployments began in 2017.<sup>19</sup> In October 2018, the U.S. sent 700 Marines, an increase that coincided with the opening of a second training area in Norway's Troms region near Russia. In March 2019, a new deployment of 700 Marines arrived, the fifth unit to take part in the six-month rotation. With a focus on cold-weather training and mountain warfare, the Norwegian Marine deployment has allowed for training activities with Norway, Sweden, and the U.K.<sup>20</sup>

The U.S. also continues to rotate a Sustainment Task Force of 900 personnel from 11 Army Reserve and National Guard units that concentrate on logistics and maintenance to improve readiness. The Sustainment Task Force is based in Poland but includes personnel deployed to Lithuania and Romania.<sup>21</sup>

Operation Atlantic Resolve's naval component has consisted in part of increased deployments of U.S. ships to the Baltic and Black Seas. According to Admiral James Foggo III, Commander of U.S. Naval Forces in Europe and Africa, "The United States and NATO are active with more ships in the Black Sea Region. We provide deterrence through our military presence, our exercises, and the training we conduct with allies and partners there."<sup>22</sup> The Navy also has taken part in bilateral and NATO exercises. U.S. Naval Forces Europe "executed a no-notice deployment of the Harry S. Truman (HST) Carrier Strike Group (CSG) to the Mediterranean in the

summer [of] 2018 and to the North Atlantic in the fall [of] 2018."<sup>23</sup>

In May 2018, the Navy announced the reestablishment of the Second Fleet, "responsible for the northern Atlantic Ocean," nearly seven years after it had been disbanded in 2011.<sup>24</sup> The fleet was reestablished because of Russian militarization of the Arctic and was scheduled to lead the BALTOPS exercise in June 2019.<sup>25</sup>

In his 2019 USEUCOM posture statement, General Scaparrotti raised the possibility of potential future forward deployments of enabler units: "The forward stationing of long-range fires and air defense units will further improve the lethality and resilience of USA-REUR forces."<sup>26</sup>

*Prepositioned Stocks.* The U.S. Army has prepositioned additional equipment across Europe as part of Operation Atlantic Resolve. A prepositioning site in Eygelshoven, the Netherlands, opened in December 2016 and stores 1,600 vehicles including "M1 Abrams Tanks, M109 Paladin Self-Propelled Howitzers and other armored and support vehicles."<sup>27</sup> Exercises in March 2019 with 1,500 soldiers from Texas deploying rapidly to Europe drew on 700 pieces of equipment from Eygelshoven.<sup>28</sup> A second site in Dülmen, Germany, opened in May 2017 and holds equipment for an artillery brigade.<sup>29</sup> Other prepositioning sites include Zutendaal, Belgium; Livorno, Italy; Mannheim and Miesau, Germany; and Powidz, Poland. The Polish site, which has been selected by the Army for prepositioned armor and artillery, is expected to cost \$200 million (funded by NATO) and will open in 2021.<sup>30</sup>

Equipment and ammunition sufficient to support a division will continue to arrive in Europe through 2021.<sup>31</sup> The U.S. Air Force, Special Forces, and Marine Corps are beefing up prepositioned stocks; the Marine Corps Prepositioning Program in Norway is emphasizing cold-weather equipment.<sup>32</sup>

*Multinational Training.* In 2018, "USEUCOM conducted nearly 100 exercises with allies and partners from approximately 30 countries."<sup>33</sup> The combat training center at Hohenfels, Germany, is one of a very few located

outside of the continental United States at which large-scale combined-arms exercises can be conducted, and more than 60,000 U.S. and allied personnel train there annually.

U.S.–European training exercises further advance U.S. interests by developing links between America’s allies in Europe and National Guard units back in the United States. At a time when most American servicemembers do not recall World War II or the Cold War, cementing bonds with allies in Europe is vital. Currently, 22 nations in Europe have state partners in the U.S. National Guard.<sup>34</sup>

**Assistance to Ukraine.** In addition to training with fellow NATO member states, the U.S. Joint Multinational Training Group–Ukraine (JMTG–U) will train up to five Ukrainian battalions a year through 2020 at the Yarvoriv Combat Training Center in the Lviv region.<sup>35</sup> Canada, Lithuania, and Poland also participate in JMTG–U.<sup>36</sup> In March 2019, Canada announced an extension of Operation UNIFIER, the Canadian training mission in Ukraine, through 2022. The mission has trained 10,800 Ukrainian personnel since its inception in September 2015.<sup>37</sup>

In April 2018, the U.S. delivered 210 Javelin anti-tank missiles and 37 Javelin launchers to Ukraine.<sup>38</sup> In July 2018, the U.S. announced a further \$200 million “in security cooperation funds for additional training, equipment and advisory efforts to build the defensive capacity of Ukraine’s forces.”<sup>39</sup> In December 2018, NATO Secretary General Jens Stoltenberg announced that NATO was supplying Ukraine with secure communications equipment, encrypted radios, and GPS trackers through its “Command, Control, Communications and Computers (C4) Trust Fund for Ukraine, a support package announced in 2016 to assist Kiev in better providing for its own security.”<sup>40</sup> In July 2018, the same trust fund provided Ukraine with “state of the art” equipment to bolster the nation’s cyber defenses.<sup>41</sup>

In October 2018, troops from Belgium, Denmark, Estonia, the Netherlands, Poland, Romania, the United Kingdom, and the United States took part in Clear Sky 2018, the first

large multinational air exercise to be held in Ukraine since Russia’s invasion in 2014. U.S. Air Force Chief of Staff General David Goldfein explained that Clear Sky 2018 “showcased the strong bond between the U.S. and Ukraine and how far the Ukrainian air force has come in their path towards NATO interoperability.” Lieutenant Colonel Robert Swertfager, State Partnership Director for the California Air National Guard, noted the “need to highlight differences, not just in record keeping and cross-functional equipment, but also laws,” adding that “[t]hese are things we highlighted for Ukraine that they can take back to their Ministry of Defense and start working to change internal laws or doctrine within their own military” to enhance interoperability.<sup>42</sup>

**U.S. Nuclear Weapons in Europe.** It is believed that until the end of the Cold War, the U.S. maintained approximately 2,500 nuclear warheads in Europe. Unofficial estimates range between 150 and 200 warheads based in Italy, Turkey, Germany, Belgium, and the Netherlands.<sup>43</sup> All of these weapons are free-fall gravity bombs designed for use with U.S. and allied dual-capable aircraft. The bombs are undergoing a life extension program that is expected to add at least 20 years to their life span.<sup>44</sup>

In October 2018, the National Nuclear Security Administration stated that the new B61-12 gravity bomb had completed its final design review; production of the first unit is scheduled for March 2020.<sup>45</sup> Also in October 2018, the B61-12’s guided tail kit assembly received approval to enter the production phase after a series of successful tests had been completed.<sup>46</sup> The B61-12, according to U.S. officials, is “intended to be three times more accurate than its predecessors.”<sup>47</sup>

## Important Alliances and Bilateral Relations in Europe

The United States has a number of important multilateral and bilateral relationships in Europe. First and foremost is the North Atlantic Treaty Organization (NATO), the world’s most important and arguably most successful defense alliance.

### **North Atlantic Treaty Organization.**

NATO is an intergovernmental, multilateral security organization that was designed originally to defend Western Europe from the Soviet Union. It anchored the U.S. firmly in Europe, solidified Western resolve during the Cold War, and rallied European support following the terrorist attacks on 9/11. NATO has been the bedrock of transatlantic security cooperation ever since its creation in 1949 and is likely to remain so for the foreseeable future.

The past year saw continued focus on military mobility and logistics in line with NATO's 2014 Readiness Action Plan (RAP). The RAP was designed to reassure nervous member states and put in motion "longer-term changes to NATO's forces and command structure so that the Alliance will be better able to react swiftly and decisively to sudden crises."<sup>48</sup>

In June 2018, NATO defense ministers agreed to the Four 30s plan to improve movement of troops in Europe by 2020. "Four 30s" derives from the plan's objective that NATO should be able to respond to any aggression with 30 battalions, 30 squadrons of aircraft, and 30 warships within 30 days.<sup>49</sup> The plan was endorsed at the July 2018 NATO summit in Brussels, Belgium, but the declaration "did not include Four Thirties initiative specifics, including which nations would contribute which types of forces and a timeframe for implementation."<sup>50</sup>

*Enhanced Forward Presence.* The centerpiece of NATO's renewed focus on collective defense is the four multinational battalions stationed in Poland and the Baltic States as part of the alliance's Enhanced Forward Presence (EFP).

- The U.S. serves as the framework nation in Orzysz, Poland, near the Suwalki Gap. The U.S.-led battlegroup consists of 889 American troops augmented by 69 from Croatia, 120 from Romania, and 140 from the United Kingdom.<sup>51</sup>
- In Estonia, the United Kingdom serves as the framework nation, headquartered in

Tapa with 800 troops in an armored infantry battalion along with main battle tanks and artillery and 300 French troops, 269 troops from Belgium, three staff officers from Denmark, and one Icelandic strategic communications civilian.<sup>52</sup>

- In Adazi, Latvia, Canada is the framework nation with 450 troops and armored fighting vehicles augmented by 21 troops from Albania, 60 from the Czech Republic, 160 from Italy, eight from Montenegro, approximately 200 from Poland, 152 from Slovakia, 50 from Slovenia, and 300 from Spain.<sup>53</sup>
- In Rukla, Lithuania, Germany serves as the framework nation with 540 troops augmented by another 230 from the Czech Republic, approximately 270 from the Netherlands, 13 from Norway, one Belgian staff officer, and one Icelandic public affairs civilian.<sup>54</sup>

EFP troops are under NATO command and control; a Multinational Division Headquarters Northeast located in Elblag, Poland, which reached full operational capability in December 2018, coordinates the four battalions.<sup>55</sup> In February 2017, the Baltic States signed an agreement to facilitate the movement of NATO forces among the countries.<sup>56</sup>

In addition, NATO has established eight Force Integration Units located in Sofia, Bulgaria; Tallinn, Estonia; Riga, Latvia; Vilnius, Lithuania; Bydgoszcz, Poland; Bucharest, Romania; Szekesfehervar, Hungary; and Bratislava, Slovakia. These new units "will help facilitate the rapid deployment of Allied forces to the Eastern part of the Alliance, support collective defence planning and assist in coordinating training and exercises."<sup>57</sup>

At the July 2016 Warsaw summit, NATO also agreed to create a multinational framework brigade based in Craiova, Romania, under the control of Headquarters Multinational Division Southeast (HQ MND-SE) in Bucharest.<sup>58</sup> HQ MND-SE achieved final operational

capability in March 2018.<sup>59</sup> The 5,000-strong brigade “still consists mainly of Romanian troops, but they are supplemented by Bulgarian and Polish troops and headquarters staff from various other NATO states.”<sup>60</sup>

Addressing a NATO capability gap, Belgium, Germany, Luxembourg, the Netherlands, and Norway are jointly procuring eight A330 air-to-air refueling aircraft, to be deployed from 2020–2024.<sup>61</sup> The U.S. currently carries out 90 percent of NATO air-to-air refuelings.<sup>62</sup>

Logistics have been a significant focus of the alliance in recent years. An internal alliance assessment in 2017 reportedly concluded that NATO’s “ability to logistically support rapid reinforcement in the much-expanded territory covering SACEUR’s (Supreme Allied Commander Europe) area of operation has atrophied since the end of the Cold War.”<sup>63</sup> In 2018, NATO established two new commands: a joint force command for the Atlantic based in Norfolk, Virginia, and a logistics and military mobility command.<sup>64</sup> These commands consist of a total of 1,500 personnel, with the logistics command headquartered in Ulm, Germany.<sup>65</sup>

In recent years, shortfalls in the alliance’s ability to move soldiers and equipment swiftly and efficiently have occasionally been glaring. In January 2018, German border guards stopped six U.S. M109 Paladin howitzers en route from Poland to multinational exercises in Bavaria because the trucks being used to transport the artillery were allegedly too wide and heavy for German roadways. In addition, contractors driving the trucks were missing paperwork and trying to transport the howitzers outside of the allowed 9:00 p.m.–5:00 a.m. window.

Former Commander of U.S. Army Europe Lieutenant General Ben Hodges has described the importance of NATO’s recent focus on ports. In addition to improving capabilities for loading and offloading equipment, utilizing different ports in Europe has helped to improve alliance resiliency. Focusing on only one port “would obviously communicate a vulnerability to the Russians or other potential adversaries,” according to Hodges, “so we’ve used Gdansk.

We’ve used Bremerhaven. We’ve used Klaipeda in Lithuania. We’ve used Thessaloniki and Alexandropolis in Greece, and Constanta in Romania.”<sup>66</sup> In May 2018, a U.S. ABCT arriving in Europe for a rotational deployment disembarked at Antwerp, Belgium, and practiced traveling overland to its deployment bases further east.<sup>67</sup>

**Training Exercises.** In order to increase interoperability and improve familiarity with allied warfighting capabilities, doctrines, and operational methods, NATO conducts frequent joint training exercises. The number of these exercises has increased from 108 in 2017 to 180 in 2018.<sup>68</sup>

The broad threat that Russia poses to Europe’s common interests makes military-to-military cooperation, interoperability, and overall preparedness for joint warfighting especially important in Europe. In October and November 2018, 50,000 troops from 31 nations (every NATO member state plus Finland and Sweden) took part in Trident Juncture 18, the largest NATO exercise since 2002.<sup>69</sup> “At the core of the exercise,” as described by Admiral James Foggo, Commander, Allied Joint Force Command, “is the NATO Response Force and within that, the 5000 person-plus Spearhead force, otherwise known as the VJTF or the Very High Readiness Joint Taskforce.”<sup>70</sup> A principal focus of the exercise “was NATO’s ability to move personnel and armor quickly across Europe.”<sup>71</sup>

In June 2018, 18,000 troops from Canada, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Italy, Latvia, Lithuania, Macedonia, the Netherlands, Norway, Poland, Romania, Spain, the United Kingdom, and the U.S. took part in Saber Strike 18 across Estonia, Latvia, Lithuania, and Poland. The exercise focused on moving large numbers of troops and equipment across Europe and “integrat[ing] NATO command elements at multiple levels to practice coordination and command and control.”<sup>72</sup>

In September and October 2018, 5,500 troops from 20 nations including the U.S. took part in Saber Junction 2018 in Germany. The

exercise “was designed to assess the readiness of the 173rd Airborne Brigade to execute land operations in a joint, combined environment and to promote interoperability with participating allies and partner nations.”<sup>73</sup>

**Cyber Capabilities.** The alliance’s Joint Air Power (JAP) Strategy released in June 2018 highlighted the importance of cyber and space capabilities:

Increasing reliance on cyber and space-based capabilities by Alliance forces presents vulnerabilities for adversaries to negate critical NATO capabilities through degradation, denial or destruction, whilst providing opportunities for the Alliance to integrate such capabilities with JAP for kinetic and non-kinetic effect. Both the resilience and exploitation of such capabilities is [sic] therefore a critical requirement that future development should address.<sup>74</sup>

At the 2016 Warsaw summit, NATO recognized cyberspace as a domain of operations, and on August 31, 2018, it established a Cyber-space Operations Center (CYOC) in Mons, Belgium, that will include 70 cyber experts when it becomes fully operational in 2023.<sup>75</sup> The CYOC, according to NATO, “will provide situational awareness and coordination of NATO operational activity within cyberspace.”<sup>76</sup> In 2017, NATO announced \$1.85 billion to expand its satellite communications capabilities.<sup>77</sup> Its decision was driven in part by the acquisition of five Global Hawk surveillance drones, which generate significant data; after delays, the first drone was delivered in 2019 to Sigonella Naval Air Station.<sup>78</sup>

The alliance is seeking ways to work more closely with the EU on cyber issues, but “[d]espite political-level agreement to work together, EU–NATO cyber cooperation remains difficult and the institutional options often limited.”<sup>79</sup> Nevertheless, cyber is recognized as a critical area of competition, and NATO is expanding its efforts to gain greater expertise and capability in this area. In 2018, Japan and Australia

became the first non-NATO countries outside of the EU to join the Cooperative Cyber Defence Centre of Excellence (CCDCOE) in Tallinn.<sup>80</sup>

**Ballistic Missile Defense.** NATO announced the initial operating capability of the Ballistic Missile Defense (BMD) system in 2016.<sup>81</sup> An Aegis Ashore site in Deveselu, Romania, became operational in May 2016, and in April 2019, the U.S. announced the temporary deployment of a Terminal High Altitude Area Defense (THAAD) system to Romania while the Aegis Ashore system is being updated.<sup>82</sup> Other components include a forward-based early-warning BMD radar at Kürecik, Turkey, and BMD-capable U.S. Aegis ships forward deployed at Rota, Spain.<sup>83</sup> A second Aegis Ashore site in Redzikowo, Poland, which broke ground in May 2016, was expected to be operational in 2017 but because of “construction issues” is now not expected to become operational until 2020.<sup>84</sup> Ramstein Air Base in Germany hosts a command and control center.<sup>85</sup>

In January 2017, the Russian embassy in Norway threatened that if Norway contributes ships or radar to NATO BMD, Russia “will have to react to defend our security.”<sup>86</sup> Norway operates four Aegis *Fridtjof Nansen*-class Aegis-equipped frigates that are not currently BMD capable.<sup>87</sup> A fifth Aegis-equipped frigate, the *Helge Ingstad*, collided with an oil tanker and was intentionally run aground in November 2018 and is almost certainly lost.<sup>88</sup>

Denmark, which agreed in 2014 to equip at least one frigate with radar to contribute to NATO BMD, reaffirmed this commitment in the recent Defence Agreement 2018–2023.<sup>89</sup> Russia’s ambassador in Copenhagen has openly threatened Denmark for agreeing to contribute: “I do not believe that Danish people fully understand the consequences of what may happen if Denmark joins the American-led missile defense system. If Denmark joins, Danish warships become targets for Russian nuclear missiles.”<sup>90</sup>

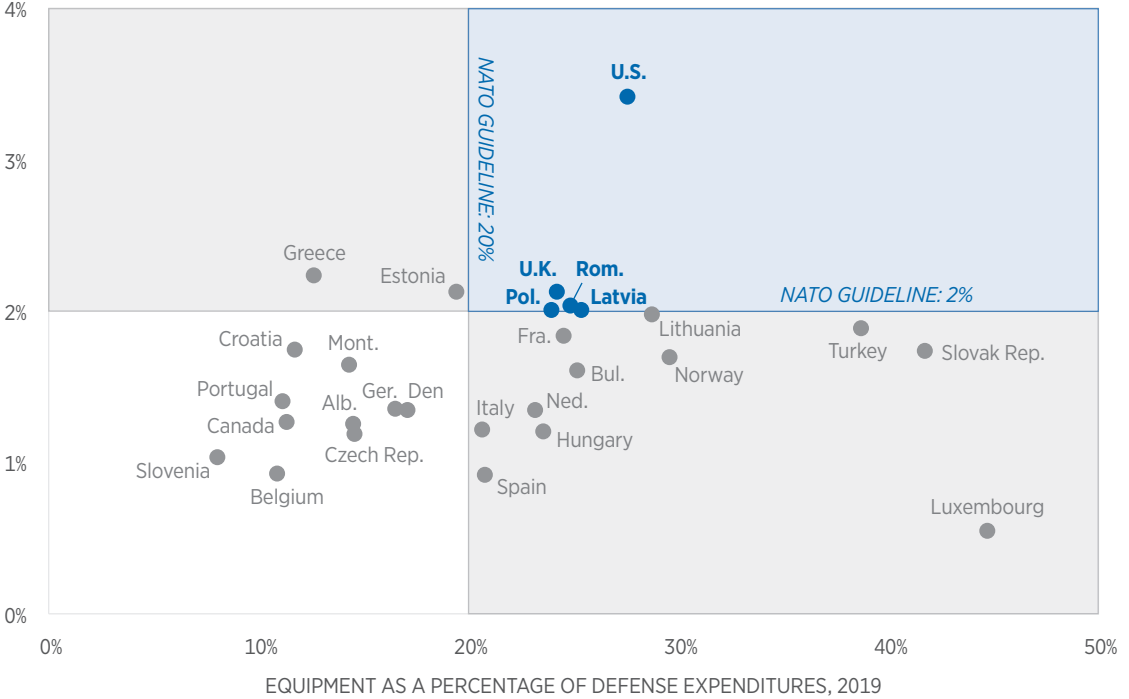
In March 2019, the first of four Dutch *Iver Huitfeldt*-class frigates received a SMART-L Multi-Mission/Naval (MM/N) D-band



## Few NATO Members Follow Defense Spending Guidelines

NATO members are expected to spend at least 2 percent of their GDP on defense, and at least 20 percent of their defense spending is supposed to go to equipment. Only the U.S. and four other nations do both, though Estonia and Lithuania nearly meet both guidelines.

DEFENSE SPENDING AS A PERCENTAGE OF GDP, 2019



**NOTES:** Figures are estimates for 2019. Iceland is not listed because it has no military.

**SOURCE:** NATO, “Defence Expenditures of NATO Countries (2012–2019),” June 25, 2019, [https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/pdf\\_2019\\_06/20190625\\_PR2019-069-EN.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2019_06/20190625_PR2019-069-EN.pdf) (accessed June 26, 2019).

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long-range radar upgrade, which is “designed to detect air, surface, and high-speed exo-atmospheric targets out to an instrumental range of 2,000 km.”<sup>91</sup> In February, the German Navy began a tender to upgrade radar on three F124 *Sachsen*-class frigates in order to contribute sea-based radar to NATO BMD.<sup>92</sup>

The U.K. operates a BMD radar at RAF Fylingdales in England. In November 2015, the

U.K. government stated that it plans to build new ground-based BMD radar as a contribution.<sup>93</sup> It expects the new radar to be in service by the mid-2020s and reportedly will also “investigate further the potential of the Type 45 Destroyers to operate in a BMD role.”<sup>94</sup> It also has been reported that Belgium intends to procure M-class frigates that “will be able to engage exo-atmospheric ballistic missiles.”<sup>95</sup>

Belgium and the Netherlands are jointly procuring four frigates. Spain currently operates four Aegis equipped F-100 *Alvaro de Bazan*-class frigates.<sup>96</sup>

In October 2017, ships from the U.S. and allies Canada, France, Germany, Italy, the Netherlands, Spain, and the United Kingdom took part in a three-and-a-half-week BMD exercise called Formidable Shield off the Scottish Coast.<sup>97</sup> Formidable Shield exercises were held again in 2019.<sup>98</sup>

### Quality of Armed Forces in the Region

Article 3 of the 1949 North Atlantic Treaty, NATO's founding document, states that members at a minimum "will maintain and develop their individual and collective capacity to resist armed attack."<sup>99</sup> Regrettably, only a handful of NATO members are living up to their Article 3 commitments.

In 2018, seven countries—Estonia (2.07 percent); Greece (2.22 percent); Latvia (2.03 percent); Lithuania (2.00 percent); Poland (2.05 percent); the United Kingdom (2.15 percent); and the United States (3.39 percent)—spent the required 2 percent of gross domestic product (GDP) on defense,<sup>100</sup> and 16 NATO allies spent 20 percent of their defense budgets on "major new capabilities."<sup>101</sup> NATO defense spending continues to trend upward: "In real terms, defence spending among European Allies and Canada increased by almost 4% from 2017 to 2018. Furthermore, in the period from 2016 to 2018, they have contributed an additional cumulative spending of over USD 41 billion."<sup>102</sup>

**Germany.** Germany remains an economic powerhouse that punches well below its weight in terms of defense. In 2018, it spent only 1.23 percent of GDP on defense and 14.1 percent of its defense budget on equipment.<sup>103</sup> This year, Germany officially reneged on its pledge to spend 2 percent of GDP in 2024, informing NATO that it would reach only 1.5 percent.<sup>104</sup> Germany plans to raise defense spending to 1.3 percent of GDP in 2019 and 1.37 percent in 2020; however, under current budget plans, its defense spending will decline again to 1.25

percent in 2023.<sup>105</sup> Because of the political constraints under the current coalition government, which is likely to remain in office until 2021, German defense spending is not likely to shift significantly.

The German military remains underfunded and underequipped. One former German diplomat has stated that without NATO, Germany "would have to double its defence budget to 3–3.5 per cent of GDP or risk being 'completely blind, deaf and defenceless.'"<sup>106</sup>

Germany continues to serve as the framework nation for NATO's EFP battalion in Lithuania, with 540 troops stationed there.<sup>107</sup> The Luftwaffe has taken part 11 times in Baltic Air Policing, more than any other nation's armed forces, including most recently in the second half of 2018. Additionally, in January, Germany took over the lead for NATO's VJTF.<sup>108</sup> However, the political decision-making involved in deploying German VJTF forces could prove worrisome in case of a crisis.<sup>109</sup> An ominous internal Ministry of Defense report leaked in February 2018 questioned the readiness and ability of the brigade that will lead the VJTF, citing a lack of equipment. According to reports, "the brigade had only nine of 44 Leopard 2 tanks, and three of the 14 Marder armored personnel carriers that it needs. It is also missing night vision goggles, support vehicles, winter clothing and body armor."<sup>110</sup>

The 1st German/Netherlands Corps is also currently in charge of the land forces of the larger NATO Response Force.<sup>111</sup> Germany maintains 100 troops in Kosovo as part of NATO's Kosovo Force (KFOR)<sup>112</sup> and is the second-largest contributor to NATO's Resolute Support Mission in Afghanistan, with 1,300 troops, a level made possible by an increase of one-third that was approved in March 2018.<sup>113</sup> The Bundestag also extended the mandate for Germany's participation in NATO's Sea Guardian maritime security operation, as well as deployments in support of the U.N. peacekeeping mission in Mali and South Sudan and participation in the counter-ISIS coalition.<sup>114</sup>

In October 2018, Germany extended its non-combat training mission in Iraq, but it

is scheduled to end its reconnaissance and air-to-air refueling missions in support of the counter-ISIS coalition by October 31, 2019.<sup>115</sup> Germany has trained over 18,000 Peshmerga since 2015 and in August 2018 introduced a new training program for Iraqi forces at Taji, which will focus on “logistics, paramedic training and defusing explosive devices.”<sup>116</sup> In April 2017, the Bundeswehr established a new cyber command, which initially will consist of 260 staff but will number around 13,500 by the time it becomes fully operational in 2021.<sup>117</sup>

While Germany’s forces have taken on additional roles in recent years, its overall military continues to suffer serious equipment and readiness issues. In June 2018, it was reported that a Defense Ministry document revealed the state of German readiness: Only 39 of 128 German Typhoons, 26 of 93 Tornado aircraft, 12 of 62 Tiger attack helicopters, 16 of 72 CH-53 transport helicopters, 13 of 58 NH-90 transport helicopters, three of 15 A400M transport aircraft, 105 of 224 Leopard 2 tanks, five of 13 frigates, and no German submarines were ready for action. The same report also stated that the increased number of deployments and training events since 2014 was causing equipment to wear down at a faster rate.<sup>118</sup>

The myriad examples of Germany’s lack of military readiness are worrisome. Despite plans to raise the number of active soldiers from 179,000 to 198,000 by 2024, for example, the military already suffers from acute manpower shortages including 21,000 vacant officer posts.<sup>119</sup> News reports in December 2018 cited a classified Defense Ministry plan to recruit Italians, Poles, and Romanians living in Germany to fill manpower gaps.<sup>120</sup>

For five months in 2018, the German Navy had no working submarines; all six of its Type 212-class submarines were in dry-dock awaiting repairs or not ready for active service.<sup>121</sup> In December 2017, Germany’s F-125 *Baden-Württemberg*-class frigate failed sea trials because of “software and hardware defects.”<sup>122</sup> The frigate reportedly had “problems with its radar, electronics and the flameproof coating on

its fuel tanks. The vessel was also found to list to the starboard” and lacked sufficiently robust armaments as well as the ability to add them.<sup>123</sup> Concerns have been raised about the frigate’s ability to defend against aerial attack, leaving it fit only for “stabilization operations.”<sup>124</sup> Germany returned the ship to the shipbuilder following delivery.<sup>125</sup>

The German Army cannot deploy a single brigade without first cannibalizing equipment and materials from other units.<sup>126</sup> The Luftwaffe faces similar problems. Training for new Tornado pilots is three months behind, and “[t]he Luftwaffe’s main forces—the Eurofighter and Tornado fighter jets and its CH-53 transport helicopters—are only available for use an average of four months a year—the rest of the time the aircraft are grounded for repairs and rearmament.”<sup>127</sup>

The Navy’s planned acquisitions signal the growing importance of operations in the Baltic Sea.<sup>128</sup> Germany is seeking a replacement for its 90 Tornado aircraft, set to be retired in 2030. In January 2019, the F-35 was eliminated as a potential replacement, leaving the F/A-18E/F Super Hornet and the Eurofighter Typhoon.<sup>129</sup> The Tornado replacement, planned “to enter service in about 2025,”<sup>130</sup> will need to be able to carry both nuclear and conventional weapons, as the Tornados are dual-capable aircraft equipped to carry B61 tactical nukes in addition to conventional payloads.<sup>131</sup>

Germany’s military faces institutional challenges to procurement that include an understaffed procurement office with 1,100 vacancies, which is equal to 17 percent of its entire workforce, and the need for special approval by a parliamentary budget committee for any expenditure of more than €25 million.<sup>132</sup> Because of vacancies and ineffective management, 10 percent of Germany’s equipment budget went unspent in 2018.<sup>133</sup>

In February 2017, Germany decided to replace its short-range air defense systems. Once complete, this upgrade, which could cost as much as €3.3 billion by 2030, will help to close a gap in Europe’s short-range air defense weapons that was identified in 2016.<sup>134</sup>

Germany's procurement of A400M cargo aircraft has been beset by delays, although the nation did receive 10 A400M aircraft in 2018.<sup>135</sup> A confidential German report reportedly raised doubts about "whether, when and how many mature deployable A400M will be available with the contractually required suite of tactical capabilities."<sup>136</sup> A difficult-to-use mission-planning system was a significant problem flagged by the report.<sup>137</sup> The continued failure of the A400M to include all of the original requirements has led in part to further delays and the need for retrofits and upgrades to produced aircraft, which could take several years; the U.K.'s A400M fleet reportedly will not be fully capable until the middle of the next decade.<sup>138</sup>

In May 2018, the U.S. approved the sale of six C-130J Hercules aircraft and three KC-130J tankers to France and Germany, which are planning to create a joint capability.<sup>139</sup>

**France.** France has one of the most capable militaries within the NATO alliance and retains an independent nuclear deterrent capability. Although France rejoined NATO's Integrated Command Structure in 2009, it remains outside the alliance's nuclear planning group. France increased its defense spending by 5 percent (\$2.1 billion more than 2017) in 2018 and further increased spending by 5 percent (\$2 billion more than 2018) in 2019.<sup>140</sup> In 2018, France spent 1.82 percent of GDP on defense and 23.7 percent of defense spending on equipment, attaining one of two NATO benchmarks.<sup>141</sup> In 2019, it plans to spend an extra \$1.46 billion more on equipment purchases than in 2018.<sup>142</sup>

In July 2018, President Emmanuel Macron signed the 2019–2025 military budget law, under which France's defense spending would reach 2 percent of GDP in 2025. However, one-third of the planned increases will not take effect until 2023 after the next French general election, with a budgetary review set for 2021. Much of the increased spending will be used for intelligence and military procurement, including "the acquisition of more than 1,700 armored vehicles for the Army as well

as five frigates, four nuclear-powered attack submarines and nine offshore patrol vessels for the Navy." Procurements for the Air Force would include "12 in-flight refueling tankers, 28 Rafale fighter jets and 55 upgraded Mirage 2000 fighters."<sup>143</sup>

In January 2019, France signed a \$2.3 billion agreement with Dassault Aviation for development of the F4 standard upgrade to the Rafale fighter aircraft. The 28 Rafales, to be delivered in 2023, "will include some F4 functionalities." Also in January, French Armed Forces Minister Florence Parly announced a potential order of 30 additional Rafales at full F4 standard in 2023 for delivery between 2027 and 2030.<sup>144</sup>

France is upgrading its sea-based and air-based nuclear deterrent. "It is estimated the cost of this process will increase from \$4.4bn in 2017 to \$8.6bn per year in 2022–2025," according to the International Institute for Strategic Studies (IISS), "but decrease thereafter—with these outlays likely to come at the expense of conventional procurements."<sup>145</sup>

In December 2016, France opened a cyber-operational command.<sup>146</sup> The French Military Programming Law for 2019–2015, enacted in the summer of 2018, added "an additional 1.6 billion euros for cyber operations along with 1,500 additional personnel for a total of 4,000 cyber combatants by 2025," and in January 2019, France issued its "first doctrine for offensive cyber operations."<sup>147</sup>

France, which has the third-largest number of active-duty personnel in NATO,<sup>148</sup> withdrew the last of its troops from Afghanistan at the end of 2014, although all French combat troops had left in 2012. France has 1,100 soldiers deployed in the campaign against the Islamic State, along with 10 Rafale fighter jets and three CAESAR self-propelled howitzers.<sup>149</sup>

The September 2017 death of a Special Forces soldier was the first combat death in Operation Chammal (French operations in Iraq).<sup>150</sup> In April 2018, France joined the U.S. and U.K. in targeting the Assad regime for its use of chemical weapons.<sup>151</sup> In January 2019, President Macron stated that France would continue to be

“militarily engaged” in the Middle East through the end of 2019.<sup>152</sup>

In April 2019, 300 French troops, along with four Leclerc tanks and 20 IFVs, joined the U.K.-led NATO EFP battlegroup in Estonia, to remain until the end of August.<sup>153</sup> The French military is also very active in Africa, with more than 4,500 troops involved in anti-terrorism operations in Burkina Faso, Chad, Mali, Mauritania, and Niger as part of Operation Barkhane and more than 1,450 troops stationed in Djibouti, 900 in Côte d’Ivoire, 350 in Gabon, and 350 in Senegal. In addition, France has a close relationship with the United Arab Emirates. It has 650 troops stationed in the UAE, and a 15-year defense agreement between the countries has been in effect since 2012.

France is part of the EU-led Operation Sophia in the Mediterranean to clamp down on human smuggling and migration and is involved in a few other maritime missions across the globe as well.<sup>154</sup> French naval forces occasionally conduct freedom of navigation operations in the South China Sea.<sup>155</sup> In April 2019, France sent a frigate, the *Vendémiaire*, through the Taiwan Strait on a freedom of navigation operation.<sup>156</sup> In March 2019, a French carrier strike group that included the French aircraft carrier *Charles de Gaulle* following an 18-month refurbishment began a five-month deployment to the Mediterranean to support Operation Chammal, as well as to the Red Sea and Indian Ocean, making a port call in Singapore in May.<sup>157</sup>

Operation Sentinelle, launched in January 2015 to protect the country from terrorist attacks, is the largest operational commitment of French forces, accounting for some 13,000 troops and reportedly costing “upwards of €400,000 per day.”<sup>158</sup> Frequent deployments, especially in Operation Sentinelle, have placed significant strains on French forces and equipment. “In early September 2017,” according to the IISS, “the chief of defense staff declared that the French armed forces have been used to ‘130% of their capacities and now need time to regenerate.’”<sup>159</sup> To counteract the strain on soldiers, the government extended

deployment pay to soldiers taking part in and created a “medal for Protection of the Territory” for troops deployed for 60 days in Operation Sentinelle.<sup>160</sup>

**The United Kingdom.** America’s most important bilateral relationship in Europe is the Special Relationship with the United Kingdom. In his famous 1946 “Sinews of Peace” speech—now better known as his “Iron Curtain” speech—Winston Churchill described the Anglo–American relationship as one that is based first and foremost on defense and military cooperation. From the sharing of intelligence to the transfer of nuclear technology, a high degree of military cooperation has helped to make the Special Relationship between the U.S. and the U.K. unique. U.K. Prime Minister Margaret Thatcher made clear the essence of this Special Relationship when she first met U.S.S.R. President Mikhail Gorbachev in 1984: “I am an ally of the United States. We believe the same things, we believe passionately in the same battle of ideas, we will defend them to the hilt. Never try to separate me from them.”<sup>161</sup>

In 2015, the U.K. conducted a Strategic Defence and Security Review (SDSR), the results of which have driven a modest increase in defense spending and an effort to reverse some of the cuts that had been implemented pursuant to the previous review in 2010. In 2018, the U.K. spent 2.15 percent of GDP on defense and 24.1 percent of its defense budget on equipment.<sup>162</sup> In October 2018, the Treasury announced an additional \$1.28 billion for the Ministry of Defence (MOD), in particular for cyber, anti-submarine warfare, and Dreadnought-class submarines.<sup>163</sup> Even though the MOD managed to save £5 billion over five years on “efficiencies,”<sup>164</sup> funding procurement remains a long-term issue. A November 2018 report from the National Audit Office found a \$9.4 billion funding shortfall for the U.K.’s equipment program.<sup>165</sup>

In December 2018, the U.K. released its Defence Modernisation Programme, which reaffirmed Britain’s commitment to defense in post-Brexit Europe: “As we leave the European Union, the UK will continue to protect

the Euro-Atlantic region through our leading role in the Alliance.” The program also noted plans to rebuild weapons stockpiles and “improve the readiness and availability of a range of key defence platforms, including: major warships, our attack submarines and helicopters.” The report on the program also announced the creation of a £160 million transformation fund to develop “cutting-edge technologies.”<sup>166</sup>

Though its military is small in comparison to the militaries of France and Germany, the U.K. maintains one of European NATO’s most effective armed forces. Former Defence Secretary Michael Fallon stated in February 2017 that the U.K. will have an expeditionary force of 50,000 troops by 2025.<sup>167</sup> This goal was reiterated in the MOD’s 2018 report on the Defence Modernisation Programme.<sup>168</sup> However, U.K. defense forces remain plagued by vacancies. “Under-staffing increased by 1.3% in 2018, an overall deficit of 6.2%, compared with 3.3% in 2016,” according to the IISS. “There are particular deficiencies in numbers of pilots, intelligence specialists and engineers, especially nuclear engineers.”<sup>169</sup>

In October 2018, because of a shortage of sailors, four of the Royal Navy’s 13 frigates reportedly had not spent a day at sea.<sup>170</sup> In April 2019, the U.K. reportedly was planning to upgrade only 148 of its 227 remaining Challenger 2 main battle tanks, cutting its fleet by one-third.<sup>171</sup> The 79 other tanks would be scavenged for spare parts.<sup>172</sup> The British Army had previously cut its tank forces by 40 percent in 2010.<sup>173</sup>

In November 2018, former Defence Secretary Gavin Williamson announced a contract to order an additional 17 F-35B aircraft. The Royal Air Force (RAF), which has already taken delivery of 17 F-35Bs and has one additional plane on order, will have a fleet of 35 F-35Bs by the end of 2022.<sup>174</sup> The MOD remains committed to purchasing 138 F-35s, but defense budget pressure has led some to raise the possibility that the number acquired might be cut.<sup>175</sup> In January 2019, the RAF announced that initial operating capability had been reached both for the F-35B and for the Typhoon fighter aircraft,

which received additional Storm Shadow long-range cruise missiles and Brimstone precision attack missiles under the \$546 billion Project Centurion upgrades.<sup>176</sup> The U.K. also plans to invest \$2.6 billion in development of the Tempest, a sixth-generation fighter to be delivered in 2035.<sup>177</sup>

The RAF recently brought into service a new fleet of air-to-air refuelers, which is particularly noteworthy because of the severe shortage of this capability in Europe. Along with the U.K., the U.S. has produced and jointly operated an intelligence-gathering platform, the RC-135 Rivet Joint aircraft, which has already seen service in Mali, Nigeria, and Iraq and is now part of the RAF fleet.<sup>178</sup>

The U.K. operates seven C-17 cargo planes and has started to bring the European A400M cargo aircraft into service after years of delays. Britain will procure a total fleet of 22 A400Ms by the early 2020s.<sup>179</sup> The 2015 SDSR recommended keeping 14 C-130Js in service even though they initially were going to be removed from the force structure.

The Sentinel R1, an airborne battlefield and ground surveillance aircraft, originally was due to be removed from the force structure in 2015, but its service is being extended at least to 2025, and the U.K. will soon start operating the P-8 Poseidon maritime patrol aircraft (MPA). The U.K. has procured nine P-8A maritime patrol aircraft, the first of which will come into service in November.<sup>180</sup> In January 2019, RAF members began P-8 training in the U.S.<sup>181</sup> A £132 million facility to house the P-8s is under construction at RAF Lossiemouth in Scotland, to be completed in 2020.<sup>182</sup> In the meantime, the U.K. has relied on allied MPAs to fill the gap; in 2017, 17 MPAs from the U.S., Canada, France, Germany, and Norway deployed to RAF Lossiemouth.<sup>183</sup>

The Royal Navy’s surface fleet is based on the new Type-45 destroyer and the older Type-23 frigate. The latter will be replaced by eight Type-26 Global Combat Ships sometime in the 2020s.<sup>184</sup> The U.K. operates only 19 frigates and destroyers, which most experts agree is dangerously low for the commitment asked of the

Royal Navy (in the 1990s, the fleet numbered nearly 60 surface combatants). In December 2017, 12 of 13 Type-23 frigates and all six Type-45 destroyers were in port, leaving only one Royal Navy frigate on patrol.<sup>185</sup> In August 2017, because of a shortage of surface combatants, the U.K. was forced to send a minesweeper to escort two Russian submarines through the English Channel.<sup>186</sup>

The U.K. will not have an aircraft carrier in service until the first *Queen Elizabeth*-class carrier enters service next year.<sup>187</sup> This will be the largest carrier operated in Europe, and two of her class will be built. In September 2018, the *Queen Elizabeth* underwent development trials off the Maryland coast that included flight trials with F-35Bs landing and taking off from the carrier's deck.<sup>188</sup> HMS *Queen Elizabeth* will return to the U.S. in late 2019 for additional sea and flight trials.<sup>189</sup> The Royal Navy is also introducing seven *Astute*-class attack submarines as it phases out its older *Trafalgar*-class subs. Crucially, the U.K. maintains a fleet of 13 Mine Counter Measure Vessels (MCMVs) that deliver world-leading capability and play an important role in Persian Gulf security contingency planning.

Perhaps the Royal Navy's most important contribution is its continuous-at-sea, submarine-based nuclear deterrent based on the *Vanguard*-class ballistic missile submarine and the Trident missile. In July 2016, the House of Commons voted to renew Trident and approved the manufacture of four replacement submarines to carry the missile. However, the replacement submarines are not expected to enter service until 2028 at the earliest.<sup>190</sup> In March 2018, Prime Minister Theresa May announced a £600m increase for procurement of the new *Dreadnought*-class submarines, stating that the extra funds "will ensure the work to rebuild the UK's new world-class submarines remains on schedule."<sup>191</sup>

The U.K. remains a leader inside NATO, serving as the framework nation for NATO's EFP in Estonia and as a contributing nation for the U.S.-led EFP in Poland. In April, four RAF Typhoons were sent to Estonia to begin

Britain's fifth Baltic Air Policing deployment.<sup>192</sup> Four RAF Typhoons were deployed to Romania for four months in May 2017 to support NATO's Southern Air Policing mission, and another four were deployed from May–September 2018.<sup>193</sup> The U.K. took part in Icelandic Air Policing in 2018 for the first time in over a decade because of a previous diplomatic dispute.<sup>194</sup> The U.K. also increased its already sizeable force in Afghanistan to 1,100 troops in 2018 as part of NATO's Resolute Support Mission and contributes to NATO's Kosovo Force, Standing NATO Maritime Group 1, and Mine Countermeasures Group One.<sup>195</sup> U.K. forces are an active part of the anti-ISIS coalition, and the U.K. joined France and the U.S. in launching airstrikes against the Assad regime in April 2018 in response to its use of chemical weapons against civilians.<sup>196</sup>

**Italy.** Italy hosts some of the U.S.'s most important bases in Europe, including the headquarters of the Sixth Fleet. It also has NATO's fifth-largest military<sup>197</sup> and one of its more capable ones despite continued lackluster defense investment. In 2018, Italy spent only 1.15 percent of GDP on defense, but it did spend 21.1 percent of its defense budget on equipment, meeting the second NATO spending benchmark.<sup>198</sup> Italy cut a further \$512.3 million from defense spending in 2019 and suspended NH-90 helicopter procurements and, as a result, the CAMM-ER (Common Anti-Air Modular Missile-Extended Range) missile system as well.<sup>199</sup>

Home to a developed and mature defense industry, Italy spent approximately \$5.7 billion on procurement in 2018, including purchases of four Special Forces Chinook helicopters.<sup>200</sup> The Italian Navy is undergoing a long-term replacement program that will include seven multipurpose patrol ships, new U212A submarines, a submarine rescue vehicle, and a new anti-ship missile system.<sup>201</sup> Italy launched the eighth of 10 planned FREMM frigates in February 2019 and also plans to purchase 60 F-35As for the air force and 30 F-35Bs for naval aviation.<sup>202</sup>

A government-owned final assembly plant for the F-35 is located in Italy, which "was

about to take delivery of its 12 F-35” as of March 2019.<sup>203</sup> Italian Defense Minister Elisabetta Trenta of the Five Star Movement was reviewing the program in June 2018, and the Five Star Movement had gone on record previously against Italy’s planned order, but in March 2019, the leader of Italy’s powerful junior coalition partner defended the nation’s planned F-35 purchase.<sup>204</sup>

Italy’s focus is the Mediterranean region where it participates in a number of stabilization missions including NATO’s Sea Guardian and the EU’s Operation Sophia.<sup>205</sup> Italy’s Operation Mare Sicuro has been active off the Libyan coast, and Italy has donated patrol boats to the Libyan coast guard.<sup>206</sup> Additionally, 283 Italian troops take part in the bilateral Mission of Assistance of Support in both Misrata and Tripoli.<sup>207</sup> These efforts have borne fruit; In February 2019, Central Mediterranean migrant crossings reached a nine-year low.<sup>208</sup>

Despite a southern focus, Italy contributes to NATO’s EFP battalion in Latvia with 160 troops and (second only to the United States) KFOR with 542 troops.<sup>209</sup> The Italian Air Force has taken part in Baltic Air Policing three times, most recently in the first half of 2018. From May–August 2019, Italy’s air force took part in NATO’s enhanced air policing in Romania, having previously participated in “a four-month enhanced Air Policing deployment to Bulgaria in 2017.”<sup>210</sup> In March 2019, the Italian Air Force deployed to Iceland to perform air patrols for the fourth time since 2013.<sup>211</sup>

**Poland.** Situated in the center of Europe, Poland shares a border with four NATO allies, a long border with Belarus and Ukraine, and a 144-mile border with Russia’s Kaliningrad Oblast, a Russian enclave between Poland and Lithuania on the Baltic Sea. Poland also has a 65-mile border with Lithuania, making it the only NATO member state that borders any of the Baltic States, and NATO’s contingency plans for liberating the Baltic States in the event of a Russian invasion reportedly rely heavily on Polish troops and ports.<sup>212</sup>

Poland has an active military force of 117,800, including a 61,200-strong army

with 637 main battle tanks.<sup>213</sup> In November 2016, Poland’s Parliament approved a new 53,000-strong territorial defense force intended, in the words of Poland’s Defense Minister, “to increase the strength of the armed forces and the defense capabilities of the country” and as “the best response to the dangers of a hybrid war like the one following Russia’s aggression in Ukraine.”<sup>214</sup> The planned 17 brigades of the Territorial Defense Forces will be distributed across the country.<sup>215</sup> Scheduled “to reach the full manpower by 2019,” the Territorial Defense Forces constitute the fifth branch of the Polish military, subordinate to the Minister of Defense,<sup>216</sup> and will deal with hybrid threats, linking “the military closely to society, so that there will be someone on hand in the event of an emergency to organize our defenses at the local level.”<sup>217</sup> Prioritization of the Territorial Defense Forces, which had a budget similar to the Polish Navy’s in 2018,<sup>218</sup> remains controversial in Polish defense circles.

In 2018, Poland spent 2.05 percent of GDP on defense and 26.5 percent of its defense budget on equipment, reaching both NATO benchmarks.<sup>219</sup> Pursuant to increases in defense spending adopted in October 2017, Poland should be spending 2.5 percent of GDP on defense in 2030.<sup>220</sup> Poland is making major investments in military modernization and is planning to spend \$48.7 billion on new capabilities by 2026, as assumed by the Armed Forces Technological Modernisation Plan (TMP) 2017–2026 signed in February 2019.<sup>221</sup>

In March 2018, in the largest procurement contract in its history, Poland signed a \$4.75 billion deal for two Patriot missile batteries.<sup>222</sup> In February 2019, Poland signed a \$414 million deal to purchase 20 high-mobility artillery rocket systems from the U.S. for delivery by 2023,<sup>223</sup> and in April 2019, it signed a \$430 million deal to buy four AW101 helicopters, which will provide anti-submarine warfare and search-and-rescue capabilities and are to be delivered by the end of 2022.<sup>224</sup> In February 2018, Poland joined an eight-nation “coalition of NATO countries seeking to jointly buy a fleet of maritime surveillance aircraft.”<sup>225</sup> Poland



has also expressed interest in purchasing 32 F-35 fighter jets.<sup>226</sup>

Poland seeks a permanent U.S. presence, offering \$2 billion to support it.<sup>227</sup> Although Poland's focus is territorial defense, it has 303 troops deployed in Afghanistan as part of NATO's Resolute Support Mission and took part in Operation Inherent Resolve to defeat ISIS.<sup>228</sup> Poland's air force has taken part in Baltic Air Policing eight times since 2006, most recently from January–May 2019.<sup>229</sup> Poland also is part of NATO's EFP in Latvia,<sup>230</sup> has 100 troops in NATO Mission Iraq,<sup>231</sup> has a frigate in Standing NATO Maritime Group One (SNMGI),<sup>232</sup> and has 240 troops in NATO's KFOR mission.<sup>233</sup>

**Turkey.** Turkey remains an important U.S. ally and NATO member, but the increasingly autocratic presidency of Recep Tayyip Erdogan and a thaw in relations between Turkey and Russia have introduced troubling challenges. Turkey has been an important U.S. ally since the closing days of World War II. During the Korean War, it deployed 15,000 troops and suffered 721 killed in action and more than 2,000 wounded. Turkey joined NATO in 1952, one of only two NATO members (the other was Norway) that had a land border with the Soviet Union. Today, it continues to play an active role in the alliance, but not without difficulties.

Following an attempted coup in July 2016, thousands of academics, teachers, journalists, judges, prosecutors, bureaucrats, and soldiers were fired or arrested. As of April 2019, 77,000 people had been jailed, and nearly 170,000 civil servants and military members had been fired or suspended; the mass detentions led the government in December 2017 to announce plans to build 228 new prisons over five years.<sup>234</sup> The post-coup crackdown has had an especially negative effect on the military. In April 2019, Turkey announced the detention of 210 additional military members including five colonels, seven lieutenant colonels, 14 majors, and 33 captains.<sup>235</sup> In April 2019, the Turkish Defense Ministry reported that 16,540 military personnel have been dismissed since the coup attempt.<sup>236</sup>

Turkey's military is now suffering from a loss of experienced generals and admirals as well as an acute shortage of pilots, and former NATO Supreme Allied Commander, Europe, General Scaparrotti has stated that Erdogan's military purges have "degraded" NATO's military capabilities.<sup>237</sup> The dismissal of more than 300 F-16 pilots, for instance, led to an August 2017 emergency decree in which the government recalled retired fighter pilots by threatening to revoke their civil pilot licenses; as of January 2019, only 40 had returned.<sup>238</sup> In January 2019, Turkish Defense Minister Hulusi Akar admitted that pilots are overworked: "When we conduct ground operations, our air force, with great heroism and sacrifice, successfully hits its targets, with one pilot assuming tasks that five pilots are supposed to do."<sup>239</sup>

Erdogan's rapprochement with Russian President Vladimir Putin has brought U.S.–Turkish relations to an all-time low. In December 2017, Turkey signed a \$2.5 billion agreement with Russia to purchase S-400 air defense systems, and Russia began delivery of the S-400 system to Turkey in July 2019.<sup>240</sup> U.S. officials, including Secretary of State Mike Pompeo, have expressed grave concerns about this purchase and have stated that Turkey will not receive F-35 jets if it acquires the S-400.<sup>241</sup>

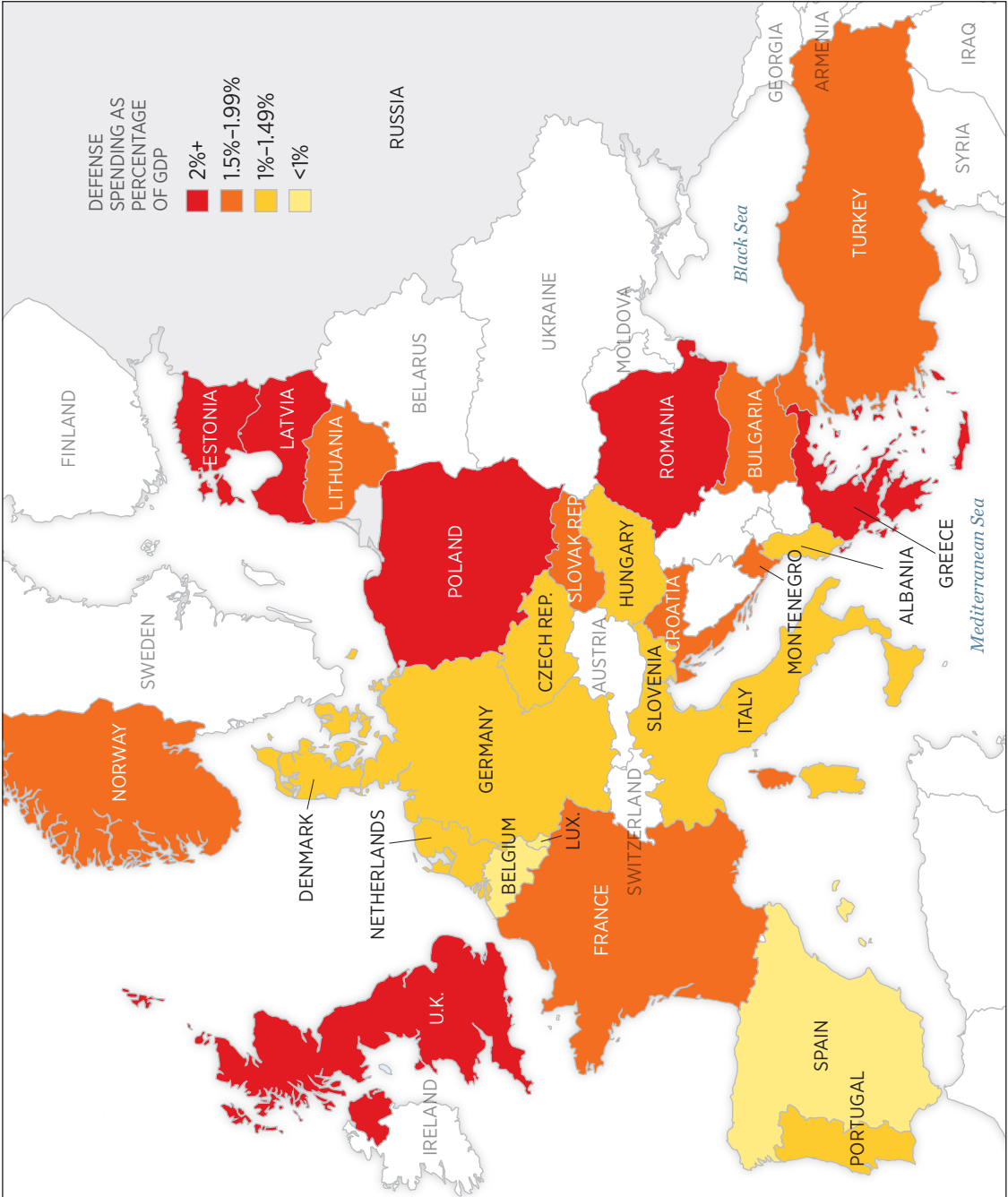
U.S. Administration officials and Members of Congress have threatened Turkey with potential sanctions because of the purchase.<sup>242</sup> In March 2019, Katie Wheelbarger, Acting Assistant Secretary of Defense for International Security Affairs, summarized the threat: "The S-400 is a computer. The F-35 is a computer. You don't hook your computer to your adversary's computer and that's basically what we would be doing."<sup>243</sup> While training of Turkish pilots on the aircraft in the U.S. reportedly continues,<sup>244</sup> it is hard to envision a scenario in which Turkey continues with the S-400 purchase and receives the F-35.

Eight Turkish defense firms make more than 800 components for the F-35, and some U.S. officials have suggested that American sanctions could cost Turkish defense industry as much as \$10 billion.<sup>245</sup> The U.S. stopped

MAP 2

## Threat Proximity Largely Dictates Military Spending

In Europe, NATO members closer to Russia and the Middle East spend, in general, more on defense than those further away.



**NOTES:** Figures are estimates for 2019. Iceland is not listed because it has no military.

**SOURCE:** NATO, "Defence Expenditures of NATO Countries (2012-2019)," June 25, 2019, [https://www.nato.int/nato\\_static\\_f2014/assets/pdf/pdf\\_2019\\_06/20190625\\_PR2019-069-EN.pdf](https://www.nato.int/nato_static_f2014/assets/pdf/pdf_2019_06/20190625_PR2019-069-EN.pdf) (accessed June 26, 2019).

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delivery of key parts and program materials to Turkish firms in early April and reportedly has offered to allow Turkey to purchase a Patriot missile battery if it cancels the S-400 sale, an offer that Turkish officials have declined in part because of the exclusion of a technology-sharing pact.<sup>246</sup>

One result of the strain in U.S.–Turkish relations caused by the S-400 purchase has been an underappreciated strengthening of U.S.–Greek relations. In May 2018, the U.S. began to operate MQ-9 Reaper drones out of Greece’s Larisa Air Base in flights that continued through August 2019.<sup>247</sup> The U.S. and Greece are in discussions about possibly using Larisa for KC-135 Stratotanker or UAV flights and expanding training at the base.<sup>248</sup> In October 2018, Greek Defense Minister Panos Kammenos raised the possibility that the U.S. might “deploy military assets in Greece on a more permanent basis, not only in Souda Bay but also in Larissa, in Volos, in Alexandroupoli.”<sup>249</sup>

Nevertheless, U.S. security interests in the region lend considerable importance to America’s relationship with Turkey. Turkey is home to Incirlik Air Base, a major U.S. and NATO air base, but it was reported early in 2018 that U.S. combat operations at Incirlik had been significantly reduced and that the U.S. was considering permanent reductions. In January 2018, the U.S. relocated an A-10 squadron from Incirlik to Afghanistan to avoid operational disruptions. According to U.S. officials, “Turkey has been making it harder to conduct air operations at the base, such as requesting the U.S. suspend operations to allow high-ranking Turkish officials to use the runway. Officials said this sometimes halts U.S. air operations for more than a day.”<sup>250</sup> Germany’s decision to leave the base also has affected American views of Incirlik’s value. Other tensions stem from an August 2018 petition promoted by a Turkish legal organization with ties to the ruling party. The group was seeking to execute a search warrant at Incirlik and to arrest American personnel who, according to the petition, at one time were assigned to the base and allegedly had participated in the failed 2016 coup.<sup>251</sup>

U.S. officials, however, have largely downplayed tensions with Turkey. An official at EU-COM, for example, has stated that “Incirlik still serves as [a] forward location that enables operational capabilities and provides the U.S. and NATO the strategic and operational breadth needed to conduct operations and assure our allies and partners.”<sup>252</sup> Incirlik’s strategic value was on display again in May 2018 when an F-18 pilot taking part in airstrikes against ISIS made an emergency landing there after suffering from hypoxia.<sup>253</sup>

One cause for optimism has been NATO’s decision to deploy air defense batteries to Turkey and increased AWACS flights in the region after the Turkish government requested them in late 2015.<sup>254</sup> NATO members Italy and Spain currently deploy air defense batteries to Turkey.<sup>255</sup> Additionally, NATO AWACS aircraft involved in counter-ISIS operations have flown from Turkey’s Konya Air Base.<sup>256</sup> Turkey also hosts a crucial radar at Kürecik, which is part of NATO’s BMD system, and the U.S. is reportedly building a second undisclosed site (site K) near Malatya, which is home to an AN/TPY-2 radar with a range of up to 1,800 miles.<sup>257</sup>

While visiting Turkey in April 2018, NATO Secretary General Jens Stoltenberg stated that “Turkey is a highly valued NATO Ally, and Turkey contributes to our shared security, our collective defence, in many different ways.” Stoltenberg also referenced the significant financial investment that NATO was making in the upgrading of Turkey’s military infrastructure.<sup>258</sup> Turkey continues to maintain more than 593 troops in Afghanistan as part of NATO’s Resolute Support Mission, making it the seventh-largest troop contributor out of 39 nations.<sup>259</sup> The Turks also have contributed to a number of peacekeeping missions in the Balkans, still maintain 246 troops in Kosovo, and have participated in counterpiracy and counterterrorism missions off the Horn of Africa in addition to deploying planes, frigates, and submarines during the NATO-led operation in Libya. Turkey has a 355,200-strong active-duty military,<sup>260</sup> which is NATO’s second largest after that of the United States.

The failed coup plot enabled Erdogan to consolidate more power. A December 2017 decree placed the Undersecretariat for Defense Industries (SSB) responsible for procurement under Erdogan's direct control.<sup>261</sup> Since then, Turkey's defense procurement has suffered from a "brain drain." In January 2019, it was reported that 272 defense officials and engineers had left for jobs overseas since the change. Of the 81 who responded to an SSB survey, "41 percent are in the 26–30 age group. 'This highlights a trend among the relatively young professionals to seek new opportunities abroad,' one SSB official noted."<sup>262</sup> Other challenges include a sputtering economy, weakened lira,<sup>263</sup> and continued reliance on foreign components despite a focus on indigenous procurement. For example, Turkey's procurement of 250 new Altay main battle tanks, the first of which are scheduled to be ready in May 2020, relies on a German-made engine and transmission.<sup>264</sup>

Other major procurements include 350 T-155 Firtina 155mm self-propelled howitzers, six Type-214 submarines, and more than 50 T-129 attack helicopters.<sup>265</sup> Turkish submarine procurement has faced six-year delays, and the first submarine will not be delivered until 2021.<sup>266</sup> In February 2019, Turkey announced upgrades of four *Prevez*-class submarines, to take place from 2023–2027.<sup>267</sup> The same month, Turkey launched an intelligence-gathering ship, the TCG *Ufuk*, described by President Erdogan as the "eyes and ears of Turkey in the seas."<sup>268</sup>

Geographically and geopolitically, Turkey remains a key U.S. ally and NATO member. It has been a constructive and fruitful security partner for decades, and maintaining the relationship is in America's interest. The challenge for U.S. and NATO policymakers will be to navigate Erdogan's increasingly autocratic leadership, discourage Ankara's warming relations with Russia, and find a way to resolve the S-400 standoff.

**The Baltic States.** The U.S. has a long history of championing the sovereignty and territorial integrity of the Baltic States that dates back to the interwar period of the 1920s. Since

regaining their independence from Russia in the early 1990s, the Baltic States have been staunch supporters of the transatlantic relationship. Although small in absolute terms, the three countries contribute significantly to NATO in relative terms.

*Estonia.* Estonia has been a leader in the Baltics in terms of defense spending and, with defense spending equal to 2.07 percent of GDP, was one of seven NATO members to meet the first NATO benchmark in 2018.<sup>269</sup> In March 2019, the Defense Ministry announced that "[a] total of EUR 585 million has been set aside for defence expenditures, representing 2.16% of the forecast GDP."<sup>270</sup>

Although the Estonian armed forces total only 6,600 active-duty service personnel (including the army, navy, and air force),<sup>271</sup> they are held in high regard by their NATO partners and punch well above their weight inside the alliance. Between 2003 and 2011, 455 served in Iraq. Perhaps Estonia's most impressive deployment has been to Afghanistan: more than 2,000 troops deployed between 2003 and 2014, sustaining the second-highest number of deaths per capita among all 28 NATO members.

In 2015, Estonia reintroduced conscription for men ages 18–27, who must serve eight or 11 months before being added to the reserve rolls.<sup>272</sup> The number of Estonian conscripts will increase from 3,200 to 4,000 by 2026.<sup>273</sup>

Estonia has demonstrated that it takes defense and security policy seriously, focusing on improving defensive capabilities at home while maintaining the ability to be a strategic actor abroad. One recent joint procurement is with neighboring Finland to acquire 12 South Korean-built howitzers by 2023.<sup>274</sup> In 2014, Estonia contracted with the Netherlands to purchase 44 used infantry fighting vehicles, the last of which have been delivered.<sup>275</sup> In June 2018, it signed a \$59 million deal to purchase short-range air defenses, with Mistral surface-to-air missiles to be delivered starting in 2020.<sup>276</sup> In 2019, Estonia received two C-145A tactical transport aircraft donated by the U.S.<sup>277</sup> In May, the first of three *Sandown*-class minehunters underwent sea trials following upgrades.<sup>278</sup>

According to Estonia's National Defence Development Plan for 2017–2026, “the size of the rapid reaction structure will increase from the current 21,000 to over 24,400.”<sup>279</sup> In February 2019, the Defense Ministry approved its development plan for 2020–2023, which in part details plans to spend over \$48 million on the Estonian Defence League: “The equipment and armaments of the Defence Forces and the Defence League are being upgraded—new firearms, communications and IT equipment, clothing, flak jackets and bulletproof vests are being procured.”<sup>280</sup>

Estonia's cyber command became operational in August 2018 and is expected to include 300 people when it reaches full operational capability in 2023.<sup>281</sup> The Estonian Defence League also has a Cyber Defence Unit, a reserve force that relies heavily on expertise found in the civilian sector and whose mission is “to protect Estonia's high-tech way of life, including protection of information infrastructure and supporting broader objectives of national defence.”<sup>282</sup>

In 2017, Estonia and the U.S. strengthened their bilateral relationship by signing a defense cooperation agreement that builds on the NATO–Estonia Status of Forces Agreement, further clarifying the legal framework for U.S. troops in Estonia.<sup>283</sup> Estonia's defense budget for 2019 reflects that Estonia was to receive €14 million from NATO's Security Investment Program to improve staging facilities at Tapa where the NATO EFP is located and €9 million “for increasing training opportunities at the central training area.”<sup>284</sup>

*Latvia.* Latvia's recent military experience also has been centered on operations in Iraq and Afghanistan alongside NATO and U.S. forces. Latvia has deployed more than 3,000 troops to Afghanistan and between 2003 and 2008 deployed 1,165 troops to Iraq. In addition, it has contributed to a number of other international peacekeeping and military missions. These are significant numbers when one considers that only 6,210 of Latvia's troops are full-time servicemembers; the remainder are reserves.<sup>285</sup>

Latvia's 2016 National Defence Concept clearly defines Russia as a threat to national security and states that “[d]eterrence is enhanced by the presence of the allied forces in Latvia.”<sup>286</sup> The concept requires a 6,500-strong peacetime military force, a level that Latvia has not yet achieved; Latvia added 640 soldiers to its armed forces in 2018 and plans “to recruit up to 710” more by the end of 2019.<sup>287</sup>

In 2018, Latvia spent 2.03 percent of GDP on defense, slightly higher than the NATO benchmark of 2 percent, and spent 35.4 percent of its defense budget on equipment.<sup>288</sup> In November 2018, it signed a deal for four UH-60M Black Hawk helicopters.<sup>289</sup> In addition, Latvia has purchased 47 M109 self-propelled artillery pieces from Austria and *Stinger* man-portable air-defense missile systems (MANPADs) from Denmark.<sup>290</sup> Latvia has also expressed interest in procuring a medium-range ground-based air-defense system (GBADS) and is investing \$56 million annually through 2022 on military infrastructure, with two-thirds of this amount being spent to upgrade Ādaži military base, headquarters of the Canadian-led EFP battlegroup.<sup>291</sup>

*Lithuania.* Lithuania is the largest of the three Baltic States, and its armed forces total 19,850 active-duty troops.<sup>292</sup> It reintroduced conscription in 2015.<sup>293</sup> Lithuania has also shown steadfast commitment to international peacekeeping and military operations. Between 2003 and 2011, it sent 930 troops to Iraq. Since 2002, around 3,000 Lithuanian troops have served in Afghanistan, a notable contribution that is divided between a special operations mission alongside U.S. and Latvian Special Forces and command of a Provisional Reconstruction Team (PRT) in Ghor Province, making Lithuania one of only a handful of NATO members to have commanded a PRT. Lithuania continues to contribute to NATO's KFOR and Resolute Support Missions.<sup>294</sup>

In 2018, Lithuania reached the NATO benchmark of 2 percent of GDP devoted to spending on defense and spent 30.6 percent of its defense budget on equipment.<sup>295</sup> The government's 2019 National Threat Assessment

clearly identifies Russia as the main threat to the nation.<sup>296</sup> In April 2019, the U.S. and Lithuania signed a five-year “road map” defense agreement.<sup>297</sup> According to the Pentagon, the agreement will help “to strengthen training, exercises, and exchanges” and help Lithuania “to defend against malicious cyber intrusions and attacks.” The two nations also pledged “to support regional integration and procurement of warfighting systems,” including “integrated air and missile defense systems and capabilities to enhance maritime domain awareness.”<sup>298</sup>

Prime Minister Saulius Skvernelis has identified modernization as the armed forces’ “number-one priority.”<sup>299</sup> Lithuania is procuring Norwegian-made ground-based mid-range air defence systems armed with U.S.-made missiles by 2021.<sup>300</sup> Additional procurements include 88 Boxer Infantry Fighting Vehicles through 2021, additional missiles for the Javelin anti-tank system, and 21 PzH 2000 self-propelled howitzers.<sup>301</sup> Lithuania is also seeking to purchase 200 Oshkosh Joint Light Tactical Vehicles by 2023.<sup>302</sup>

### **Current U.S. Military Presence in Europe**

At its peak in 1953, because of the Soviet threat to Western Europe, the U.S. had approximately 450,000 troops in Europe operating across 1,200 sites. During the early 1990s, both in response to a perceived reduction in the threat from Russia and as part of the so-called peace dividend following the end of the Cold War, U.S. troop numbers in Europe were slashed. Today, around 68,000 troops are stationed in Europe.<sup>303</sup>

EUCOM’s stated mission is to conduct military operations, international military partnering, and interagency partnering to enhance transatlantic security and defend the United States as part of a forward defensive posture. EUCOM is supported by four service component commands (U.S. Naval Forces Europe [NAVEUR]; U.S. Army Europe [USAREUR]; U.S. Air Forces in Europe [USAFE]; and U.S. Marine Forces Europe [MARFOREUR]) and one subordinate unified command (U.S. Special Operations Command Europe [SOCEUR]).

**U.S. Naval Forces Europe.** NAVEUR is responsible for providing overall command, operational control, and coordination for maritime assets in the EUCOM and Africa Command (AFRICOM) areas of responsibility. This includes more than 20 million square nautical miles of ocean and more than 67 percent of the Earth’s coastline.

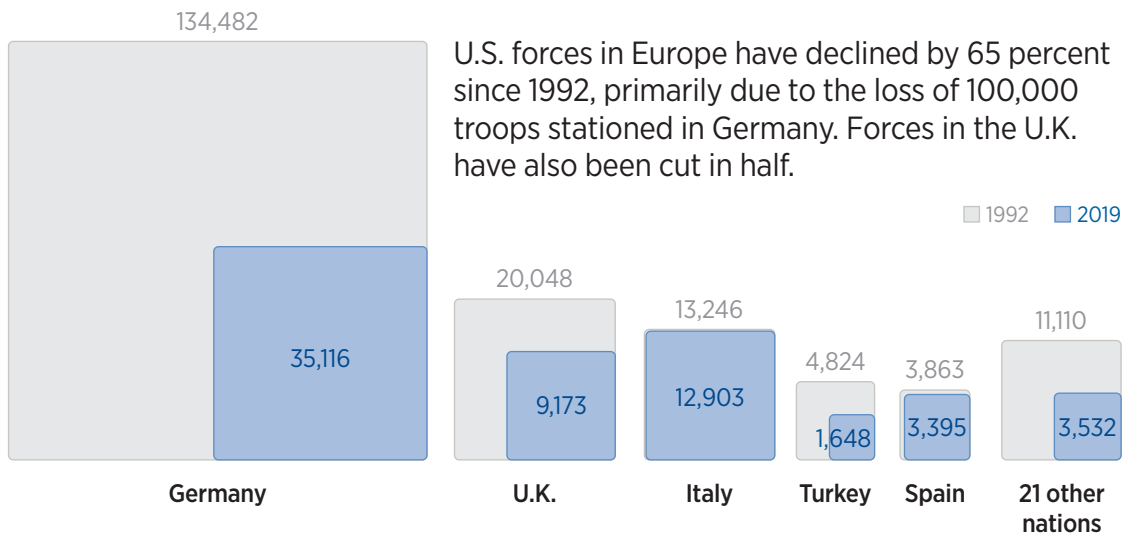
This command is currently provided by the U.S. Sixth Fleet, based in Naples, and brings critical U.S. maritime combat capability to an important region of the world. Some of the more notable U.S. naval bases in Europe include the Naval Air Station in Sigonella, Italy; the Naval Support Activity Base in Souda Bay, Greece; and the Naval Station at Rota, Spain. Naval Station Rota is home to four capable Aegis-equipped destroyers.<sup>304</sup>

A special focus for NAVEUR this year includes “enhancement to the Theater’s Anti-Submarine Warfare through the procurement of additional equipment and the improvement to theater infrastructure” and a naval logistics hub.<sup>305</sup> In 2018, the Norfolk, Virginia-based Harry S. Truman Carrier Strike Group (CSG) executed no-notice deployments to the Mediterranean over the summer and the Norwegian Sea above the Arctic Circle in October; the Arctic deployment was the first for a CSG in 30 years.<sup>306</sup>

**U.S. Army Europe.** USAREUR was established in 1952. Then, as today, the U.S. Army formed the bulk of U.S. forces in Europe. USAREUR, overseeing 35,000 soldiers, is headquartered in Wiesbaden, Germany. Permanently deployed forces include the 2nd Cavalry Regiment, based in Vilseck, Germany, and the 173rd Airborne Brigade in Italy, with both units supported by the 12th Combat Aviation Brigade out of Ansbach, Germany. Additionally, in November 2018, the 41st Field Artillery Brigade returned to Europe, with headquarters in Grafenwoehr, Germany.<sup>307</sup> In addition:

Operational and theater enablers such as the 21st Theater Sustainment Command, 7th Army Training Command, 10th Army

## U.S. Maintains Significantly Smaller Presence in Europe



**NOTES:** 2019 figures are as of March. “21 other nations” include non-listed NATO members with American forces.

**SOURCES:** U.S. Department of Defense, Defense Manpower Data Center, “DoD Personnel, Workforce Reports & Publications: Historical Reports—Military Only—1950, 1953–1999,” [https://www.dmdc.osd.mil/appj/dwp/dwp\\_reports.jsp](https://www.dmdc.osd.mil/appj/dwp/dwp_reports.jsp) (accessed August 10, 2018), and U.S. Department of Defense, Defense Manpower Data Center, “DoD Personnel, Workforce Reports & Publications: Military and Civilian Personnel by Service/Agency by State/Country,” [https://www.dmdc.osd.mil/appj/dwp/dwp\\_reports.jsp](https://www.dmdc.osd.mil/appj/dwp/dwp_reports.jsp) (accessed July 1, 2019).

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Air and Missile Defense Command, 2nd Theater Signal Brigade, 66th Military Intelligence Brigade, the U.S. Army NATO Brigade, Installation Management Command-Europe and Regional Health Command-Europe provide essential skills and services that enable our entire force.<sup>308</sup>

USAREUR will add 1,500 soldiers by 2020, including “two multiple launch rocket system battalions” and “a short-range air defense battalion.”<sup>309</sup> The 5th Battalion, 4th Air Defense Artillery Regiment, was activated in November 2018 and is now based in Ansbach.<sup>310</sup> The rotational National Guard 174th Air Defense Artillery Brigade has replaced the National Guard 678th ADAB, which first deployed in April 2018 in the first such deployment since the end of the Cold War.<sup>311</sup>

**U.S. Air Forces in Europe.** USAFE provides a forward-based air capability that can support a wide range of contingency operations. USAFE originated as the 8th Air Force in 1942 and flew strategic bombing missions over the European continent during World War II.

Headquartered at Ramstein Air Base, USAFE has seven main operating bases along with 114 geographically separated locations. The main operating bases include the RAF bases at Lakenheath and Mildenhall in the U.K., Ramstein and Spangdahlem Air Bases in Germany, Lajes Field in the Azores, Incirlik Air Base in Turkey, and Aviano Air Base in Italy.<sup>312</sup>

**U.S. Marine Forces Europe.** MARFOR-EUR was established in 1980. It was originally a “designate” component command, meaning that it was only a shell during peacetime but could bolster its forces during wartime. Its

initial staff was 40 personnel based in London. By 1989, it had more than 180 Marines in 45 separate locations in 19 countries throughout the European theater. Today, the command is based in Boeblingen, Germany, and approximately 140 of the 1,500 Marines based in Europe are assigned to MARFOREUR.<sup>313</sup> It was also dual-hatted as Marine Corps Forces, Africa (MARFORAF), under U.S. Africa Command in 2008.

MARFOREUR supports the Norway Air Landed Marine Air Ground Task Force, the Marine Corps' only land-based prepositioned stock. The Corps has enough prepositioned stock in Norway "to equip a fighting force of 4,600 Marines, led by a colonel, with everything but aircraft and desktop computers," and the Norwegian government covers half of the costs of the prepositioned storage. The stores have been utilized for Operation Iraqi Freedom and current counter-ISIS operations, as well as for humanitarian and disaster response.<sup>314</sup> The prepositioned stock's proximity to the Arctic region makes it of particular geostrategic importance. In October 2018, Marines utilized the prepositioned equipment as part of NATO's exercise Trident Juncture 18, the largest NATO exercise in 16 years, which included 50,000 troops from 31 nations.<sup>315</sup>

Crucially, MARFOREUR provides the U.S. with rapid reaction capability to protect U.S. embassies in North Africa. The Special-Purpose Marine Air-Ground Task Force-Crisis Response-Africa (SPMAGTF-CR-AF) is currently located in Spain and Italy and provides a response force of 850 Marines, six MV-22 Ospreys, and three KC-130s.<sup>316</sup> The SPMAGTF helped with embassy evacuations in Libya and South Sudan and conducts regular drills with embassies in the region and exercises with a host of African nations' militaries.<sup>317</sup>

In September 2018, the Marine Corps ended a consistent rotation of 700 marines to the Black Sea Rotational Force (BSRF).<sup>318</sup>

**U.S. Special Operations Command Europe.** SOCEUR is the only subordinate unified command under EUCOM. Its origins are in the

Support Operations Command Europe, and it was based initially in Paris. This headquarters provided peacetime planning and operational control of special operations forces during unconventional warfare in EUCOM's area of responsibility.

SOCEUR has been headquartered in Panzer Kaserne near Stuttgart, Germany, since 1967. It also operates out of RAF Mildenhall. In June 2018, former U.S. Special Operations Command General Tony Thomas stated that the U.S. plans "to move tactical United States special operations forces from the increasingly crowded and encroached Stuttgart installation of Panzer Kaserne to the more open training grounds of Baumholder," a move that is expected to take a few years.<sup>319</sup>

Due to the sensitive nature of special operations, publicly available information is scarce. However, it has been documented that SOCEUR elements participated in various capacity-building missions and civilian evacuation operations in Africa; took an active role in the Balkans in the mid-1990s and in combat operations in the Iraq and Afghanistan wars; and most recently supported AFRICOM's Operation Odyssey Dawn in Libya. SOCEUR also plays an important role in joint training with European allies; since June 2014, it has maintained an almost continuous presence in the Baltic States and Poland in order to train special operations forces in those countries.

According to General Scaparrotti, "USEUCOM and USSOCOM work together to employ SOF in Europe, where their unique access and capabilities can be utilized to compete below the level of armed conflict."<sup>320</sup> The FY 2020 DOD budget request included over \$100 million for various special operations programs and functions through EDI. This funding is intended to go to such projects as enhancement of special operations forces' staging capabilities and prepositioning in Europe, exercise support, and partnership activities with Eastern and Central European allies' special operations forces.<sup>321</sup>



## Key Infrastructure and Warfighting Capabilities

One of the major advantages of having U.S. forces in Europe is access to logistical infrastructure. For example, EUCOM supports the U.S. Transportation Command (TRANSCOM) with its array of air bases and access to ports throughout Europe. One of these bases, Mihail Kogalniceanu Air Base in Romania, is a major logistics and supply hub for U.S. equipment and personnel traveling to the Middle East region.<sup>322</sup>

Europe is a mature and advanced operating environment. America's decades-long presence in Europe means that the U.S. has tried and tested systems that involve moving large numbers of matériel and personnel into, inside, and out of the continent. This offers an operating environment that is second to none in terms of logistical capability. There are more than 166,000 miles of rail line in Europe (not including Russia), an estimated 90 percent of roads in Europe are paved, and the U.S. enjoys access to a wide array of airfields and ports across the continent.

## Conclusion

Overall, the European region remains a stable, mature, and friendly operating environment. Russia remains the preeminent military threat to the region, both conventionally and unconventionally. America's closest and oldest allies are located in Europe, and

the region is incredibly important to the U.S. for economic, military, and political reasons. Perhaps most important, the U.S. has treaty obligations through NATO to defend the European members of that alliance. If the U.S. needs to act in the European region or nearby, there is a history of interoperability with allies and access to key logistical infrastructure that makes the operating environment in Europe more favorable than the environment in other regions in which U.S. forces might have to operate.

The past year saw continued U.S. reengagement with the continent, both militarily and politically, along with modest increases in European allies' defense budgets and capability investment. Despite allies' initial concerns, the U.S. has increased its investment in Europe, and its military position on the continent is stronger than it has been for some time.

NATO's renewed focus on collective defense has resulted in a focus on logistics, newly established commands that reflect a changed geopolitical reality, and a robust set of exercises. NATO's biggest challenges derive from capability and readiness gaps for many European nations, continuing improvements and exercises in the realm of logistics, a tempestuous Turkey, disparate threat perceptions within the alliance, and the need to establish the ability to mount a robust response to both linear and nonlinear forms of aggression.

## Scoring the European Operating Environment

As noted at the beginning of this section, various considerations must be taken into account in assessing the regions within which the U.S. may have to conduct military operations to defend its vital national interests. Our assessment of the operating environment utilized a five-point scale, ranging from "very poor" to "excellent" conditions and covering four regional characteristics of greatest relevance to the conduct of military operations:

1. **Very Poor.** Significant hurdles exist for military operations. Physical infrastructure is insufficient or nonexistent, and the region is politically unstable. The U.S. military is poorly placed or absent, and alliances are nonexistent or diffuse.
2. **Unfavorable.** A challenging operating environment for military operations is marked by inadequate infrastructure, weak alliances, and recurring political

instability. The U.S. military is inadequately placed in the region.

3. **Moderate.** A neutral to moderately favorable operating environment is characterized by adequate infrastructure, a moderate alliance structure, and acceptable levels of regional political stability. The U.S. military is adequately placed.
4. **Favorable.** A favorable operating environment includes good infrastructure, strong alliances, and a stable political environment. The U.S. military is well placed in the region for future operations.
5. **Excellent.** An extremely favorable operating environment includes well-established and well-maintained infrastructure; strong, capable allies; and a stable political environment. The U.S. military is exceptionally well placed to defend U.S. interests.

The key regional characteristics consist of:

- a. **Alliances.** Alliances are important for interoperability and collective defense, as allies are more likely to lend support to U.S. military operations. Various indicators provide insight into the strength or health of an alliance. These include whether the U.S. trains regularly with countries in the region, has good interoperability with the forces of an ally, and shares intelligence with nations in the region.
- b. **Political Stability.** Political stability brings predictability for military planners when considering such things as transit, basing, and overflight rights for U.S. military operations. The overall degree of political stability indicates whether U.S. military actions would be hindered or enabled and considers, for example, whether transfers of power are generally

peaceful and whether there have been any recent instances of political instability in the region.

- c. **U.S. Military Positioning.** Having military forces based or equipment and supplies staged in a region greatly facilitates the United States' ability to respond to crises and, presumably, achieve successes in critical "first battles" more quickly. Being routinely present in a region also assists in maintaining familiarity with its characteristics and the various actors that might try to assist or thwart U.S. actions. With this in mind, we assessed whether or not the U.S. military was well positioned in the region. Again, indicators included bases, troop presence, prepositioned equipment, and recent examples of military operations (including training and humanitarian) launched from the region.
- d. **Infrastructure.** Modern, reliable, and suitable infrastructure is essential to military operations. Airfields, ports, rail lines, canals, and paved roads enable the U.S. to stage, launch operations from, and logistically sustain combat operations. We combined expert knowledge of regions with publicly available information on critical infrastructure to arrive at our overall assessment of this metric.

For Europe, scores this year remained steady, with no substantial changes in any individual categories or average scores:

- Alliances: **4—Favorable**
- Political Stability: **4—Favorable**
- U.S. Military Positioning: **3—Moderate**
- Infrastructure: **4—Favorable**

Leading to a regional score of: **Favorable**

## Operating Environment: Europe

	VERY POOR	UNFAVORABLE	MODERATE	FAVORABLE	EXCELLENT
Alliances				✓	
Political Stability				✓	
U.S. Military Posture			✓		
Infrastructure				✓	
<b>OVERALL</b>				✓	

## Endnotes

1. On March 29, 2017, Great Britain began a two-year process of formal withdrawal from the EU by invoking Article 50 of the Treaty on European Union.
2. Trisha Thomas, "NATO: Russia Uses Syrian War to Boost Mediterranean Presence," Associated Press, May 8, 2018, <https://www.military.com/daily-news/2018/05/08/nato-russia-uses-syrian-war-boost-mediterranean-presence.html> (accessed May 30, 2019).
3. David A. Wemer, "US Joint Chiefs Chairman Makes the Case for Keeping US Troops in Europe," Atlantic Council, March 21, 2019, <https://www.atlanticcouncil.org/blogs/new-atlanticist/us-joint-chiefs-chairman-makes-the-case-for-keeping-us-troops-in-europe> (accessed May 30, 2019).
4. Stenographic transcript of *Hearing to Receive Testimony on United States European Command*, Committee on Armed Services, U.S. Senate, March 23, 2017, p. 14, [https://www.armed-services.senate.gov/imo/media/doc/17-24\\_03-23-17.pdf](https://www.armed-services.senate.gov/imo/media/doc/17-24_03-23-17.pdf) (accessed May 30, 2019).
5. U.S. Army Europe, "America's Continued Commitment to European Security: #AtlanticResolve," <https://www.eur.army.mil/AtlanticResolve/> (accessed May 30, 2019).
6. U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller), *Department of Defense Budget, Fiscal Year (FY) 2020: European Deterrence Initiative*, March 2019, p. 1, [https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/fy2020\\_EDI\\_JBook.pdf](https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/fy2020_EDI_JBook.pdf) (accessed May 30, 2019).
7. Ibid.
8. Ibid. and Aaron Mehta, "European Defense Fund Takes a 10 Percent Cut in New Budget," *Defense News*, March 12, 2019, <https://www.defensenews.com/smr/federal-budget/2019/03/12/european-defense-fund-takes-a-10-percent-cut-in-new-budget/> (accessed May 30, 2019).
9. Mehta, "European Defense Fund Takes a 10 Percent Cut in New Budget."
10. U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller), *Department of Defense Budget, Fiscal Year (FY) 2020: European Deterrence Initiative*, p. 1, and Mehta, "European Defense Fund Takes a 10 Percent Cut in New Budget."
11. General Curtis M. Scaparrotti, United States Army, Commander, United States European Command, statement on USEUCOM posture before the Committee on Armed Services, U.S. Senate, March 5, 2019, p. 19, [https://www.armed-services.senate.gov/imo/media/doc/Scaparrotti\\_03-05-19.pdf](https://www.armed-services.senate.gov/imo/media/doc/Scaparrotti_03-05-19.pdf) (accessed May 30, 2019).
12. General Curtis M. Scaparrotti, United States Army, Commander, United States European Command, statement before the Subcommittee on Military Construction, Veterans Affairs, and Related Agencies, Committee on Appropriations, U.S. Senate, May 2, 2017, unclassified "Resource Requirements—Addendum," p. [1], <https://www.appropriations.senate.gov/imo/media/doc/050217-Scaparrotti-Testimony.pdf> (accessed June 4, 2019).
13. Ibid., pp. [1]–[2].
14. U.S. Army Europe, "Fact Sheet: Atlantic Resolve Armored Rotation," January 11, 2019, <https://www.eur.army.mil/Portals/19/documents/Fact%20Sheets/11DArmorRotationFactSheet.pdf?ver=2019-01-22-110644-883> (accessed May 30, 2019).
15. Caroline Houck, "Army Chief: The US Needs More Troops in Europe," *Defense One*, November 15, 2017, <https://www.defenseone.com/threats/2017/11/army-chief-us-needs-more-troops-europe/142580/> (accessed May 30, 2019).
16. Christopher Woody, "NATO Is Boosting Its Armor in Europe—and US Tanks Just Marched on German Roads for the First Time in 15 Years," *Business Insider*, April 27, 2018, <https://www.businessinsider.com/us-tanks-europe-drove-on-public-roads-2018-4> (accessed May 30, 2019).
17. This was announced early in 2016. See Reuters, "U.S. to Deploy Armored Brigade Combat Teams to Europe," March 30, 2016, <https://www.reuters.com/article/us-usa-military-europe-idUSKCN0WW23P> (accessed May 30, 2019). In early 2017, the Army initiated a program to rotate units from CONUS to Europe and back, emphasizing the heel-to-toe aspect, meaning that the replacing unit would arrive before departure of the current unit so as to achieve a constant presence in Europe. The program began in January 2017 with the 10th CAB, followed by the 1st CAB in November 2017 and the 4th CAB in June 2018. See Thomas Scaggs, "10th Combat Aviation Brigade Returns from Successful Rotation in Europe," U.S. Army, November 15, 2017, [https://www.army.mil/article/196979/10th\\_combat\\_aviation\\_brigade\\_returns\\_from\\_successful\\_rotation\\_in\\_europe](https://www.army.mil/article/196979/10th_combat_aviation_brigade_returns_from_successful_rotation_in_europe) (accessed May 30, 2019), and Adrian Patoka, "Third Atlantic Resolve Aviation Brigade Arrives in Europe," U.S. Department of Defense, June 22, 2018, <https://www.defense.gov/News/Article/Article/1558059/third-atlantic-resolve-aviation-brigade-arrives-in-europe/> (accessed May 30, 2019).
18. U.S. Army Europe, "Fact Sheet: Atlantic Resolve Aviation Rotation."

19. Christopher Woody, "Norway Wants More US Marines and to Station Them Closer to Russia, and Moscow Is Vowing to Retaliate," *Business Insider*, June 14, 2018, <https://www.businessinsider.com/russia-vows-retaliation-for-us-marines-stationed-near-border-in-norway-2018-6> (accessed May 30, 2019).
20. Kyle Rempfer, "New Marine Rotation Arrives in Norway as Corps Preps for a Cold-Weather Fight," *Marine Corps Times*, March 29, 2019, <https://www.marinecorpstimes.com/news/your-military/2019/03/29/new-marine-rotation-arrives-in-norway-as-corps-preps-for-a-cold-weather-fight/> (accessed May 31, 2019).
21. U.S. Army Europe, "Quick Facts: Logistical Rotation in Europe," January 10, 2019, <https://www.eur.army.mil/Portals/19/documents/Infographics/20190110LogisticalInfograph.pdf?ver=2019-01-10-054747-170> (accessed May 31, 2019).
22. Podcast, "On the Horizon: Navigating the European and African Theaters," Episode 7, March 25, 2019, <https://www.stitcher.com/podcast/public-affairs-officer/on-the-horizon-navigating-the-european-and-african-theaters/e/59615532> (accessed May 31, 2019).
23. Scaparrotti, statement on USEUCOM posture, March 5, 2019, p. 15.
24. Idrees Ali, "With an Eye on Russia, U.S. Navy Re-Establishing Its Second Fleet," Reuters, May 4, 2018, <https://www.reuters.com/article/us-usa-defense-navy-russia/with-an-eye-on-russia-u-s-navy-re-establishing-its-second-fleet-idUSKBN1I52CJ> (accessed May 31, 2019).
25. Press release, "U. S. 2nd Fleet to Lead BALTOPS 2019," U.S. Navy, April 2, 2019, [https://www.navy.mil/submit/display.asp?story\\_id=109131](https://www.navy.mil/submit/display.asp?story_id=109131) (accessed May 31, 2019).
26. Scaparrotti, statement on USEUCOM posture, March 5, 2019, p. 15.
27. Jacob McDonald, "Prepositioned Equipment Site Officially Opens in Netherlands," U.S. Army, December 16, 2016, [https://www.army.mil/article/179831/prepositioned\\_equipment\\_site\\_officially\\_opens\\_in\\_netherlands](https://www.army.mil/article/179831/prepositioned_equipment_site_officially_opens_in_netherlands) (accessed May 31, 2019).
28. "1,500 Soldiers Just Rolled Up in Germany to Flex Their Rapid-Deployment Muscles," *El Paso Times*, March 20, 2019, <https://taskandpurpose.com/army-rapid-deplotment-exercise-germany> (accessed May 31, 2019).
29. Jacob A. McDonald, "Ribbon Cut on Second Prepositioned Equipment Site," U.S. Army, May 11, 2017, <https://www.army.mil/article/187565/> (accessed May 31, 2019).
30. U.S. Army Europe, "Fact Sheet: Army Prepositioned Stock," April 3, 2019, <https://www.eur.army.mil/Portals/19/documents/Fact%20Sheets/APSFactSheet20190405.pdf?ver=2019-04-05-032016-170> (accessed May 31, 2019).
31. U.S. Army Europe, "Army Prepositioned Stock–Europe," August 3, 2017, <https://www.army.mil/standto/2017-08-03> (accessed May 31, 2019).
32. U.S. Department of Defense, Office of the Secretary of Defense (Comptroller), *Department of Defense Budget, Fiscal Year (FY) 2019: European Deterrence Initiative*, February 2018, pp. 12, 13, and 23, [http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2019/fy2019\\_EDI\\_Book.pdf](http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2019/fy2019_EDI_Book.pdf) (accessed May 31, 2019).
33. Press release, "EUCOM 2018 Year in Review," U.S. European Command, December 27, 2018, <https://www.eucom.mil/media-library/pressrelease/39528/eucom-2018-year-in-review> (accessed May 31, 2019).
34. U.S. Department of Defense, National Guard Bureau, "State Partnership Program," January 18, 2019, [https://www.nationalguard.mil/Portals/31/Documents/J-5/InternationalAffairs/StatePartnershipProgram/SPP%20Partnership%20Map%20\(January%202019\).pdf](https://www.nationalguard.mil/Portals/31/Documents/J-5/InternationalAffairs/StatePartnershipProgram/SPP%20Partnership%20Map%20(January%202019).pdf) (accessed May 31, 2019).
35. Interfax-Ukraine, "Rotation of US Military Instructors Under JMTG-U Takes Place in Lviv," *Kyiv Post*, August 13, 2018, <https://www.kyivpost.com/ukraine-politics/rotation-of-us-military-instructors-under-jmtg-u-takes-place-in-lviv.html> (accessed May 31, 2019).
36. Kealy Moriarty, "JMTG-U Is More Than a Training Center for Tennessee Guardsmen Deployed to Ukraine," Defense Visual Information Distribution Service, January 10, 2019, <https://www.dvidshub.net/news/306581/jmtg-u-more-than-training-center-tennessee-guardsmen-deployed-ukraine> (accessed May 31, 2019).
37. "Canada Extends Ukraine Training Mission Until 2022," *The Defense Post*, March 19, 2019, <https://thedefensepost.com/2019/03/19/canada-extends-ukraine-training-mission-unifer/> (accessed May 31, 2019).
38. Christopher Miller, "U.S. Confirms Delivery of Javelin Antitank Missiles to Ukraine," Radio Free Europe/Radio Liberty, April 30, 2018, <https://www.rferl.org/a/javelin-missile-delivery-ukraine-us-confirmed/29200588.html> (accessed May 31, 2019).
39. Press release, "DoD to Provide \$200 Million in Security Cooperation Funds to Ukraine," U.S. Department of Defense, July 20, 2018, <https://dod.defense.gov/News/Article/Article/1580565/dod-to-provide-200-million-in-security-cooperation-funds-to-ukraine/source/GovDelivery/> (accessed May 31, 2019).
40. "NATO to Provide Ukraine with Secure Communications Equipment, Stoltenberg says," *The Defense Post*, December 13, 2018, <https://thedefensepost.com/2018/12/13/nato-ukraine-secure-communications-equipment-russia/> (accessed May 31, 2019).

41. Anna Varfolomeeva, "NATO Says Priority Is to Strengthen Cyber Defenses as BadRabbit Ransomware Hits Ukraine," *The Defense Post*, October 26, 2017, <https://thedefensepost.com/2017/10/26/badrabbit-ukraine-nato-ransomware/> (accessed May 31, 2019).
42. Kyle Rempfer, "US Air Force's Huge Exercise in Ukraine Fuels Growing Partnership and That Country's NATO Ambitions," *Air Force Times*, November 13, 2018, <https://www.airforcetimes.com/news/your-air-force/2018/11/13/nato-ambitions-ukraine-looks-west-with-air-exercises-and-high-level-discussions/> (accessed May 9, 2019).
43. See, for example, Malcolm Chalmers and Simon Lunn, "NATO's Tactical Nuclear Dilemma," Royal United Services Institute *Occasional Paper*, March 2010, p. 1, [https://rusi.org/sites/default/files/201003\\_op\\_natos\\_tactical\\_nuclear\\_dilemma.pdf](https://rusi.org/sites/default/files/201003_op_natos_tactical_nuclear_dilemma.pdf) (accessed May 31, 2019); Erin Connolly, "U.S. Nuclear Weapons in Europe," Center for Arms Control and Non-Proliferation, August 10, 2016, <https://armscontrolcenter.org/u-s-nuclear-weapons-in-europe/> (accessed May 31, 2019); Nuclear Threat Initiative, "Nuclear Disarmament NATO," February 10, 2017, <https://www.nti.org/analysis/articles/nato-nuclear-disarmament/> (accessed May 31, 2019); and Hans M. Kristensen and Matt Korda, "Status of World Nuclear Forces," Federation of American Scientists, updated May 2019, <https://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/> (accessed May 31, 2019).
44. Geoff Ziezulewicz, "B61-12 Life Extension Program Receives NNSA Approval," United Press International, August 2, 2016, [http://www.upi.com/Business\\_News/Security-Industry/2016/08/02/B61-12-life-extension-program-receives-NNSA-approval/3261470147434/](http://www.upi.com/Business_News/Security-Industry/2016/08/02/B61-12-life-extension-program-receives-NNSA-approval/3261470147434/) (accessed May 31, 2019).
45. Aaron Mehta, "America's Newest Nuclear Gravity Bomb Completes Design Review," *Defense News*, October 1, 2018, <https://www.defensenews.com/space/2018/10/01/americas-newest-nuclear-gravity-bomb-completes-design-review/> (accessed May 31, 2019).
46. Leah Bryant, "Nuclear Bomb Tail Kit Reaches Major Milestone for Production Phase," U.S. Air Force, December 7, 2018, <https://www.af.mil/News/Article-Display/Article/1707698/nuclear-bomb-tail-kit-reaches-major-milestone-for-production-phase/> (accessed May 31, 2019).
47. Oriana Pawlyk, "Air Force Advances Testing of New Nuclear Gravity Bomb: General," Military.com, May 1, 2018, <https://www.military.com/dodbuzz/2018/05/01/air-force-advances-testing-new-nuclear-gravity-bomb-general.html> (accessed May 31, 2019).
48. North Atlantic Treaty Organization, "Readiness Action Plan," last updated September 21, 2017, [http://www.nato.int/cps/on/natohq/topics\\_119353.htm](http://www.nato.int/cps/on/natohq/topics_119353.htm) (accessed May 31, 2019).
49. Radio Free Europe/Radio Liberty, "NATO Agrees to 'Four 30s' Plan to Counter Russia," updated June 7, 2018, <https://www.rferl.org/a/nato-ministers-expected-to-okay-four-thirties-initiative-stoltenberg/29275979.html> (accessed May 31, 2019).
50. Ben Werner, "SECDEF Mattis' New 'Four Thirties' Initiative Designed to Reinforce NATO Against Russia," U.S. Naval Institute News, August 30, 2018, <https://news.usni.org/2018/08/30/mattis-says-natos-four-thirties-force-structure-shows-political-strength> (accessed May 31, 2019).
51. Fact Sheet, "NATO's Enhanced Forward Presence," North Atlantic Treaty Organization, March 2019, [https://www.nato.int/nato\\_static\\_fi2014/assets/pdf/pdf\\_2019\\_04/20190402\\_1904-factsheet\\_efp\\_en.pdf](https://www.nato.int/nato_static_fi2014/assets/pdf/pdf_2019_04/20190402_1904-factsheet_efp_en.pdf) (accessed May 31, 2019).
52. Baltic News Service, "300 French Troops to Arrive in Tapa Next Week," ERR News, April 16, 2019, <https://news.err.ee/930721/300-french-troops-to-arrive-in-tapa-next-week> (accessed May 31, 2019), and Fact Sheet, "NATO's Enhanced Forward Presence," March 2019.
53. Fact Sheet, "NATO's Enhanced Forward Presence," March 2019.
54. *Ibid.*
55. Mariusz Błaszczak, "Poland's Defense Minister: Making the Constant Effort to Strengthen Defense," *Defense News*, December 9, 2018, <https://www.defensenews.com/outlook/2018/12/10/polands-defense-minister-making-the-constant-effort-to-strengthen-defense/> (accessed May 31, 2019), and North Atlantic Treaty Organization, Multinational Division North East, "Landcom Soldiers in Elblag," February 22, 2018, <https://mndne.wp.mil.pl/en/articlesnews-u/2018-02-226-landcom-soldiers-in-elblag/> (accessed May 31, 2019).
56. Baltic News Service, "Baltic Countries Sign Agreement on Fast Movement of NATO Forces," Latvian Information Agency, February 15, 2017, [http://www.leta.lv/eng/defence\\_matters\\_eng/defence\\_matters\\_eng/news/CEB6CED4-EA2D-404C-8814-A8765D6BA915/](http://www.leta.lv/eng/defence_matters_eng/defence_matters_eng/news/CEB6CED4-EA2D-404C-8814-A8765D6BA915/) (accessed May 31, 2019).
57. North Atlantic Treaty Organization, Allied Joint Force Command, "NATO Force Integration Unit (NFIU) Fact Sheet," <https://jfcbs.nato.int/page5725819/nato-force-integration-units/nato-force-integration-units-fact-sheet> (accessed May 31, 2019).
58. Boris Toucas, "NATO and Russia in the Black Sea: A New Confrontation?" Center for Strategic and International Studies, March 6, 2017, <https://www.csis.org/analysis/nato-and-russia-black-sea-new-confrontation> (accessed May 31, 2019), and press release, "Warsaw Summit Communiqué Issued by the Heads of State and Government Participating in the Meeting of the North Atlantic Council in Warsaw 8–9 July 2016," North Atlantic Treaty Organization, July 9, 2016, [http://www.nato.int/cps/en/natohq/official\\_texts\\_133169.htm](http://www.nato.int/cps/en/natohq/official_texts_133169.htm) (accessed May 31, 2019).

59. Headquarters Multinational Division South-East, "About," <http://www.en.mndse.ro/about> (accessed May 31, 2019).
60. Siemon T. Wezeman and Alexandra Kuimova, "Romania and Black Sea Security," Stockholm International Peace Research Institute *Background Paper*, December 2018, p. 9, [https://www.sipri.org/sites/default/files/2018-12/bp\\_1812\\_black\\_sea\\_romania\\_0.pdf](https://www.sipri.org/sites/default/files/2018-12/bp_1812_black_sea_romania_0.pdf) (accessed May 31, 2019).
61. David Pugliese and Aaron Mehta, "NATO's Tanks, AWACS Programs See Membership Increase," *Defense News*, February 14, 2018, <https://www.defensenews.com/smr/munich-security-forum/2018/02/14/natos-tanker-awacs-programs-see-membership-increase/> (accessed May 31, 2019).
62. Ciaran McGrath, "It's a Farce! £10.5Billion Fleet Cannot Refuel RAF Aircraft Mid-air—So We Rely on the US," *Express*, July 30, 2018, <https://www.express.co.uk/news/uk/995845/hitch-raf-planes-voyagers-us-planes-air-to-air-refuelling-mid-air-refuelling> (May 31, 2019).
63. Christopher Woody, "A Convoy of US Army Howitzers Got Stopped by German Police, and It Points to a Major Problem NATO Has in Europe," *Business Insider*, January 12, 2018, <http://www.businessinsider.com/us-army-howitzers-stopped-in-germany-nato-logistics-problems-2018-1> (accessed May 31, 2019).
64. Jim Garamone, "NATO Approves Norfolk Joint Force Command, Defense Readiness Initiative," U.S. Army, June 8, 2018, [https://www.army.mil/article/206683/nato\\_approves\\_norfolk\\_joint\\_force\\_command\\_defense\\_readiness\\_initiative](https://www.army.mil/article/206683/nato_approves_norfolk_joint_force_command_defense_readiness_initiative) (accessed May 31, 2019), and North Atlantic Treaty Organization, "NATO Defence Ministers Take Decisions to Strengthen the Alliance," last updated February 15, 2018, [https://www.nato.int/cps/ua/natohq/news\\_152125.htm](https://www.nato.int/cps/ua/natohq/news_152125.htm) (accessed May 31, 2019).
65. Reuters, "Germany Chooses Ulm for New Proposed NATO Logistics Command," March 20, 2018, <https://www.reuters.com/article/us-nato-germany/germany-chooses-ulm-for-new-proposed-nato-logistics-command-idUSKBNIGW1QM> (accessed May 31, 2019).
66. Christopher Woody, "NATO Forces Are Relearning the Lessons of the Cold War to Face Russian Threats," *Business Insider*, July 30, 2018, <https://www.businessinsider.com/nato-relearning-cold-war-tactics-to-face-new-threats-in-europe-2018-7> (accessed May 31, 2019).
67. Christopher Woody, "The US Army Is Taking Part in a Massive Exercise to Practice Moving Around Europe, and 4 of Its Strykers Ran into Each Other in Lithuania," *Business Insider*, June 8, 2018, <https://www.businessinsider.com/us-army-strykers-crash-in-lithuania-during-us-army-europe-saber-strike-2018-6> (accessed May 31, 2019).
68. Fact Sheet, "Key NATO and Allied Exercises in 2018," North Atlantic Treaty Organization, June 2018, [https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/pdf\\_2018\\_04/20180425\\_1804-factsheet\\_exercises\\_en.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2018_04/20180425_1804-factsheet_exercises_en.pdf) (accessed May 31, 2019).
69. Norwegian Armed Forces, "Facts and Information: Exercise Trident Juncture 2018 (TRJE18)," <https://forsvaret.no/en/Forsvaret/Documents/Facts-English.pdf> (accessed May 31, 2019), and Jim Garamone, "Commander Describes Exercise Trident Juncture Effort, Planning," U.S. Department of Defense, June 12, 2018, <https://dod.defense.gov/News/Article/Article/1547736/commander-describes-exercise-trident-juncture-effort-planning/> (accessed May 31, 2019).
70. North Atlantic Treaty Organization, "Trident Juncture 2018 Press Conference with Admiral James G. Foggo, Commander of Allied Joint Force Command in Naples, Italy, and Lieutenant General Rune Jakobsen, Commander of the Norwegian Joint Headquarters in Bodø, Norway," last updated October 10, 2018, [https://www.nato.int/cps/en/natohq/opinions\\_159119.htm](https://www.nato.int/cps/en/natohq/opinions_159119.htm) (accessed May 31, 2019). Punctuation as in original.
71. North Atlantic Treaty Organization, "Germany Steps Up to Lead NATO High Readiness Force," North Atlantic Treaty Organization, last updated January 1, 2019, [https://www.nato.int/cps/en/natohq/news\\_161796.htm](https://www.nato.int/cps/en/natohq/news_161796.htm) (accessed May 31, 2019).
72. Capt. Jeku Arce, "Saber Strike 18 Comes to a Close," U.S. Army Europe, June 15, 2018, [https://www.army.mil/article/207186/saber\\_strike\\_18\\_comes\\_to\\_a\\_close](https://www.army.mil/article/207186/saber_strike_18_comes_to_a_close) (accessed May 9, 2019), and Woody, "The US Army Is Taking Part in a Massive Exercise to Practice Moving Around Europe."
73. Todd South, "Five Questions with US Army Europe," *Army Times*, October 9, 2018, <https://www.armytimes.com/news/your-army/2018/10/09/five-questions-with-us-army-europe/> (accessed May 31, 2019).
74. North Atlantic Treaty Organization, "NATO's Joint Air Power Strategy," June 26, 2018, [https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/pdf\\_2018\\_06/20180626\\_20180626-joint-air-power-strategy.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2018_06/20180626_20180626-joint-air-power-strategy.pdf) (accessed May 31, 2019).
75. Press release, "Warsaw Summit Communiqué," and Robin Emmott, "NATO Cyber Command to Be Fully Operational in 2023," Reuters, October 16, 2018, <https://www.reuters.com/article/us-nato-cyber/nato-cyber-command-to-be-fully-operational-in-2023-idUSKCNIMQ1Z9> (accessed May 31, 2019).
76. North Atlantic Treaty Organization, "Cyber Defence," last updated July 16, 2018, [https://www.nato.int/cps/en/natohq/topics\\_78170.htm](https://www.nato.int/cps/en/natohq/topics_78170.htm) (accessed May 31, 2019).
77. Julian Barnes, "NATO Invests in More Bandwidth for New Data-Hungry Drones," *The Wall Street Journal*, March 27, 2017, <https://www.wsj.com/articles/nato-invests-in-more-bandwidth-for-new-data-hungry-drones-1490601588> (accessed May 31, 2019).

78. Reuters, "NATO to Receive First Northrop Surveillance Drone, Years Late," Voice of America, March 18, 2019, <https://www.voanews.com/a/nato-to-receive-first-northrop-surveillance-drone-years-late/4837218.html> (accessed May 31, 2019).
79. Bruno L  t   and Piret Pernik, "EU-NATO Cybersecurity and Defense Cooperation: From Common Threats to Common Solutions," German Marshall Fund of the United States *Policy Brief* No. 38, December 2017, p. 3, <http://www.gmfus.org/publications/eu-nato-cybersecurity-and-defense-cooperation-common-threats-common-solutions> (accessed May 31, 2019).
80. Defence Connect, "Australia Joins NATO Cyber Centre," May 3, 2018, <https://www.defenceconnect.com.au/intel-cyber/2240-australia-joins-nato-cyber-centre> (accessed May 31, 2019).
81. Press release, "Warsaw Summit Communiqu  ."
82. Robin Emmott, "U.S. Activates Romanian Missile Defense Site, Angering Russians," Reuters, May 12, 2016, <http://www.reuters.com/article/us-nato-shield-idUSKCN0Y30JX> (accessed May 31, 2019), and press release, "USEUCOM deploys THAAD system to Romania," U.S. European Command, April 11, 2019, <https://www.eucom.mil/media-library/pressrelease/39562/useucom-deploys-thaad-system-to-romania> (accessed May 31, 2019).
83. Fact Sheet, "NATO Ballistic Missile Defence," North Atlantic Treaty Organization, July 2016, [http://www.nato.int/nato\\_static\\_fl2014/assets/pdf/pdf\\_2016\\_07/20160630\\_1607-factsheet-bmd-en.pdf](http://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2016_07/20160630_1607-factsheet-bmd-en.pdf) (accessed May 31, 2019).
84. Lisa Ferdinando, "Work Joins Groundbreaking for Ballistic Missile Defense Site in Poland," U.S. Department of Defense, May 13, 2016, <https://www.defense.gov/News/Article/Article/759662/work-joins-groundbreaking-for-ballistic-missile-defense-site-in-poland/> (accessed May 31, 2019), and Jen Judson, "US Army Terminal Missile Defense System Is Headed to Eastern Europe," *Defense News*, April 11, 2019, <https://www.defensenews.com/land/2019/04/11/us-army-terminal-missile-defense-system-is-headed-to-eastern-europe/> (accessed May 31, 2019).
85. Fact Sheet, "NATO Ballistic Missile Defence."
86. Russian Embassy in Norway and Norway Today, "Russia Threatens Norway to Stay out of NATO Missile Defense," Atlantic Council, March 21, 2017, <http://www.atlanticcouncil.org/blogs/natosource/russia-threatens-norway-to-stay-out-of-nato-missile-defense> (accessed May 31, 2019).
87. Ronald O'Rourke, "Navy Aegis Ballistic Missile Defense (BMD) Program: Background and Issues for Congress," Congressional Research Service *Report for Members and Committees of Congress*, updated April 25, 2019, p. 2, <https://crsreports.congress.gov/product/pdf/RL/RL33745/190> (accessed June 2, 2019).
88. Kyle Mizokami, "Norway's Ruined Frigate Is Afloat Again and It Doesn't Look Good," *Popular Mechanics*, April 15, 2019, <https://www.popularmechanics.com/military/navy-ships/a27154115/norways-ruined-frigate-is-afloat-again-and-it-doesnt-look-good/> (accessed May 9, 2019).
89. Defence Agreement 2018-2023, <https://www.fmn.dk/temaer/forsvarsforlig/Documents/danish-defence-agreement-2018-2023-pdf.pdf> (accessed May 31, 2019).
90. "Denmark Progresses in NATO Ballistic Missile Defense Role," *Defense News*, April 22, 2016, <http://www.defensenews.com/story/defense/air-space/strike/2016/04/22/denmark-progresses-nato-ballistic-missile-defense-role/83391868/> (accessed May 31, 2019).
91. Richard Scott, "SMART-L MM/N BMD Radar Installed on First LCF Frigate," *Jane's 360*, March 26, 2019, <https://www.janes.com/article/87470/smart-l-mm-n-bmd-radar-installed-on-first-lcf-frigate> (accessed May 31, 2019).
92. Grant Turnbull, "German Navy Eyes New Sensors, BMD for Air-Defence Frigates," *Jane's 360*, February 4, 2019, <https://www.janes.com/article/86156/german-navy-eyes-new-sensors-bmd-for-air-defence-frigates> (accessed May 31, 2019).
93. Fact Sheet, "NATO Ballistic Missile Defence."
94. George Allison, "UK Looks to Industry for New Ground-Based Ballistic Missile Defence Radar Capability," *UK Defence Journal*, July 18, 2017, <https://ukdefencejournal.org.uk/uk-issues-request-information-industry-new-ground-based-ballistic-missile-defence-radar/> (accessed May 31, 2019).
95. "Future Belgian Navy Frigates May Have Ballistic Missile Defense Capabilities," *Navy Recognition*, January 5, 2017, <http://www.navyrecognition.com/index.php/news/defence-news/2017/january-2017-navy-naval-forces-giukdefense-industry-technology-maritime-security-global-news/4766-future-belgian-navy-frigates-may-have-ballistic-missile-defense-capabilities.html> (accessed May 31, 2019).
96. Lockheed Martin, "Global Aegis Fleet," <https://www.lockheedmartin.com/en-us/products/aegis-combat-system/global-aegis-fleet.html> (accessed May 31, 2019).
97. Megan Eckstein, "Navy, NATO Forces Conduct Integrated Air and Missile Defense Exercise off Scotland," U.S. Naval Institute News, updated October 16, 2017, <https://news.usni.org/2017/10/16/navy-nato-forces-conduct-integrated-air-missile-defense-exercise-off-scotland> (accessed May 31, 2019).



98. Press release, "U.S., Allies Conclude Formidable Shield 2019," U.S. Naval Forces Europe/Africa/U.S. 6th Fleet, May 20, 2019, [https://www.navy.mil/submit/display.asp?story\\_id=109642](https://www.navy.mil/submit/display.asp?story_id=109642) (accessed May 31, 2019).
99. The North Atlantic Treaty, Article 3, April 4, 1949, last updated April 10, 2019, [http://www.nato.int/cps/en/SID-857936BB-66246E10/natolive/official\\_texts\\_17120.htm](http://www.nato.int/cps/en/SID-857936BB-66246E10/natolive/official_texts_17120.htm) (accessed May 31, 2019).
100. Press release, "Defence Expenditure of NATO Countries (2011–2018)," North Atlantic Treaty Organization, March 14, 2019, p. 3, [https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/pdf\\_2019\\_03/190314-pr2018-34-eng.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2019_03/190314-pr2018-34-eng.pdf) (accessed June 1, 2019).
101. North Atlantic Treaty Organization, *The Secretary General's Annual Report: 2018*, p. 34, [https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/pdf\\_publications/20190315\\_sgar2018-en.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_publications/20190315_sgar2018-en.pdf) (accessed June 1, 2019).
102. Ibid.
103. Press release, "Defence Expenditure of NATO Countries (2011–2018)." p. 3.
104. Editorial Board, "Germany's Low Defence Spending Weakens Nato," *Financial Times*, April 21, 2019, <https://www.ft.com/content/303ec9e8-5c3d-11e9-9dde-7aedca0a081a> (accessed May 31, 2019).
105. Reuters, "German 2020 Budget Plan Calls for 1.7 Percent Boost in Spending: Sources," *Reuters*, March 18, 2019, <https://www.reuters.com/article/us-germany-budget/german-2020-budget-plan-calls-for-1-7-percent-boost-in-spending-sources-idUSKCN1QZIPT> (accessed May 31, 2019).
106. Editorial Board, "Germany's Low Defence Spending Weakens Nato."
107. Fact Sheet, "NATO's Enhanced Forward Presence," March 2019.
108. North Atlantic Treaty Organization, "Germany Steps Up to Lead NATO High Readiness Force."
109. Sebastian Sprenger, "Germany Picks Up Two Thorny Defense and Diplomacy Assignments in 2019," *Defense News*, January 2, 2019, <https://www.defensenews.com/global/europe/2019/01/02/germany-picks-up-two-thorny-defense-and-diplomacy-assignments-in-2019/> (accessed May 31, 2019).
110. Andrea Shalal, "Equipment Shortages Impair German Military Ahead of Key NATO Mission," Reuters, February 19, 2018, <https://www.reuters.com/article/us-germany-military/equipment-shortages-impair-german-military-ahead-of-key-nato-mission-idUSKCNIG3IPX> (accessed May 31, 2019).
111. George Allison, "Germany to Lead NATO High Readiness Force," *UK Defence Journal*, January 30, 2019, <https://ukdefencejournal.org.uk/germany-to-lead-nato-high-readiness-force/> (accessed May 31, 2019).
112. North Atlantic Treaty Organization, "Kosovo Force (KFOR): Key Facts and Figures," February 2019, [https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/pdf\\_2019\\_02/20190213\\_2019-02-KFOR-Placemat.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2019_02/20190213_2019-02-KFOR-Placemat.pdf) (accessed May 31, 2019).
113. North Atlantic Treaty Organization, "Resolute Support Mission (RSM): Key Facts and Figures," February 2019, [https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/pdf\\_2019\\_02/20190215\\_2019-02-RSM-Placemat.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2019_02/20190215_2019-02-RSM-Placemat.pdf) (accessed May 31, 2019), and Radio Free Europe/Radio Liberty, "German Lawmakers Approve Troop Increase for Afghanistan," March 22, 2018, <https://www.rferl.org/a/germany-approves-troop-increase-afghanistan/29116022.html> (accessed May 31, 2019).
114. Associated Press, "Germany Extends Military Missions in Iraq, Afghanistan, Mali," *U.S. News & World Report*, March 7, 2018, <https://www.usnews.com/news/world/articles/2018-03-07/germany-extends-military-missions-in-iraq-afghanistan-mali> (accessed June 4, 2019).
115. Deutsche Welle, "Germany Extends Military Mandate in Iraq," October 2, 2018, <https://www.dw.com/en/germany-extends-military-mandate-in-iraq/a-45728646> (accessed May 31, 2019).
116. Josué Michels, "What Is Germany Doing in Iraq?" *Trumpet*, September 7, 2018, <https://www.thetrumpet.com/17709-what-is-germany-doing-in-iraq> (accessed May 31, 2019), and Deutsche Welle, "German Minister Urges Long-Term Military Presence in Iraq," September 16, 2018, <https://www.dw.com/en/german-minister-urges-long-term-military-presence-in-iraq/a-45510053> (accessed May 31, 2019).
117. Nina Werkhäuser, "German Army Launches New Cyber Command," Deutsche Welle, April 1, 2017, <http://www.dw.com/en/german-army-launches-new-cyber-command/a-38246517> (accessed May 31, 2019).
118. George Allison, "Less Than a Third of German Military Assets Are Operational Says Report," *UK Defence Journal*, June 21, 2018, <https://ukdefencejournal.org.uk/less-third-german-military-assets-operational-says-report/> (accessed May 31, 2019).
119. Reuters, "German Army Floats Plan to Recruit Foreigners," December 27, 2018, <https://www.reuters.com/article/us-germany-military-foreigners/german-army-floats-plan-to-recruit-foreigners-idUSKCN1QI4L> (accessed June 1, 2019), and Deutsche Welle, "Germany's Lack of Military Readiness 'Dramatic,' Says Bundeswehr Commissioner," February 20, 2018, <https://www.dw.com/en/germanys-lack-of-military-readiness-dramatic-says-bundeswehr-commissioner/a-42663215> (accessed June 1, 2019).

120. Reuters, "German Army Floats Plan to Recruit Foreigners."
121. Andrea Shalal, "Germany Not Satisfied with Readiness of Submarines, Some Aircraft," Reuters, March 11, 2019, <https://www.reuters.com/article/us-germany-arms/germany-not-satisfied-with-readiness-of-submarines-some-aircraft-idUSKBN1QIS1G7> (accessed June 1, 2019).
122. Tyler Rogoway, "The German Navy Decided to Return Their Bloated New Frigate to the Ship Store This Christmas," *The War Zone*, December 23, 2017, <http://www.thedrive.com/the-war-zone/17185/the-german-navy-has-decided-to-return-their-new-frigate-to-the-ship-store-this-christmas> (accessed June 1, 2019).
123. William Wilkes, "German Engineering Yields New Warship That Isn't Fit for Sea," *The Wall Street Journal*, January 12, 2018, <https://www.wsj.com/articles/german-engineering-yields-new-warship-that-isnt-fit-for-sea-1515753000> (accessed June 1, 2019).
124. John Beckner and Helmoed Heitman, "Is Germany's Navy Dead?" *The National Interest*, July 23, 2018, <https://nationalinterest.org/blog/buzz/germanys-navy-dead-26566> (accessed June 1, 2019).
125. "Germany Returns Lead F125 Frigate to Builder, Report," *Naval Today*, December 22, 2017, <https://navaltoday.com/2017/12/22/germany-returns-lead-f125-frigate-to-builder-report/> (accessed June 1, 2019).
126. "Patience Wears Thin with Germany's NATO Spending," *Der Spiegel*, April 2, 2019, <http://www.spiegel.de/international/germany/patience-wears-thin-among-germany-s-nato-allies-a-1260366.html> (accessed June 1, 2019).
127. Allison, "Less Than a Third of German Military Assets Are Operational Says Report." Punctuation as in original.
128. Sebastian Sprenger, "German Navy Returns to Treating the Baltic Sea as a Potential Theater of War," *Defense News*, January 23, 2019, [https://www.defensenews.com/global/europe/2019/01/23/german-navy-returns-to-treating-the-baltic-sea-as-a-potential-theater-of-war/?utm\\_medium=social&utm\\_source=twitter.com&utm\\_campaign=Socialflow+DFN](https://www.defensenews.com/global/europe/2019/01/23/german-navy-returns-to-treating-the-baltic-sea-as-a-potential-theater-of-war/?utm_medium=social&utm_source=twitter.com&utm_campaign=Socialflow+DFN) (accessed June 1, 2019).
129. Sebastian Sprenger, "Germany Officially Knocks F-35 out of Competition to Replace Tornado," *Defense News*, January 31, 2019, <https://www.defensenews.com/global/europe/2019/01/31/germany-officially-knocks-f-35-out-of-competition-to-replace-tornado/> (accessed June 1, 2019).
130. Gareth Jennings, "Germany Eliminates F-35 from Tornado-Replacement Race," *Jane's 360*, February 1, 2019, <https://www.janes.com/article/86100/germany-eliminates-f-35-from-tornado-replacement-race> (accessed June 12, 2019).
131. Douglas Barrie, "Dogfight over Berlin: Germany's Tornado Replacement Aspirations," *International Institute for Strategic Studies, Military Balance Blog*, December 21, 2017, <https://www.iiss.org/blogs/military-balance/2017/12/berlin> (accessed June 1, 2019).
132. John Louth, "Germany Calling: The Bundeswehr, Acquisition and a Broken Narrative," *Royal United Services Institute Commentary*, February 13, 2019, <https://rusi.org/commentary/germany-calling-bundeswehr-acquisition-and-broken-narrative> (accessed June 1, 2019), and Konstantin von Hammerstein and Peter Müller, "U.S. Pressures Germany to Increase Defense Spending," *Spiegel Online*, February 17, 2017, [http://www.spiegel.de/international/world/pressure-on-germany-to-increase-defense-spending-for-nato-a-1135192.html?utm\\_source=dlvr.it&utm\\_medium=twitter#ref=rss](http://www.spiegel.de/international/world/pressure-on-germany-to-increase-defense-spending-for-nato-a-1135192.html?utm_source=dlvr.it&utm_medium=twitter#ref=rss) (accessed June 1, 2019).
133. Louth, "Germany Calling: The Bundeswehr, Acquisition and a Broken Narrative."
134. Andrea Shalal, "Germany to Move Ahead on New Short-Range Air Defense System," Reuters, February 2, 2017, <http://www.reuters.com/article/us-germany-military-idUSKBN15H1Z9> (accessed June 4, 2019).
135. Giovanni de Briganti, "Airbus Delivered 17 A400Ms in 2018, Two More Than Planned," *defense-aerospace.com*, January 28, 2019, <http://www.defense-aerospace.com/articles-view/feature/5/199392/-airbus-delivered-17-a400ms-in-2018%2C-two-more-than-planned.html> (accessed June 12, 2019), and "Airbus A400M Production List," *ABCDlist*, last updated May 24, 2019, <https://www.abcdlist.nl/a400mf/a400mf.html> (accessed June 12, 2019).
136. Joseph Trevithick, "Germany, France Move Ahead with Joint C-130J Unit Amid Budget Woes and A400M Delays," *The War Zone*, May 8, 2018, <https://www.thedrive.com/the-war-zone/20697/germany-france-move-ahead-with-joint-c-130j-unit-amid-budget-woes-and-a400m-delays> (accessed June 1, 2019).
137. Reuters, "Exclusive: German Military Report Airbus A400M Transport Still in Trouble," March 29, 2018, <https://www.businessinsider.com/r-exclusive-german-military-report-airbus-a400m-transport-still-in-trouble-2018-3> (accessed June 1, 2019).
138. Peggy Hollinger, Tobias Buck, and Laura Pitel, "A400M: The €20bn Military Aircraft that Has Bedevilled Airbus," *Financial Times*, July 3, 2018, <https://www.ft.com/content/b02b65be-7d70-11e8-bc55-50daf1b720d> (accessed June 1, 2019).
139. Trevithick, "Germany, France Move Ahead with Joint C-130J Unit Amid Budget Woes and A400M Delays."

140. Pierre Tran, "Macron Signs French Military Budget into Law. Here's What the Armed Forces Are Getting," *Defense News*, July 16, 2018, <https://www.defensenews.com/global/europe/2018/07/16/macron-signs-french-military-budget-into-law-heres-what-the-armed-forces-are-getting/> (accessed June 1, 2019), and Pierre Tran, "France to Bolster Defense Spending by \$2 Billion. Here's the Military Equipment Already on Order," *Defense News*, September 26, 2018, <https://www.defensenews.com/global/europe/2018/09/26/france-to-bolster-defense-spending-by-2-billion-heres-the-military-equipment-already-on-order/> (accessed June 1, 2019).
141. Press release, "Defence Expenditure of NATO Countries (2010–2018)," p. 3.
142. Frédéric Lert, "Next Year to See Sharp Increase in French Defence Budget," *Jane's 360*, September 26, 2018, <https://www.janes.com/article/83399/next-year-to-see-sharp-increase-in-french-defence-budget> (accessed June 1, 2019).
143. Tran, "Macron Signs French Military Budget into Law. Here's What the Armed Forces Are Getting."
144. Christina Mackenzie, "France Orders \$2.3 Billion Upgrade for Rafale Warplanes," *Defense News*, January 14, 2019, <https://www.defensenews.com/global/europe/2019/01/14/france-orders-upgraded-rafale-warplanes-for-23-billion/> (accessed June 1, 2019).
145. International Institute for Strategic Studies, *The Military Balance 2018: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2018), p. 74.
146. Marine Pennetier, "Under Threat, France Grooms Army Hackers for Cyber Warfare," Reuters, April 5, 2017, <https://www.reuters.com/article/us-france-cyber/under-threat-france-grooms-army-hackers-for-cyber-warfare-idUSKBN1771B2> (accessed June 3, 2019).
147. Arthur P.B. Laudrain, "France's New Offensive Cyber Doctrine," *Lawfare*, February 26, 2019, <https://www.lawfareblog.com/frances-new-offensive-cyber-doctrine> (accessed June 3, 2019).
148. International Institute for Strategic Studies, *The Military Balance 2019: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2019), p. 66.
149. Republic of France, Ministry of Defence, "Operations: Chammal," updated April 4, 2019, <https://www.defense.gouv.fr/english/operations/chammal/cartes/cartes> (accessed June 3, 2019).
150. Chad Garland, "Paratrooper Becomes France's First Combat Death in Anti-ISIS Coalition," *Stars and Stripes*, September 23, 2017, <https://www.stripes.com/news/middle-east/paratrooper-becomes-france-s-first-combat-death-in-anti-isis-coalition-1.489322> (accessed June 3, 2019).
151. Nancy A. Youseff and Michael C. Bender, "U.S., U.K. and France Launch Strikes Against Syria," *The Wall Street Journal*, updated April 14, 2018, <https://www.wsj.com/articles/u-s-u-k-launch-strikes-against-syria-1523668212> (accessed June 4, 2019).
152. Fergus Kelly, "France to Continue Military Operation in Syria and Iraq in 2019, Macron Says," *The Defense Post*, January 17, 2019, <https://thedefensepost.com/2019/01/17/france-military-operation-chammal-syria-iraq-2019-macron/> (accessed June 3, 2019).
153. Baltic News Service, "300 French Troops to Arrive in Tapa Next Week," ERR News, April 16, 2019, <https://news.err.ee/930721/300-french-troops-to-arrive-in-tapa-next-week> (accessed June 2, 2019).
154. Republic of France, Ministry of Defence, "Carte des Opérations et Missions Militaires," January 22, 2019, [https://www.defense.gouv.fr/english/operations/rubriques\\_complementaires/carte-des-operations-et-missions-militaires](https://www.defense.gouv.fr/english/operations/rubriques_complementaires/carte-des-operations-et-missions-militaires) (accessed June 3, 2019), and European Union, EUNAVFOR MED, Operation Sophia, "About Us," <https://www.operation sophia.eu/about-us/> (accessed June 3, 2019).
155. Caitlin Doornbos, "French Aircraft Carrier Set for Lengthy Patrol of Mediterranean, Indo-Pacific," *Stars and Stripes*, February 25, 2019, <https://www.stripes.com/news/french-aircraft-carrier-set-for-lengthy-patrol-of-mediterranean-indo-pacific-1.570282> (accessed May 9, 2019).
156. Idrees Ali and Phil Stewart, "Exclusive: In Rare Move, French Warship Passes Through Taiwan Strait," Reuters, April 24, 2019, <https://www.reuters.com/article/us-taiwan-france-warship-exclusive-idUSKCNIS027E> (accessed June 3, 2019).
157. "French Aircraft Carrier Gets Underway for First Deployment Since 2016," *Naval Today*, March 5, 2019, <https://navaltoday.com/2019/03/05/french-aircraft-carrier-gets-underway-for-first-deployment-since-2016/> (accessed June 3, 2019).
158. Republic of France, Ministry of Defence, "Carte des Opérations et Missions Militaires," and Lindsey Tramuta, "Will Paris Feel Safer With Its New Municipal Police Force?" *Conde Nast Traveler*, March 8, 2019, <https://www.cntraveler.com/story/will-paris-feel-safer-with-its-new-municipal-police-force> (accessed June 3, 2019).
159. International Institute for Strategic Studies, *The Military Balance 2018*, p. 74.
160. "On the Frontline with Operation Sentinelle," *Politico*, December 29, 2016, <http://www.politico.eu/interactive/french-soldiers-deployed-operation-sentinelle-paris-terror-attacks/> (accessed June 3, 2019).

161. Transcript of Geoffrey Smith interview with Margaret Thatcher, Margaret Thatcher Foundation, January 8, 1990, <http://www.margarethatcher.org/document/109324> (accessed June 3, 2019).
162. Press release, "Defence Expenditure of NATO Countries (2011–2018)," p. 3.
163. Andrew Chuter, "UK MoD Gets Budget Boost of More than \$1B with Three Programs in Mind," *Defense News*, October 29, 2018, <https://www.defensenews.com/global/europe/2018/10/29/uk-mod-gets-budget-boost-of-more-than-1b-with-three-programs-in-mind/> (accessed June 3, 2019).
164. United Kingdom Ministry of Defence, *Mobilising, Modernising & Transforming Defense: A Report on the Modernising Defence Programme*, 2018, p. 16, [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/765879/ModernisingDefenceProgramme\\_report\\_2018\\_FINAL.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/765879/ModernisingDefenceProgramme_report_2018_FINAL.pdf) (accessed June 3, 2019).
165. International Institute for Strategic Studies, *The Military Balance 2019*, p. 83.
166. United Kingdom Ministry of Defence, *Mobilising, Modernising & Transforming Defense: A Report on the Modernising Defence Programme*, pp. 10 and 4.
167. Steve McCarthy, "Britain's Defense Capabilities and the Future of Transatlantic Security," Atlantic Council, February 28, 2017, <http://www.atlanticcouncil.org/blogs/natosource/britain-s-defense-capabilities-and-the-future-of-transatlantic-security> (accessed June 3, 2019).
168. United Kingdom Ministry of Defence, *Mobilising, Modernising & Transforming Defense: A Report on the Modernising Defence Programme*, p. 9.
169. International Institute for Strategic Studies, *The Military Balance 2019*, p. 86.
170. Tony Diver and Dominic Nicholls, "Sailor Shortage Means Four of Navy's 13 Frigates Have Not Spent a Single Day at Sea This Year, MoD Data Reveal," *The Telegraph*, October 18, 2018, <https://www.telegraph.co.uk/news/2018/10/18/sailor-shortage-means-four-navys-13-frigates-have-not-spent/> (accessed June 3, 2019).
171. Samuel Cranny-Evans, "UK to Reduce Operational Challenger 2 Tank Fleet," *Jane's 360*, April 23, 2019, <https://www.janes.com/article/88028/uk-to-reduce-operational-challenger-2-tank-fleet> (accessed June 3, 2019).
172. David Axe, "British Army Is Planning to Upgrade Just 148 of Its 227 Challenger 2 Tanks," *The National Interest*, April 21, 2019 <https://nationalinterest.org/blog/buzz/british-army-planning-upgrade-just-148-its-227-challenger-2-tanks-53587> (accessed June 3, 2019).
173. Cranny-Evans, "UK to Reduce Operational Challenger 2 Tank Fleet."
174. Jon Lake, "UK F-35B and Centurion Typhoon Are Combat-Ready," AINonline, January 14, 2019, <https://www.ainonline.com/aviation-news/defense/2019-01-14/uk-f-35b-and-centurion-typhoon-are-combat-ready> (accessed June 3, 2019), and press release, "UK to Double F-35 fleet with 17-Jet Order, Defence Secretary Announces," U.K. Ministry of Defence, Defence Equipment and Support, and The Rt. Hon. Gavin Williamson CBE MP, November 15, 2018, <https://www.gov.uk/government/news/uk-to-double-f-35-fleet-with-17-jet-order-defence-secretary-announces> (accessed June 3, 2019).
175. Jamie Johnson, "UK May Not Be Able to Buy New Fleet of F-35 Fighter Jets Unless Black Hole in Defence Budget Is Plugged, MPs Warn," *The Telegraph*, February 1, 2019, <https://www.telegraph.co.uk/news/2019/02/01/uk-may-not-able-buy-new-fleet-f-35-fighter-jets-unless-black/> (accessed June 3, 2019).
176. Gareth Jennings, "UK Declares IOC Milestones for F-35, Typhoon," *Jane's 360*, January 11, 2019, <https://www.janes.com/article/85649/uk-declares-ioc-milestones-for-f-35-typhoon> (accessed June 3, 2019), and Lake, "UK F-35B and Centurion Typhoon Are Combat-Ready."
177. Andrew Chuter, "UK Defense Chief: F-35 Jets Are 'Ready for Operations,'" *Defense News*, January 10, 2019, <https://www.defensenews.com/global/europe/2019/01/10/uk-defense-chief-f-35-jets-are-ready-for-operations/> (accessed June 3, 2019).
178. George Allison, "A Guide to the UK's RC-135 Rivet Joint Surveillance Aircraft," *UK Defence Journal*, January 7, 2018, <https://ukdefencejournal.org.uk/guide-rc-135-rivet-joint/> (accessed June 3, 2019).
179. "RAF's A400M Atlas Airdrops Record-Breaking Heavy Cargo Load," Air Force Technology, November 23, 2018, <https://www.airforce-technology.com/news/a400m-atlas-airdrops-load/> (accessed June 3, 2019).
180. George Allison, "UK Spends \$507m on Final Four P-8A Poseidon Maritime Patrol Aircraft," *UK Defence Journal*, January 28, 2019, <https://ukdefencejournal.org.uk/uk-spends-507m-on-final-four-p-8a-poseidon-maritime-patrol-aircraft/> (accessed June 3, 2019).
181. Tim Ripley, "First UK P-8 Crews Arrive in US to Start Training," *Jane's Defence Weekly*, January 16, 2019, <https://www.janes.com/article/85749/first-uk-p-8-crews-arrive-in-us-to-start-training> (accessed June 3, 2019).
182. "UK and Norway Advance Cooperation on Maritime Patrol Aircraft," Naval Technology, May 4, 2018, <https://www.naval-technology.com/news/uk-norway-advance-cooperation-maritime-patrol-aircraft/> (accessed June 3, 2019).

183. Lizzie Dearden, "UK Military Forced to Borrow Nato Planes to Monitor Increasing Activity by Russian Submarines, Shows New Figures," *The Independent*, January 10, 2018, <https://www.independent.co.uk/news/uk/home-news/uk-russia-submarines-patrol-planes-nimrod-poseidon-p8-nato-monitor-activity-navy-air-force-security-a8151931.html> (accessed June 3, 2019).
184. Driver and Nicholls, "Sailor Shortage Means Four of Navy's 13 Frigates Have Not Spent a Single Day at Sea This Year, MoD Data Reveal."
185. Joseph Trevithick, "Almost All of the UK's Surface Combatants Are in Port While Germany Has No Working Subs," *The War Zone*, December 20, 2017, <http://www.thedrive.com/the-war-zone/17140/almost-all-of-the-uks-surface-combatants-are-in-port-while-germany-has-no-working-subs> (accessed June 2, 2019).
186. MarEx, "Royal Navy Sends Small Minesweeper to Escort Russian Subs," *The Maritime Executive*, January 31, 2018, <https://www.maritime-executive.com/article/royal-navy-sends-small-minesweeper-to-escort-russian-subs> (accessed June 3, 2019).
187. "HMS Queen Elizabeth to Undergo Dry-Docking Maintenance at Rosyth," *Naval Technology*, April 5, 2019, <https://www.naval-technology.com/news/hms-queen-elizabeth-to-undergo-dry-docking-maintenance-at-rosyth/> (accessed June 3, 2019).
188. David B. Larter, "With Historic First F-35B Landings on HMS Queen Elizabeth, the UK Is Back in the Saddle of Carrier Aviation," *Defense News*, September 28, 2018, <https://www.defensenews.com/breaking-news/2018/09/28/with-historic-first-f-35b-landings-on-hms-queen-elizabeth-the-uk-is-back-in-the-saddle-of-carrier-aviation/> (accessed June 3, 2019).
189. Bill Bostock, "Britain's Newest and Most Powerful Warship Is Heading Back to the US to Kick Off Operational Training with US F-35 Jets," *Business Insider*, February 15, 2019, <https://www.businessinsider.com/hms-queen-elizabeth-in-us-f35-fighter-jet-trials-2019-2> (accessed June 3, 2019).
190. Reuters, "Trident: UK Parliament Backs Nuclear-Armed Submarine Fleet Renewal," *Australian Broadcasting Corporation News*, July 18, 2016, <http://www.abc.net.au/news/2016-07-19/uk-parliament-backs-trident-nuclear-submarine-renewal/7640160> (accessed June 3, 2019).
191. David Bond, "May Pledges £600m Boost for Nuclear Submarines," *Financial Times*, March 28, 2018, <https://www.ft.com/content/2e74f8e8-3296-11e8-ac48-10c6fdc22f03> (accessed June 3, 2019).
192. David Cenciotti, "RAF Typhoon Jets Deploy to Estonia to Support Baltic Air Policing with NATO's 70th Anniversary Logo on Their Tails," *The Aviationist*, April 25, 2019, <https://theaviationist.com/2019/04/25/raf-typhoon-jets-deploy-to-estonia-to-support-baltic-air-policing-with-natos-70th-anniversary-logo-on-their-tails/> (accessed June 3, 2019).
193. News release, "UK's NATO Southern Air Policing Mission to Begin in May," U.K. Ministry of Defence and The Rt. Hon. Sir Michael Fallon MP, March 27, 2017, <https://www.gov.uk/government/news/uks-nato-southern-air-policing-mission-to-begin-in-may> (accessed June 3, 2019), and George Allison, "Typhoons Return to Black Sea NATO Air Policing Mission," *UK Defence Journal*, April 25, 2018, <https://ukdefencejournal.org.uk/typhoons-return-to-black-sea-nato-air-policing-mission/> (accessed June 3, 2019).
194. Gareth Jennings, "RAF to Deploy Fighters to Iceland for First Time Since Governmental Spat in 2008," *Jane's 360*, June 7, 2018, <https://www.janes.com/article/80708/raf-to-deploy-fighters-to-iceland-for-first-time-since-governmental-spat-in-2008> (accessed June 3, 2019).
195. North Atlantic Treaty Organization, "Resolute Support Mission (RSM): Key Facts and Figures"; North Atlantic Treaty Organization, "Kosovo Force (KFOR): Key Facts and Figures"; North Atlantic Treaty Organization, Allied Maritime Command, "Standing NATO Maritime Group One (SNMGI), <https://mc.nato.int/snmgl.aspx> (accessed June 3, 2019); and North Atlantic Treaty Organization, Allied Maritime Command, "Standing NATO Mine Countermeasures Group One (SNMCMG1), <https://mc.nato.int/snmcmg1.aspx> (accessed June 3, 2019).
196. Helene Cooper, Thomas Gibbons-Neft, and Ben Hubbard, "U.S., Britain and France Strike Syria over Suspected Chemical Weapons Attack," *The New York Times*, April 13, 2018, <https://www.nytimes.com/2018/04/13/world/middleeast/trump-strikes-syria-attack.html> (accessed June 3, 2019).
197. International Institute for Strategic Studies, *The Military Balance 2019*, p. 66.
198. Press release, "Defence Expenditure of NATO Countries (2011-2018)," p. 3.
199. Tom Kingston, "Italy Stalls on Missile Program as Budget Cuts Loom," *Defense News*, October 4, 2018, <https://www.defensenews.com/global/europe/2018/10/04/italy-stalls-on-missile-program-as-budget-cuts-loom/> (accessed May 9, 2019), and Tom Kingston, "Italy Plans to Slash Half a Billion Dollars from Defense in 2019," *Defense News*, October 24, 2018, <https://www.defensenews.com/global/europe/2018/10/24/italy-plans-to-slash-half-a-billion-dollars-from-defense-in-2019/> (accessed June 3, 2019).
200. Tom Kingston, "Italy Spends \$5.7 Billion on Military Procurement in 2018," *Defense News*, November 2, 2018, <https://www.defensenews.com/global/europe/2018/11/02/italy-spends-57-billion-on-military-procurement-in-2018/> (accessed June 3, 2019).

201. "Italy Starts Construction of First Fully-Configured PPA Ship," *Naval Today*, March 20, 2019, <https://navaltoday.com/2019/03/20/italy-starts-construction-of-first-fully-configured-ppa-ship/> (accessed June 3, 2019), and Luca Peruzzi, "Italian MoD Set to Launch Submarine, Rescue Ship, and Anti-Ship Missile Upgrade Programmes," *Jane's 360*, November 2, 2018, <https://www.janes.com/article/84252/italian-mod-set-to-launch-submarine-rescue-ship-and-anti-ship-missile-upgrade-programmes> (accessed June 3, 2019).
202. "Fincantieri Launches Eighth Italian FREMM Frigate Antonio Marceglia," *Naval Today*, February 5, 2018, <https://navaltoday.com/2018/02/05/fincantieri-launches-eighth-italian-fremm-frigate-antonio-marceglia/> (accessed June 3, 2019), and Tom Kington, "Italy Signals Slowdown on F-35 Orders," *Defense News*, November 9, 2018, <https://www.defensenews.com/air/2018/11/09/italy-signals-slowdown-on-f-35-orders/> (accessed June 3, 2019).
203. Steve Scherer and Giuseppe Fonte, "Italy's Salvini Defends F-35 Orders as Necessary for Country," Reuters, March 14, 2019, <https://www.reuters.com/article/us-italy-defense-f35/italys-salvini-defends-f-35-orders-as-necessary-for-country-idUSKCN1QV27K> (accessed June 3, 2019), and Tom Kington, "Italy Air Force Chief Attacks F-35 'Uncertainty' in Rome," *Defense News*, March 13, 2019, <https://www.defensenews.com/global/europe/2019/03/13/italy-air-force-chief-attacks-f-35-uncertainty-in-rome/> (accessed June 3, 2019).
204. Tom Kington, "Italy's New Defense Minister Commits to F-35, Butts Heads with France," *Defense News*, June 29, 2018, <https://www.defensenews.com/global/europe/2018/06/29/italys-new-defense-minister-commits-to-f-35-butts-heads-with-france/> (accessed June 9, 2019); Kington, "Italy Air Force Chief Attacks F-35 'Uncertainty' in Rome"; and Scherer and Fonte, "Italy's Salvini Defends F-35 Orders as Necessary for Country."
205. Italian Ministry of Defence, "Military Operations," <https://www.difesa.it/EN/Operations/Pagine/MilitaryOperations.aspx> (accessed June 3, 2019).
206. Luca Peruzzi, "Italy Donates 12 Patrol Boats to Libya," *Jane's 360*, August 10, 2018, <https://www.janes.com/article/82297/italy-donates-12-patrol-boats-to-libya> (accessed June 3, 2019).
207. Italian Ministry of Defence, "Military Operations," and Agence France-Press, "Italy Keeps Troops in Libya Despite Khalifa Advance," *Arab News*, updated April 9, 2019, <http://www.arabnews.com/node/1480051/middle-east> (accessed June 3, 2019).
208. News release, "Migratory Situation in March—Eastern Mediterranean Accounts for Most of All Irregular Migrants," Frontex, April 9, 2019, <https://frontex.europa.eu/media-centre/news-release/migratory-situation-in-march-eastern-mediterranean-accounts-for-most-of-all-irregular-migrants-klZYk5> (accessed June 3, 2019).
209. Fact Sheet, "NATO's Enhanced Forward Presence," March 2019, and North Atlantic Treaty Organization, "Kosovo Force (KFOR): Key Facts and Figures."
210. North Atlantic Treaty Organization, Allied Air Command, "Italian Eurofighters to Enhance Air Policing Capabilities over Romania," April 29, 2019, <https://ac.nato.int/archive/2019/italian-eurofighters-enhance-air-policing-capabilities-over-romania> (accessed June 3, 2019).
211. Gareth Jennings, "Update: Italy Begins Typhoon Deployment to Iceland," *Jane's 360*, March 19, 2019, <https://www.janes.com/article/87337/update-italy-begins-typhoon-deployment-to-iceland> (accessed June 3, 2019).
212. Daniel Kochis, "Poland: The Lynchpin of Security on NATO's Front Lines," Heritage Foundation *Issue Brief* No. 4455, August 17, 2015, <http://www.heritage.org/research/reports/2015/08/poland-the-lynchpin-of-security-on-natos-front-lines>.
213. International Institute for Strategic Studies, *The Military Balance 2019*, p. 135.
214. Christian Davies, "New Polish Military Force Worries Political Opposition," *Politico*, updated February 17, 2017, <http://www.politico.eu/article/new-polish-military-force-worries-political-opposition/> (accessed June 4, 2019).
215. Błaszczak, "Poland's Defense Minister: Making the Constant Effort to Strengthen Defense."
216. International Institute for Strategic Studies, *The Military Balance 2018*, p. 135, and Charlie Gao, "This Is How Poland Plans to Fight Russia in a War," *The National Interest*, March 3, 2018, <http://nationalinterest.org/blog/the-buzz/how-poland-plans-fight-russia-war-24731> (accessed June 4, 2019).
217. John R. Schindler, "Poland's Defense Minister Answers the Question: What Does Putin Want?" *Observer*, November 14, 2017, <http://observer.com/2017/11/interview-polish-defense-minister-antoni-macierewicz-on-russia-nato/> (accessed June 4, 2019).
218. Lidia Kelly, Justyna Pawlak, and Anna Włodarczak-Semczuk, "Special Report: Why Poland Fell out of Step with Europe," Reuters, October 18, 2018, <https://www.reuters.com/article/us-poland-nationalism-special-report/special-report-why-poland-fell-out-of-step-with-europe-idUSKCNIMS1M3> (accessed June 4, 2019).
219. Press release, "Defence Expenditure of NATO Countries (2011–2018)," p. 3.
220. Associated Press, "Poland Commits to Spend 2.5 Percent of Its GDP on Defense," October 23, 2017, <https://apnews.com/ae5d45b2137d426a8790da53350947eb> (accessed June 4, 2019).

221. Jarosław Adamowski, “Polish Defense Minister: F-35 Acquisition ‘Not Far Away,’” *Defense News*, April 30, 2019, <https://www.defensenews.com/global/europe/2019/04/30/polish-defense-minister-f-35-acquisition-not-far-away/> (accessed June 3, 2019), and Remigiusz Wilk, “Poland Implements Modernisation Plan for 2017–26,” *Jane’s 360*, March 11, 2019, <https://www.janes.com/article/87131/poland-implements-modernisation-plan-for-2017-26> (accessed June 3, 2019).
222. Lidia Kelly, “Poland Signs \$4.75 Billion Deal for U.S. Patriot Missile System Facing Russia,” Reuters, March 28, 2018, <https://www.reuters.com/article/us-raytheon-poland-patriot/poland-united-states-sign-4-75-billion-deal-on-patriot-missiles-idUSKBN1H4175> (accessed June 4, 2019).
223. Associated Press, “Poland to Pay \$414M for US-Made Rocket Launching System,” February 10, 2019, <https://www.apnews.com/573c2f35f5fea4cbfb65edb90aa22c0ff> (accessed June 4, 2019).
224. Jarosław Adamowski, “Poland Acquires AW101 Helos for Navy Under \$430M Deal,” *Defense News*, April 29, 2019, [https://www.defensenews.com/global/europe/2019/04/29/poland-acquires-aw101-helos-for-navy-under-430m-deal/?utm\\_source=clavis](https://www.defensenews.com/global/europe/2019/04/29/poland-acquires-aw101-helos-for-navy-under-430m-deal/?utm_source=clavis) (accessed June 4, 2019).
225. Aaron Mehta, “Poland, Canada Join NATO Members in Potential Maritime Surveillance Aircraft Buy,” *Defense News*, February 15, 2018, <https://www.defensenews.com/smr/munich-security-forum/2018/02/15/poland-canada-join-nato-members-in-potential-maritime-surveillance-aircraft-buy/> (accessed June 4, 2019).
226. Adamowski, “Polish Defense Minister: F-35 Acquisition ‘Not Far Away.’”
227. Martin Egnash, “US National Guardsmen Improving Bases in Poland and Romania,” *Stars and Stripes*, April 26, 2019, <https://www.stripes.com/news/us-national-guardsmen-improving-bases-in-poland-and-romania-1.578576> (accessed June 4, 2019).
228. North Atlantic Treaty Organization, “Resolute Support Mission (RSM): Key Facts and Figures,” and Benjamin Wilson, “Weather Station Supports Intelligence, Surveillance, Reconnaissance Mission,” U.S. Central Command, May 1, 2017, <http://www.centcom.mil/MEDIA/NEWS-ARTICLES/News-Article-View/Article/1168329/weather-station-supports-intelligence-surveillance-reconnaissance-mission/> (accessed June 4, 2019).
229. News release, “Poland Takes over NATO Air Policing Mission in Baltic States,” North Atlantic Treaty Organization, last updated January 4, 2019, [https://www.nato.int/cps/en/natohq/news\\_161981.htm](https://www.nato.int/cps/en/natohq/news_161981.htm) (accessed June 4, 2019).
230. Fact Sheet, “NATO’s Enhanced Forward Presence,” March 2019.
231. Consulate General of the Republic of Poland in Chicago, “20 Years of Poland in NATO,” March 12, 2019, [https://chicago.msz.gov.pl/en/news/20\\_years\\_of\\_poland\\_in\\_nato](https://chicago.msz.gov.pl/en/news/20_years_of_poland_in_nato) (accessed June 4, 2019).
232. North Atlantic Treaty Organization, Allied Maritime Command, “Standing NATO Maritime Group One (SNMG1).”
233. North Atlantic Treaty Organization, “Kosovo Force (KFOR): Key Facts and Figures.”
234. Reuters, “Turkey Orders Detention of 210 Military Personnel over Links to Gulen,” April 26, 2019, <https://www.reuters.com/article/us-turkey-security-prosecutor/turkey-orders-detention-of-210-military-personnel-over-links-to-gulen-idUSKCNIS20T3> (accessed June 4, 2019), and Alastair Jamieson, “Turkey’s Erdogan to Build More Prisons as Post-Coup Purge Persists,” NBC News, September 16, 2018, <https://www.nbcnews.com/news/world/turkey-s-erdogan-build-more-prisons-post-coup-purge-persists-n909486> (accessed June 4, 2019).
235. Reuters, “Turkey Orders Detention of 210 Military Personnel over Links to Gulen.”
236. “Turkish Military Dismissed 16,540 Personnel Since Coup Attempt,” *Hurriyet Daily News*, April 29, 2019, <http://www.hurriyetsdailynews.com/turkish-military-dismissed-16-540-personnel-since-coup-attempt-143030> (accessed June 4, 2019).
237. Peter Müller and Maximilian Popp, “Purges Have Weakened Once Mighty Turkish Military,” *Spiegel Online*, January 18, 2017, <http://www.spiegel.de/international/world/purges-have-weakened-once-mighty-turkish-military-a-1130494.html> (accessed June 4, 2019).
238. Laura Pitel, “Turkish Pilots Recalled to Plug Gaps in Depleted Air Force,” *Financial Times*, September 14, 2017, <https://www.ft.com/content/ecdb3ff0-9934-11e7-a652-cde3f882dd7b> (accessed June 4, 2019), and Nordic Monitor, “Turkey’s Defense Minister Admits Fighter Pilot Shortage After Mass Purge,” January 2019, <https://www.nordicmonitor.com/2019/01/turkeys-defense-minister-admits-fighter-pilot-shortage-after-mass-purge/> (accessed June 4, 2019).
239. Nordic Monitor, “Turkey’s Defense Minister Admits Fighter Pilot Shortage After Mass Purge.”
240. Reuters, “Turkey Says Russian S-400 Missile Delivery Brought Forward to July 2019,” April 4, 2018, <https://www.reuters.com/article/us-russia-turkey-missiles/turkey-says-russian-s-400-missile-delivery-brought-forward-to-july-2019-idUSKCN1HB0IU> (accessed June 4, 2019), and Reuters, “Russia to Start Deliveries of S-400 to Turkey in July: Ifax,” April 24, 2019, <https://www.reuters.com/article/us-turkey-security-russia-idUSKCNIS0IH5> (accessed June 4, 2019).
241. Joe Gould, “Pompeo: With S-400, Turkey Won’t Get F-35, May Get Sanctions,” *Defense News*, April 10, 2019, <https://www.defensenews.com/congress/budget/2019/04/10/pompeo-with-s-400-turkey-wont-get-f-35-may-get-sanctions/> (accessed May 9, 2019).

242. Reuters, "U.S. Congressional Committee Leaders Warn Turkey on F-35, S-400," April 9, 2019, <https://www.reuters.com/article/us-usa-turkey-f35-congress/u-s-congressional-committee-leaders-warn-turkey-on-f-35-s-400-idUSKCN1RL2DC> (accessed June 4, 2019).
243. Idrees Ali and Phil Stewart, "Exclusive: U.S. May Soon Pause Preparations for Delivering F-35s to Turkey," Reuters, March 21, 2019, <https://www.reuters.com/article/us-usa-turkey-defense-exclusive/exclusive-u-s-may-soon-pause-preparations-for-delivering-f-35s-to-turkey-idUSKCN1R20AY> (accessed June 4, 2019).
244. "Turkey-U.S. Continue Coordination for Delivery of F-35: Turkish Military Sources," *Reuters*, April 4, 2019, <https://www.yahoo.com/news/turkey-u-continue-coordination-delivery-f-35-turkish-132157793.html> (accessed June 4, 2019).
245. Lockheed Martin, "F-35 Lightning II: Turkey: Industrial Participation," <https://www.f35.com/global/participation/turkey-industrial-participation> (accessed June 4, 2019); David Welna, "U.S.–Turkey Standoff over F-35 Escalates as Each Side Waits for the Other to Blink," NPR, April 3, 2019, <https://www.npr.org/2019/04/03/709222963/u-s-turkey-standoff-over-f-35-escalates-as-each-side-waits-for-the-other-to-blin> (accessed June 4, 2019); and Burak Ege Bekdil, "How Turkey's Industry Could Suffer from the S-400 Deal with Russia," *Defense News*, April 11, 2019, <https://www.defensenews.com/industry/2019/04/11/how-turkeys-industry-could-suffer-from-the-s-400-deal-with-russia/> (accessed June 4, 2019).
246. Welna, "U.S.–Turkey Standoff over F-35 Escalates as Each Side Waits for the Other to Blink," and Selcan Hacaoglu and Firat Kozok, "Turkey Rejects Latest U.S. Offer to Sell Patriot Missiles," Bloomberg, March 1, 2019, <https://www.bloomberg.com/news/articles/2019-03-01/turkey-said-to-reject-latest-u-s-offer-to-sell-patriot-missiles> (accessed June 4, 2019).
247. Aaron Mehta, "Why Are US Drones Being Based in Greece for the First Time?" *Defense News*, May 23, 2018, <https://www.defensenews.com/air/2018/05/23/us-drones-are-being-based-in-greece-for-the-first-time-and-that-might-not-sit-well-with-turkey/> (accessed June 4, 2019), and Kyle Rempfer, "US Air Force Ties to Greece May Grow as Relations with Turkey Sour," *Air Force Times*, April 30, 2019, [https://www.airforcetimes.com/news/your-air-force/2019/04/30/us-air-force-ties-to-greece-may-grow-as-relations-with-turkey-sour/?utm\\_campaign=Socialflow+AIR&utm\\_medium=social&utm\\_source=twitter.com](https://www.airforcetimes.com/news/your-air-force/2019/04/30/us-air-force-ties-to-greece-may-grow-as-relations-with-turkey-sour/?utm_campaign=Socialflow+AIR&utm_medium=social&utm_source=twitter.com) (accessed June 4, 2019).
248. Rempfer, "US Air Force Ties to Greece May Grow as Relations with Turkey Sour."
249. John Vandiver, "Add Greece to the List of Countries Pressing for More US Troops," *Stars and Stripes*, October 11, 2018, <https://www.stripes.com/news/add-greece-to-the-list-of-countries-pressing-for-more-us-troops-1.551298> (accessed June 4, 2019).
250. Gordon Lubold, Felicia Schwartz, and Nancy A. Youssef, "U.S. Pares Back Use of Turkish Base Amid Strains with Ankara," *The Wall Street Journal*, updated March 11, 2018, <https://www.wsj.com/articles/u-s-pares-back-use-of-turkish-base-amid-strains-with-ankara-1520766121?mod=e2twp> (accessed June 2, 2019).
251. Joseph Trevithick, "Turkish Lawyers Demand Raid on Incirlik Air Base and Arrest of U.S. Military Personnel," *The War Zone*, August 8, 2018, <https://www.thedrive.com/the-war-zone/22738/turkish-lawyers-demand-raid-on-incirlik-air-base-and-arrest-of-u-s-military-personnel> (accessed June 2, 2019).
252. Oriana Pawlyk, "Air Force General Downplays Possible Restrictions at Incirlik," *Military.com*, March 18, 2018, <https://www.military.com/daily-news/2018/03/18/air-force-general-plays-down-possibility-restrictions-incirlik.html> (accessed June 2, 2019).
253. Tyler Rogoway, "F/A-18E Pilot Had Hypoxia Symptoms After Diversion to Incirlik Air Base During Syria Mission," *The War Zone*, May 7, 2018, <https://www.thedrive.com/the-war-zone/20690/f-a-18e-pilot-found-hypoxic-after-diversion-to-incirlik-air-base-during-syria-mission> (accessed June 2, 2019).
254. North Atlantic Treaty Organization, *The Secretary General's Annual Report: 2016*, p. 14; Deutsche Welle, "NATO Discussing Request for AWACS Surveillance Aircraft in Syrian Anti-'IS' Fight," January 22, 2016, <http://www.dw.com/en/nato-discussing-request-for-awacs-surveillance-aircraft-in-syrian-anti-is-fight/a-18998325> (accessed June 2, 2019).
255. North Atlantic Treaty Organization, "Press Conference by NATO Secretary General Jens Stoltenberg Following the First Meeting of the North Atlantic Council in Foreign Ministers' Session," last updated April 4, 2019, [https://www.nato.int/cps/en/natohq/opinions\\_165234.htm](https://www.nato.int/cps/en/natohq/opinions_165234.htm) (accessed June 2, 2019).
256. Simon Newton, "AWACS: The Intelligence Behind the Fight Against Islamic State," *Forces Network*, December 19, 2018, <https://www.forces.net/news/awacs-intelligence-behind-fight-against-islamic-state> (accessed June 2, 2019).
257. North Atlantic Treaty Organization, "NATO Ballistic Missile Defence Architecture as of 2019," [https://www.nato.int/nato\\_static\\_fl2014/assets/pictures/2016\\_07\\_160711a-infographics-bmd/20170907\\_170907-bmd03.jpg](https://www.nato.int/nato_static_fl2014/assets/pictures/2016_07_160711a-infographics-bmd/20170907_170907-bmd03.jpg) (accessed June 2, 2019), and Joseph Trevithick, "The U.S. Army Wants to Expand a Secretive Missile Defense Site in Turkey," *The War Zone*, May 25, 2017, <http://www.thedrive.com/the-war-zone/10638/the-u-s-army-wants-to-expand-a-secretive-missile-defense-site-in-turkey> (accessed June 2, 2019).
258. North Atlantic Treaty Organization, "Joint Press Conference with NATO Secretary General Jens Stoltenberg and the Minister of Foreign Affairs of Turkey, Mevlüt Çavuşoğlu," April 16, 2018, last updated April 17, 2018, [https://www.nato.int/cps/en/natohq/opinions\\_153695.htm](https://www.nato.int/cps/en/natohq/opinions_153695.htm) (accessed June 2, 2019).



259. North Atlantic Treaty Organization, “Resolute Support Mission (RSM): Key Facts and Figures.”
260. North Atlantic Treaty Organization, “Kosovo Force (KFOR): Key Facts and Figures,” and International Institute for Strategic Studies, *The Military Balance 2019*, p. 154.
261. Burak Ege Bekdil, “Turkey’s Erdogan Decrees Sweeping Defense Procurement Takeover,” *Defense News*, December 27, 2017, <https://www.defensenews.com/industry/2017/12/27/turkeys-erdogan-decrees-sweeping-defense-procurement-takeover/> (accessed June 9, 2019).
262. Burak Ege Bekdil, “Turkish ‘Brain Drain’: Why Are Defense Industry Officials Ditching Their Jobs in Turkey for Work Abroad?” *Defense News*, January 8, 2019, <https://www.defensenews.com/industry/2019/01/08/turkish-brain-drain-why-are-defense-industry-officials-ditching-their-jobs-in-turkey-for-work-abroad/> (accessed June 9, 2019).
263. Burak Ege Bekdil, “Turkey’s Fiscal State Threatens to Impact Defense Imports and Programs,” *Defense News*, April 22, 2019, <https://www.defensenews.com/industry/2019/04/22/turkeys-fiscal-state-threatens-to-impact-defense-imports-and-programs/> (accessed June 9, 2019).
264. Burak Ege Bekdil, “Future of Turkey’s Indigenous Altay Tank in Question over Foreign Involvement,” *Defense News*, November 13, 2018, <https://www.defensenews.com/land/2018/11/13/success-of-turkeys-indigenous-altay-tank-in-question-over-foreign-involvement/> (accessed June 2, 2019).
265. International Institute for Strategic Studies, *The Military Balance 2016: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2016), pp. 147–148.
266. “Turkey Starts Construction of Third Reis-Class Submarine,” *Naval Today*, February 27, 2018, <https://navaltoday.com/2018/02/27/turkey-starts-construction-of-third-reis-class-submarine/> (accessed June 2, 2019).
267. Lale Sariibrahimoglu, “Turkey’s Preveze-Class Submarines to Be Modernised,” *Jane’s 360*, February 13, 2019, <https://www.janes.com/article/86359/turkey-s-preveze-class-submarines-to-be-modernised> (accessed June 2, 2019).
268. “Turkey Launches Test and Evaluation Ship TCG Ufuk,” *Naval Today*, February 11, 2019, <https://navaltoday.com/2019/02/11/turkey-launches-test-and-evaluation-ship-tcg-ufuk/> (accessed June 2, 2019), and Can Kasapoglu, “The Blue Homeland: Turkey’s Largest Naval Drill,” Anadolu Agency, February 27, 2019, <https://www.aa.com.tr/en/analysis/-the-blue-homeland-turkey-s-largest-naval-drill/1404267> (accessed June 2, 2019).
269. Press release, “Defence Expenditure of NATO Countries (2011–2018),” p. 3.
270. Republic of Estonia, Ministry of Defence, “Defence Budget: Estonian Defence Budget 2019,” last updated March 1, 2019, <http://www.kaitseministeerium.ee/en/objectives-activities/defence-budget> (accessed June 2, 2019).
271. International Institute for Strategic Studies, *The Military Balance 2019*, p. 102.
272. Simon Newton, “Why NATO’s Military Might Is Focused on Estonia,” *Forces Network*, May 11, 2015, <https://www.forces.net/news/tri-service/why-natos-military-might-focused-estonia> (accessed June 2, 2019).
273. Republic of Estonia, Ministry of Defence, and Republic of Estonia, Defence Forces, “National Defence Development Plan 2017–2026,” <http://www.kaitseministeerium.ee/riigikaitse2026/arengukava/eng/> (accessed June 2, 2019).
274. “Estonian Ministry of Defense Approves Development Plan for 2020–2023,” *The Baltic Times*, February 2, 2019, [https://www.baltictimes.com/estonian\\_ministry\\_of\\_defense\\_approves\\_development\\_plan\\_for\\_2020-2023/](https://www.baltictimes.com/estonian_ministry_of_defense_approves_development_plan_for_2020-2023/) (accessed June 2, 2019).
275. “Netherlands Completes Delivery of CV90 Combat Vehicles to Estonia,” *Defence Blog*, April 1, 2019, <https://defence-blog.com/army/netherlands-completes-delivery-of-cv90-combat-vehicles-to-estonia.html> (accessed June 2, 2019).
276. Associated Press, “Estonia to Buy Missiles, Air Defense System in \$59M Deal,” *Defense News*, June 12, 2018, <https://www.defensenews.com/air/2018/06/12/estonia-to-buy-missiles-air-defense-system-in-50m-deal/> (accessed June 2, 2019).
277. Gareth Jennings, “Estonia to Receive Donated C-145As This Year,” *Jane’s 360*, February 4, 2019, <https://www.janes.com/article/86143/estonia-to-receive-donated-c-145as-this-year> (accessed June 2, 2019).
278. Richard Scott, “First Estonian Minehunter Upgrade Completes,” *Jane’s 360*, February 1, 2019, <https://www.janes.com/article/86121/first-estonian-minehunter-upgrade-completes> (accessed June 2, 2019).
279. Republic of Estonia, Ministry of Defence, and Republic of Estonia, Defence Forces, “National Defence Development Plan (2017–2026).”
280. *Ibid.* and Republic of Estonia, Ministry of Defence, “Defence Budget: Estonian Defence Budget 2019.”
281. Baltic News Service, “Defence Forces Cyber Command Takes Up Operations,” ERR News, August 1, 2018, <https://news.err.ee/850719/defence-forces-cyber-command-takes-up-operations> (accessed June 2, 2019).

282. Estonian Defence League, “Estonian Defence League’s Cyber Unit,” last updated December 6, 2019, <http://www.kaitseliit.ee/en/cyber-unit> (accessed June 12, 2019), and Monica M. Ruiz, “Is Estonia’s Approach to Cyber Defense Feasible in the United States?” War on the Rocks, January 9, 2018, <https://warontherocks.com/2018/01/estonias-approach-cyber-defense-feasible-united-states/> (accessed June 12, 2019).
283. U.S. Embassy in Estonia, “Signing of Defense Cooperation Agreement—Remarks by Ambassador James D. Melville,” Tallinn, Estonia, January 17, 2017, <https://ee.usembassy.gov/signing-defense-cooperation-agreement-remarks-ambassador-james-d-melville/> (accessed June 2, 2019).
284. Republic of Estonia, Ministry of Defence, “Defence Budget: Estonian Defence Budget 2019.”
285. International Institute for Strategic Studies, *The Military Balance 2019*, p. 124.
286. Raimonds Bergmanis, Minister of Defence, Republic of Latvia, “The National Defence Concept,” approved by Cabinet of Ministers May 24, 2016, and adopted by Parliament June 16, 2016, p. 8, <http://mepoforum.sk/wp-content/uploads/2017/01/Latvia-national-defence-concept-2016-en.pdf> (accessed June 2, 2019).
287. “More than 700 Latvian Soldiers to Be Recruited in 2019,” LSM.lv, December 27, 2018, <https://eng.lsm.lv/article/society/defense/more-than-700-latvian-soldiers-to-be-recruited-in-2019.a304270/> (accessed June 2, 2019).
288. Press release, “Defence Expenditure of NATO Countries (2011–2018),” p. 3.
289. Gareth Jennings, “Latvia Signs for Black Hawk Helos,” *Jane’s 360*, November 30, 2018, <https://www.janes.com/article/84927/latvia-signs-for-black-hawk-helos> (accessed June 2, 2019).
290. “Latvia: Last M109A5 Self-Propelled Howitzers from Austria Delivered,” Army Recognition, October 19, 2018, [https://www.armyrecognition.com/october\\_2018\\_global\\_defense\\_security\\_army\\_news\\_industry/latvia\\_last\\_m109a5\\_self-propelled\\_howitzers\\_from\\_austria\\_delivered.html](https://www.armyrecognition.com/october_2018_global_defense_security_army_news_industry/latvia_last_m109a5_self-propelled_howitzers_from_austria_delivered.html) (accessed June 12, 2019), and “Latvia Will Receive Stinger MANPADS Missile Purchased from Denmark,” Army Recognition, May 30, 2018, [https://www.armyrecognition.com/may\\_2018\\_global\\_defense\\_security\\_army\\_news\\_industry/latvia\\_will\\_receive\\_stinger\\_manpads\\_missile\\_purchased\\_from\\_denmark.html](https://www.armyrecognition.com/may_2018_global_defense_security_army_news_industry/latvia_will_receive_stinger_manpads_missile_purchased_from_denmark.html) (accessed June 12, 2019).
291. Gareth Jennings, “Latvia Seeks Medium-Range GBADS as Part of Wider Military Revamp,” *Jane’s 360*, November 30, 2018, <https://www.janes.com/article/84925/latvia-seeks-medium-range-gbads-as-part-of-wider-military-revamp> (accessed June 2, 2019), and press release, “Latvia Plans to Invest the Average of €50 Million a Year in the Development of Military Infrastructure over the Next Four Years,” Republic of Latvia, Ministry of Defence, February 25, 2019, <https://www.mod.gov.lv/en/news/latvia-plans-invest-average-eu50-million-year-development-military-infrastructure-over-next> (accessed June 2, 2019).
292. International Institute for Strategic Studies, *The Military Balance 2019*, p. 125.
293. “Lithuania’s Defence Budget: Expanded and Expanding,” *The Baltic Times*, February 28, 2018, [https://www.baltictimes.com/lithuania\\_s\\_defence\\_budget\\_expanded\\_and\\_expanding/](https://www.baltictimes.com/lithuania_s_defence_budget_expanded_and_expanding/) (accessed June 2, 2019).
294. North Atlantic Treaty Organization, *The Secretary General’s Annual Report: 2018*, pp. 118–119.
295. Press release, “Defence Expenditure of NATO Countries (2011–2018),” p. 3.
296. State Security Department of the Republic of Lithuania, Second Investigation Department Under the Ministry of National Defence, *National Threat Assessment 2019, passim*, <https://www.vsd.lt/wp-content/uploads/2019/02/2019-Gresmes-internetui-EN.pdf> (accessed June 2, 2019).
297. Sebastian Sprenger, “Lithuania Is First Baltic Nation to Sign US Defense–Cooperation Pact,” *Defense News*, April 3, 2019, <https://www.defensenews.com/global/europe/2019/04/03/lithuania-is-first-baltic-nation-to-sign-us-defense-cooperation-pact/> (accessed June 2, 2019).
298. News release, “U.S., Lithuania Detail Roadmap for Cooperation Through 2024,” U.S. Department of Defense, April 2, 2019, <https://dod.defense.gov/News/Article/Article/1803578/us-lithuania-detail-roadmap-for-cooperation-through-2024/> (accessed June 2, 2019).
299. “Lithuania PM Says Army Modernization Now More Important than Universal Conscription,” *The Baltic Times*, February 8, 2018, [https://www.baltictimes.com/lithuanian\\_pm\\_says\\_army\\_modernization\\_now\\_more\\_important\\_than\\_universal\\_conscription/](https://www.baltictimes.com/lithuanian_pm_says_army_modernization_now_more_important_than_universal_conscription/) (accessed June 2, 2019).
300. “Lithuania to Buy Additional NASAMS Air Defence Missiles from Norway,” Air Force Technology, January 4, 2019, <https://www.airforce-technology.com/news/lithuania-nasams-defence-missiles-norway/> (accessed June 2, 2019).

301. Gerrard Cowan, "Lithuania Acquires Sitaware Frontline for Boxer IFVs," *Jane's 360*, August 10, 2018, <https://www.janes.com/article/82306/lithuania-acquires-sitaware-frontline-for-boxer-ifvs> (accessed June 2, 2019); "Lithuania Procures Additional Missiles for Javelin Anti-Tank System," *Army Technology*, February 21, 2019, <https://www.army-technology.com/news/lithuania-missiles-javelin-anti-tank/> (accessed May 10, 2019); and "Lithuania Receives Its First Upgraded PzH 2000 Self-Propelled Howitzers," *Defence Blog*, December 16, 2018, <https://defence-blog.com/news/lithuania-receives-its-first-upgraded-pzh-2000-self-propelled-howitzers.html> (accessed June 2, 2019).
302. Daniel Darling, "Lithuania Planning JLTV Acquisition," *Defense & Security Monitor*, February 28, 2019, <https://dsm.forecastinternational.com/wordpress/2019/02/28/lithuania-planning-jltv-acquisition/> (accessed May 9, 2019).
303. Scaparrotti, statement on USEUCOM posture, March 5, 2019, p. 2.
304. O'Rourke, "Navy Aegis Ballistic Missile Defense (BMD) Program: Background and Issues for Congress," p. 7.
305. Scaparrotti, statement on USEUCOM posture, March 5, 2019, p. 19.
306. *Ibid.*, p. 15, and press release, "Truman Strike Group Returns Home from Eight-Month Deployment," U.S. Fleet Forces Command, December 17, 2018, [https://www.navy.mil/submit/display.asp?story\\_id=108134](https://www.navy.mil/submit/display.asp?story_id=108134) (accessed June 2, 2019).
307. U.S. Army Europe, "Fact Sheet: U.S. Army Europe," May 1, 2019, <https://www.eur.army.mil/Portals/19/documents/Fact%20Sheet/USArmyEuropeFactSheet190503.pdf?ver=2019-05-03-031044-087> (accessed June 2, 2019); Lacey Justinger, "41st Field Artillery Brigade Returns to Germany," U.S. Army, November 30, 2018, [https://www.army.mil/article/214491/41st\\_field\\_artillery\\_brigade\\_returns\\_to\\_germany](https://www.army.mil/article/214491/41st_field_artillery_brigade_returns_to_germany) (accessed June 2, 2019); and U.S. Army, 7th Army Training Command, "41st Field Artillery Brigade," <https://www.7atc.army.mil/41FA/> (accessed June 2, 2019).
308. U.S. Army Europe, "Fact Sheet: U.S. Army Europe."
309. Todd South, "Five Questions with US Army Europe," *Army Times*, October 9, 2018, <https://www.armytimes.com/news/your-army/2018/10/09/five-questions-with-us-army-europe/> (accessed June 2, 2019).
310. William Morris, "Europe Missile Defense Command Upgraded as Army Announces Leadership Moves," *Stars and Stripes*, April 17, 2019, <https://www.stripes.com/news/europe/europe-missile-defense-command-upgraded-as-army-announces-leadership-moves-1.577276> (accessed June 2, 2019).
311. Will Morris, "Air Defense Artillery Unit Is Activated in Germany for the First Time in Decades," *Stars and Stripes*, November 28, 2018, <https://www.stripes.com/news/air-defense-artillery-unit-is-activated-in-germany-for-the-first-time-in-decades-1.558315> (accessed June 2, 2019), and John Vandiver, "Army Air Defense Brigade Back in Europe in a Post-Cold War First," *Stars and Stripes*, April 2, 2018, <https://www.stripes.com/news/army-air-defense-brigade-back-in-europe-in-a-post-cold-war-first-1.520007> (accessed June 2, 2019).
312. Fact Sheet, "U.S. Air Forces in Europe–Air Forces Africa," U.S. Air Force, July 16, 2015, <https://www.af.mil/About-Us/Fact-Sheets/Display/Article/609838/united-states-air-force-in-europe/> (accessed June 2, 2019).
313. U.S. European Command, "Our Forces: U.S. Marine Forces Europe," <https://www.eucom.mil/about/organization/our-forces/u-s-marine-forces-europe> (accessed June 2, 2019).
314. "Marines May Move Even More Combat Gear into Norwegian Caves," *Military.com*, June 16, 2017, <https://www.military.com/defensetech/2017/06/16/marines-combat-gear-norwegian-caves> (accessed June 12, 2019).
315. Jason Fudge, "Marines, Sailors Build Bridge in Norway During Exercise Trident Juncture 18," U.S. Marine Corps, November 3, 2018, <https://www.marines.mil/News/News-Display/Article/1681732/marines-sailors-build-bridge-in-norway-during-exercise-trident-juncture-18/> (accessed June 2, 2019).
316. Matthew Cox, "6 Years After Benghazi, a Marine Commander Says Conditions May Soon Allow a US Diplomatic Return to Libya," *Business Insider*, December 17, 2018, <https://www.businessinsider.com/conditions-improving-for-us-diplomatic-return-to-libya-2018-12> (accessed June 3, 2019).
317. Martin Egnash, "Legacy of Benghazi: Marine Force Stays Ready for Quick Africa Deployment," *Stars and Stripes*, January 14, 2019, <https://www.stripes.com/news/legacy-of-benghazi-marine-force-stays-ready-for-quick-africa-deployment-1.564342> (accessed June 3, 2019).
318. Shawn Snow, "No More Marine Rotations to the Black Sea. The Corps Is Focusing Here Instead," *Marine Corps Times*, November 29, 2018, <https://www.marinecorpstimes.com/news/your-marine-corps/2018/11/29/no-more-marine-rotations-to-the-black-sea-the-corps-is-focusing-on-the-arctic-instead/> (accessed June 3, 2019).
319. John Vandiver, "Special Forces, SEAL Units to Join Mix of Elite Troops at Rural Baumholder," *Stars and Stripes*, June 13, 2018, <https://www.stripes.com/news/special-forces-seal-units-to-join-mix-of-elite-troops-at-rural-baumholder-1.532491> (accessed June 3, 2019).

320. Scaparrotti, statement on USEUCOM posture, March 5, 2019, p. 18.
321. U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller), *Department of Defense Budget, Fiscal Year (FY) 2020: European Deterrence Initiative*, pp. 18–20.
322. Dan Stoutamire, “Romanian Air Base Proving Crucial as US Hub Ahead of Major Exercises,” *Stars and Stripes*, April 18, 2017, <https://www.stripes.com/news/romanian-air-base-proving-crucial-as-us-hub-ahead-of-major-exercises-1.464105#.WPZirOR1rcs> (accessed May 31, 2019).

# Middle East

Strategically situated at the intersection of Europe, Asia, and Africa, the Middle East has long been an important focus of United States foreign policy. U.S. security relationships in the region are built on pragmatism, shared security concerns, and economic interests, including large sales of U.S. arms to countries in the region to help them defend themselves. The U.S. also has a long-term interest in the Middle East that derives from the region's economic importance as the world's primary source of oil and gas.

The region is home to a wide array of cultures, religions, and ethnic groups, including Arabs, Jews, Kurds, Persians, and Turks, among others. It also is home to the three Abrahamic religions of Judaism, Christianity, and Islam as well as many smaller religions like the Bahá'í, Druze, Yazidi, and Zoroastrian faiths. The region contains many predominantly Muslim countries as well as the world's only Jewish state.

The Middle East is deeply sectarian, and these long-standing divisions, exacerbated by the constant vying for power by religious extremists, are central to many of the challenges that the region faces today. In some cases, these sectarian divides go back centuries. Contemporary conflicts, however, have less to do with these histories than they do with modern extremist ideologies and the fact that today's borders often do not reflect the region's cultural, ethnic, or religious realities. Instead, they are often the results of decisions taken by the British, French, and other powers during and soon after World War I as they dismantled the Ottoman Empire.<sup>1</sup>

In a way not understood by many in the West, religion remains a prominent fact of daily life in the modern Middle East. At the heart of many of the region's conflicts is the friction within Islam between Sunnis and Shias. This friction dates back to the death of the Prophet Muhammad in 632 AD.<sup>2</sup> Sunni Muslims, who form the majority of the world's Muslim population, hold power in most of the Arab countries in the Middle East.

Viewing the Middle East's current instability through the lens of a Sunni–Shia conflict, however, does not show the full picture. The cultural and historical division between Arabs and Persians has reinforced the Sunni–Shia split. The mutual distrust of many Arab/Sunni powers and the Persian/Shia power (Iran), compounded by clashing national and ideological interests, has fueled instability in such countries as Iraq, Lebanon, Syria, and Yemen. Sunni extremist organizations such as al-Qaeda and the Islamic State (IS) have exploited sectarian and ethnic tensions to gain support by posing as champions of Sunni Arabs against Syria's Alawite-dominated regime and other non-Sunni governments and movements.

Current regional demographic trends also are destabilizing factors. The Middle East contains one of the world's youngest and fastest-growing populations. In most of the West, this would be viewed as an advantage, but not in the Middle East. Known as “youth bulges,” these demographic tsunamis have overwhelmed the inadequate political, economic, and educational infrastructures in many countries, and the lack of access to education, jobs, and meaningful political participation fuels

discontent. Because almost two-thirds of the region's inhabitants are less than 30 years old, this demographic bulge will continue to have a substantial effect on political stability across the region.<sup>3</sup>

The Middle East contains more than half of the world's oil reserves and is the world's chief oil-exporting region.<sup>4</sup> As the world's biggest oil consumer,<sup>5</sup> the U.S., even though it actually imports relatively little of its oil from the Middle East, has a vested interest in maintaining the free flow of oil and gas from the region. Oil is a fungible commodity, and the U.S. economy remains vulnerable to sudden spikes in world oil prices.

Because many U.S. allies depend on Middle East oil and gas, there is also a second-order effect for the U.S. if supply from the Middle East is reduced or compromised. For example, Japan is both the world's third-largest economy and second-largest importer of liquefied natural gas (LNG).<sup>6</sup> The U.S. itself might not be dependent on Middle East oil or LNG, but the economic consequences arising from a major disruption of supplies would ripple across the globe.

Financial and logistics hubs are also growing along some of the world's busiest trans-continental trade routes. One of the region's economic bright spots in terms of trade and commerce is found in the Persian Gulf. The emirates of Dubai and Abu Dhabi in the United Arab Emirates (UAE), along with Qatar, are competing to become the region's top financial center.

The economic situation in the Middle East is part of what drives the political environment. The lack of economic freedom was an important factor leading to the Arab Spring uprisings, which began in early 2011 and disrupted economic activity, depressed foreign and domestic investment, and slowed economic growth.

The political environment has a direct bearing on how easily the U.S. military can operate in a region. In many Middle Eastern countries, the political situation remains fraught with uncertainty. The Arab Spring uprisings formed a regional sandstorm that eroded the

foundations of many authoritarian regimes, erased borders, and destabilized many countries in the region.<sup>7</sup> Yet the popular uprisings in Tunisia, Libya, Egypt, Bahrain, Syria, and Yemen did not usher in a new era of democracy and liberal rule as many in the West were hoping. At best, they made slow progress toward democratic reform. At worst, they added to political instability, exacerbated economic problems, and contributed to the rise of Islamist extremists. Years later, the economic and political outlooks remained bleak.<sup>8</sup>

There is no shortage of security challenges for the U.S. and its allies in this region. Using the breathing space and funding afforded to it by the July 14, 2015, Joint Comprehensive Plan of Action (JCPOA),<sup>9</sup> for example, Iran has exacerbated Shia-Sunni tensions to increase its influence on embattled regimes and has undermined adversaries in Sunni-led states. In May 2018, the Trump Administration left the JCPOA after European allies failed to address many of the serious flaws in the deal like the sunset clauses.<sup>10</sup> A year later, in May 2019, Iran announced that it was withdrawing from certain aspects of the JCPOA.<sup>11</sup> U.S. economic sanctions have been restored to pre-JCPOA levels and in some cases have been expanded.<sup>12</sup>

While many of America's European allies publicly denounced the Administration's decision to withdraw, most officials agree privately that the JCPOA was flawed and needs to be fixed. America's allies in the Middle East, including Israel and most Gulf Arab states, supported the U.S. decision and welcomed a harder line against the Iranian regime.<sup>13</sup>

Tehran attempts to run an unconventional empire by exerting great influence on sub-state entities like Hamas (Palestinian territories); Hezbollah (Lebanon); the Mahdi movement (Iraq); and the Houthi insurgents (Yemen). In Afghanistan, Tehran's influence on some Shiite groups is such that thousands have volunteered to fight for Bashar al-Assad in Syria.<sup>14</sup> Iran also provided arms to the Taliban after it was ousted from power by a U.S.-led coalition<sup>15</sup> and has long considered the Afghan city

of Herat, near the Afghan–Iran border, to be within its sphere of influence.

Iran already looms large over its weak and divided Arab rivals. Iraq and Syria have been destabilized by insurgencies and civil war and may never fully recover; Egypt is distracted by its own internal problems, economic imbalances, and the Islamist extremist insurgency in the Sinai Peninsula; and Jordan has been inundated by a flood of Syrian refugees and is threatened by the spillover of Islamist extremist groups from Syria.<sup>16</sup> Meanwhile, Tehran has continued to build up its missile arsenal, now the largest in the Middle East; has intervened to prop up the Assad regime in Syria; and supports Shiite Islamist revolutionaries in Yemen and Bahrain.<sup>17</sup>

In Syria, the Assad regime’s brutal repression of peaceful demonstrations in early 2011 ignited a fierce civil war that has led to the deaths of more than half a million people; displaced more than 5.6 million refugees in Turkey, Lebanon, Jordan, Iraq, and Egypt; and displaced millions more people internally within Syria.<sup>18</sup> The large refugee populations created by this civil war could become a reservoir of potential recruits for extremist groups. The Islamist Hay’at Tahrir al-Sham (formally known as the al-Qaeda–affiliated Jabhat Fateh al-Sham and before that as the al-Nusra Front) and the self-styled Islamic State (formerly known as ISIS or ISIL and before that as al-Qaeda in Iraq), for example, used the power vacuum created by the war to carve out extensive sanctuaries where they built proto-states and trained militants from a wide variety of other Arab countries, Central Asia, Russia, Europe, Australia, and the United States.<sup>19</sup>

At the height of its power, with a sophisticated Internet and social media presence and by capitalizing on the civil war in Syria and sectarian divisions in Iraq, the IS was able to recruit over 25,000 fighters from outside the region to join its ranks in Iraq and Syria. These foreign fighters included thousands from Western countries, including the U.S. In 2014, the U.S. announced the formation of a broad international coalition to defeat the Islamic State. By

early 2019, thanks to the international coalition led by the U.S., the territorial “caliphate” had been destroyed.

Arab–Israeli tensions are another source of instability in the region. The repeated breakdown of Israeli–Palestinian peace negotiations has created an even more antagonistic situation. Hamas, the Palestinian branch of the Muslim Brotherhood that has controlled Gaza since 2007, seeks to transform the conflict from a national struggle over sovereignty and territory into a religious conflict in which compromise is denounced as blasphemy. Hamas invokes jihad in its struggle against Israel and seeks to destroy the Jewish state and replace it with an Islamic state.

### **Important Alliances and Bilateral Relations in the Middle East**

The U.S. has strong military, security, intelligence, and diplomatic ties with several Middle Eastern nations, including Israel, Egypt, Jordan, and the six members of the Gulf Cooperation Council (GCC).<sup>20</sup> Because the historical and political circumstances that led to the creation of NATO have largely been absent in the Middle East, the region lacks a similarly strong collective security organization.

When it came into office, the Trump Administration proposed the idea of a multilateral Middle East Strategic Alliance with its Arab partners.<sup>21</sup> The initial U.S. concept, which included security, economic cooperation, and conflict resolution and deconfliction, generated considerable enthusiasm, but the project was sidelined by a diplomatic dispute involving Saudi Arabia, the UAE, and Qatar.<sup>22</sup> Middle Eastern countries traditionally have preferred to maintain bilateral relationships with the U.S. and generally have shunned multilateral arrangements because of the lack of trust among Arab states.

This lack of trust manifested itself in June 2017 when the Kingdom of Saudi Arabia, the United Arab Emirates, Bahrain, Egypt, and several other Muslim-majority countries cut or downgraded diplomatic ties with Qatar after Doha was accused of supporting terrorism in

the region.<sup>23</sup> All commercial land, air, and sea travel between Qatar and these nations has been severed, and Qatari diplomats and citizens have been evicted.

This is the most recent example of how regional tensions can transcend the Arab–Iranian or Israeli–Palestinian debate. Qatar has long supported Muslim Brotherhood groups, as well as questionable Islamist factions in Syria and Libya, and has often been viewed as too close to Iran, a major adversary of Sunni Arab states in the Gulf.

Nor is this the first time that something like this has happened, albeit on a much smaller scale. In 2014, a number of Arab states recalled their ambassadors to Qatar to protest Doha’s support for Egypt’s Muslim Brotherhood movement.<sup>24</sup> It took eight months to resolve this dispute before relations could be fully restored.

Bilateral and multilateral relations in the region, especially with the U.S. and other Western countries, are often made more difficult by their secretive nature. It is not unusual for governments in this region to see value (and sometimes necessity) in pursuing a relationship with the U.S. while having to account for domestic opposition to working with America: hence the perceived need for secrecy. The opaqueness of these relationships sometimes creates problems for the U.S. when it tries to coordinate defense and security cooperation with European allies (mainly the U.K. and France) that are active in the region.

Military training is an important part of these relationships. The principal motivations behind these exercises are to ensure close and effective coordination with key regional partners, demonstrate an enduring U.S. security commitment to regional allies, and train Arab armed forces so that they can assume a larger share of responsibility for regional security.

**Israel.** America’s most important bilateral relationship in the Middle East is with Israel. Both countries are democracies, value free-market economies, and believe in human rights at a time when many Middle Eastern countries reject those values. With

support from the United States, Israel has developed one of the world’s most sophisticated air and missile defense networks.<sup>25</sup> No significant progress on peace negotiations with the Palestinians or on stabilizing Israel’s volatile neighborhood is possible without a strong and effective Israeli–American partnership.

After years of strained relations during the Obama Administration, ties between the U.S. and Israel improved significantly during the first two years of the Trump Administration. In May 2018, the U.S. moved its embassy from Tel Aviv to a location in western Jerusalem.<sup>26</sup>

**Saudi Arabia.** After Israel, the U.S. military relationship is deepest with the Gulf States, including Saudi Arabia, which serves as de facto leader of the GCC. America’s relationship with Saudi Arabia is based on pragmatism and is important for both security and economic reasons, but it has come under intense strain since the murder of Saudi dissident and *Washington Post* journalist Jamal Ahmad Khashoggi, allegedly by Saudi security services, in Turkey in 2018.

The Saudis enjoy huge influence across the Muslim world, and roughly 2 million Muslims participate in the annual Hajj pilgrimage to the holy city of Mecca. Riyadh has been a key partner in efforts to counterbalance Iran. The U.S. is also the largest provider of arms to Saudi Arabia and regularly, if not controversially, sells munitions needed to resupply stockpiles expended in the Saudi-led campaign against the Houthis in Yemen.

**Gulf Cooperation Council.** The countries of the GCC (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE) are located close to the Arab–Persian fault line and are therefore strategically important to the U.S.<sup>27</sup> The root of Arab–Iranian tensions in the Gulf is Tehran’s ideological drive to export its Islamist revolution and overthrow the traditional rulers of the Arab kingdoms. This ideological clash has further amplified long-standing sectarian tensions between Shia Islam and Sunni Islam. Tehran has sought to radicalize Shia Arab minority groups to undermine Sunni Arab regimes in Saudi Arabia, Kuwait, and Bahrain. It also



sought to incite revolts by the Shia majorities in Iraq against Saddam Hussein's regime and in Bahrain against the Sunni al-Khalifa dynasty. Culturally, many Iranians look down on the Gulf States, many of which they see as artificial entities carved out of the former Persian Empire and propped up by Western powers.

The GCC's member countries often have difficulty agreeing on a common policy with respect to matters of security. This reflects both the organization's intergovernmental nature and its members' desire to place national interests above those of the GCC. The recent dispute regarding Qatar illustrates this difficulty.

Another source of disagreement involves the question of how best to deal with Iran. On one end of the spectrum, Saudi Arabia, Bahrain, and the UAE take a hawkish view of the threat from Iran. Oman and Qatar, the former of which prides itself on its regional neutrality and the latter of which shares natural gas fields with Iran, view Iran's activities in the region as less of a threat and maintain cordial relations with Tehran. Kuwait tends to fall somewhere in the middle. Intra-GCC relations also can be problematic.

**Egypt.** Egypt is another important U.S. military ally. As one of only two Arab countries that maintain diplomatic relations with Israel (the other is Jordan), Egypt is closely enmeshed in the Israeli-Palestinian conflict and remains a leading political, diplomatic, and military power in the region.

Relations between the U.S. and Egypt have been problematic since the 2011 downfall of President Hosni Mubarak after 30 years of rule. The Muslim Brotherhood's Mohamed Morsi was elected president in 2012 and used the Islamist-dominated parliament to pass a constitution that advanced an Islamist agenda. Morsi's authoritarian rule, combined with rising popular dissatisfaction with falling living standards, rampant crime, and high unemployment, led to a massive wave of protests in June 2013 that prompted a military coup in July. The leader of the coup, Field Marshal Abdel Fattah el-Sisi, pledged to restore democracy and was elected president in 2014 and again in

2018 in elections that many considered to be neither free nor fair. His government faces major political, economic, and security challenges.

## Quality of Armed Forces in the Region

The quality and capabilities of the region's armed forces are mixed. Some countries spend billions of dollars each year on advanced Western military hardware, and others spend very little. Saudi Arabia is by far the region's largest military spender in terms of budget size. As a percentage of GDP, Oman leads the way in the region, spending 12.1 percent on defense in 2017, the most recent year for which data are available.<sup>28</sup>

Historically, figures on defense spending for the Middle East have been very unreliable, and the lack of data has worsened. For 2018, there were no available data for Qatar, Syria, the United Arab Emirates, and Yemen according to the Stockholm International Peace Research Institute.<sup>29</sup>

Different security factors drive the degree to which Middle Eastern countries fund, train, and arm their militaries. For Israel, which fought and defeated Arab coalitions in 1948, 1956, 1967, 1973, and 1982, the chief potential threats to its existence are now posed by an Iranian regime that has called for Israel to be "wiped from the map."<sup>30</sup> States and non-state actors in the region have responded to Israel's military dominance by investing in asymmetric and unconventional capabilities to offset its military superiority.<sup>31</sup> For the Gulf States, the main driver of defense policy is the Iranian military threat combined with internal security challenges; for Iraq, it is the internal threat posed by insurgents and terrorists.

The Israel Defense Forces (IDF) are widely considered to be the most capable military force in the Middle East. On a conventional level, the IDF consistently surpasses other regional military forces.<sup>32</sup> Other countries, such as Iran, have developed asymmetric tactics and have built up the military capabilities of proxy groups to close the gap in recent years, but the quality and effectiveness of the IDF's technical capacity and personnel remain unparalleled.

Israel funds its military sector heavily and has a strong national industrial capacity supported by significant funding from the U.S. Combined, these factors give Israel a regional advantage despite limitations of manpower and size. In particular, the IDF has focused on maintaining its superiority in missile defense, intelligence collection, precision weapons, and cyber technologies.<sup>33</sup> The Israelis regard their cyber capabilities as especially important and use cyber technologies for a number of purposes, including defending Israeli cyberspace, gathering intelligence, and carrying out attacks.<sup>34</sup>

Israel maintains its qualitative superiority in medium-range and long-range missile capabilities and fields effective missile defense systems, including Iron Dome and Arrow, both of which the U.S. helped to finance.<sup>35</sup> It also has a nuclear weapons capability (which it does not publicly acknowledge) that increases its strength relative to other powers in the region and has helped to deter adversaries as the gap in conventional capabilities has been reduced.

After Israel, the most technologically advanced and best-equipped armed forces are found in the Gulf Cooperation Council. Previously, the export of oil and gas meant that there was no shortage of resources to devote to defense spending, but the collapse of crude oil prices has forced oil-exporting countries to adjust their defense spending patterns. At present, however, GCC nations still have the region's best-funded (even if not necessarily the most effective) Arab armed forces. All GCC members boast advanced defense hardware that reflects a preference for U.S., U.K., and French equipment.

Saudi Arabia maintains the GCC's most capable military force. It has an army of 75,000 soldiers and a National Guard of 100,000 personnel reporting directly to the king. The army operates 900 main battle tanks including 370 U.S.-made M1A2s. Its air force is built around American-built and British-built aircraft and consists of more than 407 combat-capable aircraft including F-15s, Tornados, and Typhoons.<sup>36</sup>

In fact, air power is the strong suit of most GCC members. Oman operates F-16s and Typhoons. According to *Defense Industry Daily*, "The UAE operates the F-16E/F Desert Falcon, which holds more advanced avionics than any F-16 variant in the US inventory."<sup>37</sup> Qatar operates French-made Mirage fighters and is buying 24 Typhoons from the UK.<sup>38</sup>

Middle Eastern countries have shown a willingness to use their military capability under certain and limited circumstances. The navies of the GCC members rarely deploy beyond their Exclusive Economic Zones, but Kuwait, Bahrain, the UAE, Saudi Arabia, and Qatar have participated in and, in some cases, have commanded Combined Task Force-152, formed in 2004 to maintain maritime security in the Persian Gulf.<sup>39</sup> Since 2001, Jordan, Egypt, Bahrain, and the UAE have supplied troops to the U.S.-led mission in Afghanistan. The UAE and Qatar deployed fighters to participate in NATO-led operations over Libya in 2011, although they did not participate in strike operations. All six GCC members also joined the U.S.-led anti-ISIS coalition, albeit to varying degrees, with the UAE contributing the most in terms of air power.<sup>40</sup> Air strikes in Syria by members of the GCC ended in 2017.

With 438,500 active personnel and 479,000 reserve personnel, Egypt has the largest Arab military force in the Middle East.<sup>41</sup> It possesses a fully operational military with an army, air force, air defense, navy, and special operations forces. Until 1979, when the U.S. began to supply Egypt with military equipment, Cairo relied primarily on less capable Soviet military technology.<sup>42</sup> Since then, its army and air force have been significantly upgraded with U.S. military weapons, equipment, and warplanes.

Egypt has struggled with increased terrorist activity in the Sinai Peninsula, including attacks on Egyptian soldiers, attacks on foreign tourists, and the October 2015 bombing of a Russian airliner departing from the Sinai. The Islamic State's "Sinai Province" terrorist group has claimed responsibility for all of these actions.<sup>43</sup>

Jordan is a close ally of the United States and has small but effective military forces. The principal threats to its security include terrorism, turbulence spilling over from Syria and Iraq, and the resulting flow of refugees. While Jordan faces few conventional threats from its neighbors, its internal security is threatened by Islamist extremists returning from fighting in the region who have been emboldened by the growing influence of al-Qaeda and other Islamist militants. As a result, Jordan's highly professional armed forces have focused in recent years on border and internal security.

Considering Jordan's size, its conventional capability is significant. Jordan's ground forces total 86,000 soldiers and include 100 British-made Challenger 1 tanks. Sixty-one F-16 Fighting Falcons form the backbone of its air force,<sup>44</sup> and its special operations forces are highly capable, having benefitted from extensive U.S. and U.K. training. Jordanian forces have served in Afghanistan and in numerous U.N.-led peacekeeping operations.

Iraq has fielded one of the region's most dysfunctional military forces. After the 2011 withdrawal of U.S. troops, Iraq's government selected and promoted military leaders according to political criteria.<sup>45</sup> Shiite army officers were favored over their Sunni, Christian, and Kurdish counterparts, and Prime Minister Nouri al-Maliki chose top officers according to their political loyalties. Politicization of the armed forces also exacerbated corruption within many units, with some commanders siphoning off funds allocated for "ghost soldiers" who never existed or had been separated from the army for various reasons.<sup>46</sup>

The promotion of incompetent military leaders, poor logistical support due to corruption and other problems, limited operational mobility, and weaknesses in intelligence, reconnaissance, medical support, and air force capabilities have combined to weaken the effectiveness of the Iraqi armed forces. In June 2014, for example, the collapse of up to four divisions, which were routed by vastly smaller numbers of Islamic State fighters, led to the fall of Mosul.<sup>47</sup> The U.S. and its allies responded

with a massive training program for the Iraqi military that led to the liberation of Mosul on July 9, 2017.<sup>48</sup>

## **Current U.S. Military Presence in the Middle East**

Before 1980, the United States maintained a limited military presence in the Middle East that consisted chiefly of a small naval force that had been based at Bahrain since 1958. The U.S. "twin pillar" strategy relied on prerevolutionary Iran and Saudi Arabia to take the lead in defending the Persian Gulf from the Soviet Union and its client regimes in Iraq, Syria, and South Yemen,<sup>49</sup> but the 1979 Iranian revolution demolished one pillar, and the December 1979 Soviet invasion of Afghanistan increased the Soviet threat to the Gulf.

In January 1980, President Jimmy Carter proclaimed that the United States would take military action to defend oil-rich Persian Gulf States from external aggression, a commitment known as the Carter Doctrine. In 1980, he ordered the creation of the Rapid Deployment Joint Task Force (RDJTF), the precursor to USCENTCOM, which was established in January 1983.<sup>50</sup>

Up until the late 1980s, America's "regional strategy still largely focused on the potential threat of a massive Soviet invasion of Iran."<sup>51</sup> After the collapse of the Soviet Union, Saddam Hussein's Iraqi regime became the chief threat to regional stability. Iraq invaded Kuwait in August 1990, and the United States responded in January 1991 by leading an international coalition of more than 30 nations to expel Saddam's forces from Kuwait. CENTCOM commanded the U.S. contribution of more than 532,000 military personnel to the coalition's armed forces, which totaled at least 737,000.<sup>52</sup> This marked the peak U.S. force deployment in the Middle East.

Confrontations with Iraq continued throughout the 1990s as Iraq continued to violate the 1991 Gulf War cease-fire. Baghdad's failure to cooperate with U.N. arms inspectors to verify the destruction of its weapons of mass destruction and its links to terrorism led to the

U.S. invasion of Iraq in 2003. During the initial invasion, U.S. forces reached nearly 192,000,<sup>53</sup> joined by military personnel from coalition forces. Apart from the “surge” in 2007, when President George W. Bush deployed an additional 30,000 personnel, the number of American combat forces in Iraq fluctuated between 100,000 and 150,000.<sup>54</sup>

In December 2011, the U.S. officially completed its withdrawal of troops, leaving only 150 personnel attached to the U.S. embassy in Iraq.<sup>55</sup> In the aftermath of IS territorial gains in Iraq, however, the U.S. has redeployed thousands of troops to the country. Today, approximately 5,200 U.S. troops are based in Iraq.<sup>56</sup>

In addition, the U.S. continues to maintain a limited number of forces in other locations in the Middle East, primarily in GCC countries. Currently, tens of thousands of U.S. troops are serving in the region. Their exact disposition is not made public because of “host nation sensitivities,”<sup>57</sup> but information gleaned from open sources reveals the following:

- **Kuwait.** Approximately 13,500 U.S. personnel are based in Kuwait and are spread among Camp Arifjan, Ahmad al-Jabir Air Base, and Ali al-Salem Air Base.<sup>58</sup> A large depot of prepositioned equipment and a squadron of fighters and Patriot missile systems are also deployed to Kuwait.
- **UAE.** About 5,000 U.S. personnel, mainly from the U.S. Air Force, are stationed in the UAE, primarily at Al Dhafra Air Base. Their main mission in the UAE is to operate fighters, unmanned aerial vehicles (UAVs), refueling aircraft, and surveillance aircraft. The United States also has regularly deployed F-22 Raptor combat aircraft to Al Dhafra. Patriot missile systems are deployed for air and missile defense.<sup>59</sup>
- **Oman.** In 1980, Oman became the first Gulf State to welcome a U.S. military base. Today, it provides important access in the form of over 5,000 aircraft overflights, 600 aircraft landings, and 80 port calls annually. The number of U.S. military personnel in Oman has fallen to about 200, mostly from the U.S. Air Force. According to the Congressional Research Service, “the United States reportedly can use—with advance notice and for specified purposes—Oman’s military airfields in Muscat (the capital), Thumrait, Masirah Island, and Musnanah.”<sup>60</sup>
- **Bahrain.** Approximately 7,000 U.S. military personnel are based in Bahrain. Bahrain is home to the Naval Support Activity Bahrain and the U.S. Fifth Fleet, so most U.S. military personnel there belong to the U.S. Navy. A significant number of U.S. Air Force personnel operate out of Shaykh Isa Air Base, where F-16s, F/A-18s, and P-3 surveillance aircraft are stationed. U.S. Patriot missile systems also are deployed to Bahrain. The deep-water port of Khalifa bin Salman is one of the few facilities in the Gulf that can accommodate U.S. aircraft carriers.<sup>61</sup>
- **Saudi Arabia.** The U.S. withdrew the bulk of its forces from Saudi Arabia in 2003. Little information on the number of U.S. military personnel currently based there is available. However, the six-decade-old United States Military Training Mission to the Kingdom of Saudi Arabia, the four-decade-old Office of the Program Manager of the Saudi Arabian National Guard Modernization Program, and the Office of the Program Manager—Facilities Security Force are based in Eskan Village Air Base approximately 13 miles south of the capital city of Riyadh.<sup>62</sup>
- **Qatar.** Approximately 10,000 U.S. personnel, mainly from the U.S. Air Force, are deployed in Qatar.<sup>63</sup> The U.S. operates its Combined Air Operations Center at Al Udeid Air Base, which is one of the world’s most important U.S. air bases. It is also the base from which the anti-ISIS campaign

was headquartered. Heavy bombers, tankers, transports, and ISR aircraft operate from Al Udeid Air Base, which also serves as the forward headquarters of CENTCOM. The base houses prepositioned U.S. military equipment and is defended by U.S. Patriot missile systems. So far, the recent diplomatic moves by Saudi Arabia and other Arab states against Doha have not affected the United States' relationship with Qatar.

- **Jordan.** According to CENTCOM, Jordan “is one of our strongest and most reliable partners in the Levant sub-region.”<sup>64</sup> Although there are no U.S. military bases in Jordan, the U.S. has a long history of conducting training exercises in the country. Due to recent events in neighboring Syria, in addition to other military assets like fighter jets and air defense systems, more than 2,700 U.S. military personnel are deployed to Jordan.<sup>65</sup>

CENTCOM “directs and enables military operations and activities with allies and partners to increase regional security and stability in support of enduring U.S. interests.”<sup>66</sup> Execution of this mission is supported by four service component commands (U.S. Naval Forces Middle East [USNAVCENT]; U.S. Army Forces Middle East [USARCENT]; U.S. Air Forces Middle East [USAFCENT]; and U.S. Marine Forces Middle East [MARCENT]) and one subordinate unified command (U.S. Special Operations Command Middle East [SOCCENT]).

- **U.S. Naval Forces Central Command.** USNAVCENT is the maritime component of USCENTCOM. With its forward headquarters in Bahrain, it is responsible for commanding the afloat units that rotationally deploy or surge from the United States, in addition to other ships that are based in the Gulf for longer periods. USNAVCENT conducts persistent maritime operations to advance U.S. interests, deter and counter disruptive countries, defeat

violent extremism, and strengthen partner nations' maritime capabilities in order to promote a secure maritime environment in an area encompassing about 2.5 million square miles of water.

- **U.S. Army Forces Central Command.** USARCENT is the land component of USCENTCOM. Based in Kuwait, USARCENT is responsible for land operations in an area encompassing 4.6 million square miles (1.5 times larger than the continental United States).
- **U.S. Air Forces Central Command.** USAFCENT is the air component of USCENTCOM. Based in Qatar, USAFCENT is responsible for air operations and for working with the air forces of partner countries in the region. It also manages an extensive supply and equipment prepositioning program at several regional sites.
- **U.S. Marine Forces Central Command.** MARCENT is the designated Marine Corps service component for USCENTCOM. Based in Bahrain, MARCENT is responsible for all Marine Corps forces in the region.
- **U.S. Special Operations Command Central.** SOCCENT is a subordinate unified command under USCENTCOM. Based in Qatar, SOCCENT is responsible for planning special operations throughout the USCENTCOM region, planning and conducting peacetime joint/combined special operations training exercises, and orchestrating command and control of peacetime and wartime special operations.

In addition to the American military presence in the region, two U.S. allies—the United Kingdom and France—play an important role that should not be overlooked.

The U.K.'s presence in the Middle East is a legacy of British imperial rule. The U.K. has

maintained close ties with many countries that it once ruled and has conducted military operations in the region for decades. Approximately 1,000 British service personnel are based throughout the Gulf, including in Iraq. This number fluctuates with the arrival of visiting warships.<sup>67</sup>

The British presence in the region is dominated by the Royal Navy. As of May 2017, there were “around half a dozen Royal Navy ships and units deployed in the region and well over 1,200 men and women.” This presence includes “four Mine Counter Measures vessels, supported by one Royal Fleet Auxiliary ship,” that “will continue to be permanently located and supported from the new UK Mina Salman Support Facility” in Bahrain, which is also “expected to be able to host the Queen Elizabeth class and Type 45 destroyers as well as frigates and mine-hunters.”<sup>68</sup> In 2019, a frigate, the HMS *Montrose*, was also stationed in Bahrain to conduct operations in the Indian Ocean.<sup>69</sup> In addition, although such matters are not the subject of public discussion, U.K. attack submarines operate in the area. In April 2018, as a sign of its long-term maritime presence in the region, the U.K. opened a base in Bahrain, its first overseas military base in the Middle East in more than four decades.<sup>70</sup> The U.K. has made a multimillion-dollar investment in modernization of the Duqm Port complex in Oman to accommodate its new *Queen Elizabeth*-class aircraft carriers.<sup>71</sup>

The U.K. has a sizeable Royal Air Force (RAF) presence in the region as well, mainly in the UAE and Oman. A short drive from Dubai, Al-Minhad Air Base is home to a small contingent of U.K. personnel, and small RAF detachments in Oman support U.K. and coalition operations in the region. Although considered to be in Europe, the U.K.’s Sovereign Base Areas of Akrotiri and Dhekelia in Cyprus have supported U.S. military and intelligence operations in the past and will continue to do so in the future.

The British presence in the region extends beyond soldiers, ships, and planes. A British-run staff college operates in Qatar, and Kuwait chose the U.K. to help run its own

equivalent of the Royal Military Academy at Sandhurst.<sup>72</sup> The U.K. also plays a very active role in training the Saudi Arabian and Jordanian militaries.

The French presence in the Gulf is smaller than the U.K.’s but still significant. France opened its first military base in the Gulf in 2009. Located in the emirate of Abu Dhabi, it was the first foreign military installation built by the French in 50 years.<sup>73</sup> The French have 650 personnel based in the UAE, along with six Rafale fighter jets, and maintain a small presence in Qatar and around 500 troops in Iraq as part of Operation Inherent Resolve.<sup>74</sup> French ships have access to the Zayed Port in Abu Dhabi, which is big enough to handle every ship in the French Navy except the aircraft carrier *Charles De Gaulle*.

Another important actor in Middle East security is the small East African country of Djibouti. Djibouti sits on the Bab el-Mandeb Strait, through which an estimated 4.8 million barrels of oil a day transited in 2016 (the most recent year for which U.S. Energy Administration data are available) and which is a choke point on the route to the Suez Canal.<sup>75</sup> An increasing number of countries recognize Djibouti’s value as a base from which to project maritime power and launch counterterrorism operations. The country is home to the U.S.’s only permanent military base in Africa, Camp Lemonnier, which can hold up to 4,000 personnel.<sup>76</sup>

China is also involved in Djibouti and has its first permanent overseas base there, which can house 10,000 troops and which Chinese marines have used to stage live-fire exercises featuring armored combat vehicles and artillery. France, Italy, and Japan also have presences of varying strength in Djibouti.<sup>77</sup>

## Key Infrastructure and Warfighting Capabilities

The Middle East is critically situated geographically. Two-thirds of the world’s population lives within an eight-hour flight from the Gulf region, making it accessible from most other regions of the globe. The Middle East

also contains some of the world's most critical maritime choke points, such as the Suez Canal and the Strait of Hormuz.

Although infrastructure is not as developed in the Middle East as it is in North America or Europe, a decades-long presence means that the U.S. has tried-and-tested systems that involve moving large numbers of matériel and personnel into and out of the region. According to the Department of Defense, at the height of U.S. combat operations in Iraq during the Second Gulf War, the U.S. presence included 165,000 servicemembers and 505 bases. Moving personnel and equipment out of the country was “the largest logistical drawdown since World War II” and included the redeployment of “the 60,000 troops who remained in Iraq at the time and more than 1 million pieces of equipment ahead of their deadline.”<sup>78</sup>

The condition of the region's roads varies from country to country. For example, 100 percent of the roads in Israel, Jordan, and the UAE are paved. Other nations such as Oman (49.3 percent); Saudi Arabia (21.5 percent); and Yemen (8.7 percent) have poor paved road coverage according to the most recent information available.<sup>79</sup> Rail coverage is also poor.

The U.S. has access to several airfields in the region. The primary air hub for U.S. forces is Al Udeid Air Base in Qatar. Other airfields include Ali Al Salem Air Base, Kuwait; Al Dhafra, UAE; Al Minhad, UAE; Isa, Bahrain; Eskan Village Air Base, Saudi Arabia; Muscat, Oman; Thumrait, Oman; and Masirah Island, Oman, in addition to the commercial airport at Seeb, Oman. In the past, the U.S. has used major airfields in Iraq, including Baghdad International Airport and Balad Air Base, as well as Prince Sultan Air Base in Saudi Arabia.

The fact that the U.S. has access to a particular air base today, however, does not mean that it will be made available for a particular operation in the future. For example, because of their more cordial relations with Iran, it is highly unlikely that Qatar and Oman would allow the U.S. to use air bases in their territory for strikes against Iran unless they were first attacked themselves.

The U.S. has access to ports in the region, perhaps most importantly in Bahrain, as well as a deep-water port, Khalifa bin Salman, in Bahrain and naval facilities at Fujairah, UAE.<sup>80</sup> The UAE's commercial port of Jebel Ali is open for visits from U.S. warships and prepositioning of equipment for operations in theater.<sup>81</sup> In March 2019, “Oman and the United States signed a ‘Strategic Framework Agreement’ that expands the U.S.–Oman facilities access agreements by allowing U.S. forces to use the ports of Al Duqm...and Salalah.”<sup>82</sup> The location of these ports outside the Strait of Hormuz makes them particularly useful. Approximately 90 percent of the world's trade travels by sea, and some of the busiest and most important shipping lanes are located in the Middle East. Tens of thousands of cargo ships travel through the Strait of Hormuz and the Bab el-Mandeb Strait each year.

Given the high volume of maritime traffic in the region, no U.S. military operation can be undertaken without consideration of how these shipping lanes offer opportunity and risk to America and her allies. The major shipping routes include:

- **The Suez Canal.** In 2018, more than 1.1 billion tons of cargo transited the canal, averaging about 50 ships each day.<sup>83</sup> Considering that the canal itself is 120 miles long but only 670 feet wide, this is an impressive amount of traffic. The Suez Canal is important for Europe in terms of oil transportation. It also serves as an important strategic asset, as it is used routinely by the U.S. Navy to move surface combatants between the Mediterranean Sea and the Red Sea.

Thanks to a bilateral arrangement between Egypt and the United States, the U.S. Navy enjoys priority access to the canal.<sup>84</sup> However, the journey through the narrow waterway is no easy task for large surface combatants. The canal was not constructed with the aim of accommodating 90,000-ton aircraft carriers and

therefore exposes a larger ship to attack. For this reason, different types of security protocols are followed, including the provision of air support by the Egyptian military.<sup>85</sup>

- **Strait of Hormuz.** The Strait of Hormuz is a critical oil-supply bottleneck and the world's busiest passageway for oil tankers. The strait links the Persian Gulf with the Arabian Sea and the Gulf of Oman. "The Strait of Hormuz is the world's most important chokepoint, with an oil flow of 18.5 million b/d in 2016," according to the U.S. Energy Information Administration.<sup>86</sup> Most of these crude oil exports go to Asian markets, particularly Japan, India, South Korea, and China.<sup>87</sup> Given the extreme narrowness of the passage and its proximity to Iran, shipping routes through the Strait of Hormuz are particularly vulnerable to disruption. Tehran has repeatedly threatened to close the strategic strait if Iran is attacked.
- **Bab el-Mandeb Strait.** The Bab el-Mandeb Strait is a strategic waterway located between the Horn of Africa and Yemen that links the Red Sea to the Indian Ocean. Exports from the Persian Gulf and Asia destined for Western markets must pass through the strait en route to the Suez Canal. Because the Bab el-Mandeb Strait is 18 miles wide at its narrowest point, passage is limited to two channels for inbound and outbound shipments.<sup>88</sup>
- **Maritime Prepositioning of Equipment and Supplies.** The U.S. military has deployed noncombatant maritime prepositioning ships (MPS) containing large amounts of military equipment and supplies in strategic locations from which they can reach areas of conflict relatively quickly as associated U.S. Army or Marine Corps units located elsewhere arrive in the area. The British Indian Ocean Territory of Diego Garcia, an island atoll, hosts

the U.S. Naval Support Facility Diego Garcia, which supports prepositioning ships that can supply Army or Marine Corps units deployed for contingency operations in the Middle East.

## Conclusion

For the foreseeable future, the Middle East region will remain a key focus for U.S. military planners. Once considered relatively stable, mainly because of the ironfisted rule of authoritarian regimes, the area is now highly unstable and a breeding ground for terrorism.

Overall, regional security has deteriorated in recent years. Even though the Islamic State (or at least its physical presence) appears to have been defeated, the nature of its successor is unclear. Iraq has restored its territorial integrity after the defeat of ISIS, but the political situation and future relations between Baghdad and the U.S. will remain difficult as long as a government that is sympathetic to Iran is in power.<sup>89</sup> The regional dispute with Qatar has made U.S. relations in the region even more complex and difficult to manage, although it has not stopped the U.S. military from operating.

Many of the borders created after World War I are under significant stress. In countries like Iraq, Libya, Syria, and Yemen, the supremacy of the nation-state is being challenged by non-state actors who wield influence, power, and resources comparable to those of small states. The region's principal security and political challenges are linked to the unrealized aspirations of the Arab Spring, surging transnational terrorism, and meddling by Iran, which seeks to extend its influence in the Islamic world. These challenges are made more difficult by the Arab-Israeli conflict, Sunni-Shia sectarian divides, the rise of Iran's Islamist revolutionary nationalism, and the proliferation of Sunni Islamist revolutionary groups.

Thanks to its decades of military operations in the Middle East, the U.S. has tried-and-tested procedures for operating in the region. Bases and infrastructure are well established, and the logistical processes for maintaining



a large force forward deployed thousands of miles away from the homeland are well in place. Moreover, unlike in Europe, all of these processes have been tested recently in combat. The personal links between allied armed forces are also present. Joint training exercises improve interoperability, and U.S. military educational courses regularly attended by officers (and often royals) from the Middle East

allow the U.S. to influence some of the region's future leaders.

America's relationships in the region are based pragmatically on shared security and economic concerns. As long as these issues remain relevant to both sides, the U.S. is likely to have an open door to operate in the Middle East when its national interests require that it do so.

## Scoring the Middle East Operating Environment

As noted at the beginning of this section, various aspects of the region facilitate or inhibit the ability of the U.S. to conduct military operations to defend its vital national interests against threats. Our assessment of the operating environment utilizes a five-point scale, ranging from "very poor" to "excellent" conditions and covering four regional characteristics of greatest relevance to the conduct of military operations:

1. **Very Poor.** Significant hurdles exist for military operations. Physical infrastructure is insufficient or nonexistent, and the region is politically unstable. In addition, the U.S. military is poorly placed or absent, and alliances are nonexistent or diffuse.
2. **Unfavorable.** A challenging operating environment for military operations is marked by inadequate infrastructure, weak alliances, and recurring political instability. The U.S. military is inadequately placed in the region.
3. **Moderate.** A neutral to moderately favorable operating environment is characterized by adequate infrastructure, a moderate alliance structure, and acceptable levels of regional political stability. The U.S. military is adequately placed.
4. **Favorable.** A favorable operating environment includes good infrastructure, strong alliances, and a stable political

environment. The U.S. military is well placed for future operations.

5. **Excellent.** An extremely favorable operating environment includes well-established and well-maintained infrastructure, strong and capable allies, and a stable political environment. The U.S. military is exceptionally well placed to defend U.S. interests.

The key regional characteristics consist of:

- a. **Alliances.** Alliances are important for interoperability and collective defense, as allies are more likely to lend support to U.S. military operations. Various indicators provide insight into the strength or health of an alliance. These include whether the U.S. trains regularly with countries in the region, has good interoperability with the forces of an ally, and shares intelligence with nations in the region.
- b. **Political Stability.** Political stability brings predictability for military planners when considering such things as transit, basing, and overflight rights for U.S. military operations. The overall degree of political stability indicates whether U.S. military actions would be hindered or enabled and considers, for example, whether transfers of power are generally peaceful and whether there have been any

recent instances of political instability in the region.

**c. U.S. Military Positioning.** Having military forces based or equipment and supplies staged in a region greatly facilitates the United States’ ability to respond to crises and, presumably, achieve success in critical “first battles” more quickly. Being routinely present in a region also assists in maintaining familiarity with its characteristics and the various actors that might assist or thwart U.S. actions. With this in mind, we assessed whether or not the U.S. military was well positioned in the region. Again, indicators included bases, troop presence, prepositioned equipment, and recent examples of military operations (including training and humanitarian) launched from the region.

**d. Infrastructure.** Modern, reliable, and suitable infrastructure is essential to military operations. Airfields, ports, rail lines, canals, and paved roads enable the U.S. to stage, launch, and logistically sustain combat operations. We combined expert knowledge of regions with publicly available information on critical infrastructure to arrive at our overall assessment of this metric.<sup>90</sup>

In summary, the U.S. has developed an extensive network of bases in the Middle East region and has acquired substantial operational experience in combatting regional threats. At the same time, however, many of its allies are hobbled by political instability, economic problems, internal security threats, and mushrooming transnational threats. Although the region’s overall score remains “moderate,” as it was last year, it is in danger of falling to “poor” because of political instability and growing bilateral tensions with allies over the security implications of the nuclear agreement with Iran and how best to fight the Islamic State.

With this in mind, we arrived at these average scores for the Middle East (rounded to the nearest whole number):

- Alliances: **3—Moderate**
- Political Stability: **2—Unfavorable**
- U.S. Military Positioning: **3—Moderate**
- Infrastructure: **3—Moderate**

Leading to a regional score of: **Moderate**

## Operating Environment: Middle East

	VERY POOR	UNFAVORABLE	MODERATE	FAVORABLE	EXCELLENT
Alliances			✓		
Political Stability		✓			
U.S. Military Posture			✓		
Infrastructure			✓		
<b>OVERALL</b>			✓		

## Endnotes

1. For example, Sir Mark Sykes, Britain's lead negotiator with the French on carving up the Ottoman Empire in the Middle East, during a 1916 meeting in Downing Street pointed to the map and told the Prime Minister that for Britain's sphere of influence in the Middle East, "I should like to draw a line from the *e* in Acre [modern-day Israel] to the last *k* in Kirkuk [modern-day Iraq]." See James Barr, *A Line in the Sand: Britain, France, and the Struggle That Shaped the Middle East* (London: Simon & Schuster U.K., 2011), pp. 7–20. See also Margaret McMillan, *Paris 1919: Six Months That Changed the World* (New York: Random House, 2003).
2. S.B., "What Is the Difference Between Sunni and Shia Muslims?" *The Economist*, May 29, 2013, <http://www.economist.com/blogs/economist-explains/2013/05/economist-explains-19/> (accessed May 8, 2019).
3. Sabahat Khan, "MENA's Youth Bulge Is a Regional Security Challenge," *The Arab Weekly*, April 2, 2018, <https://the arabweekly.com/menas-youth-bulge-regional-security-challenge> (accessed May 19 June 10, 2019).
4. Organization of the Petroleum Exporting Countries, "OPEC Share of World Crude Oil Reserves, 2017," [https://www.opec.org/opec\\_web/en/data\\_graphs/330.htm](https://www.opec.org/opec_web/en/data_graphs/330.htm) (accessed June 10, 2019).
5. Hydrocarbons Technology, "The 10 Biggest Oil Consuming Countries," December 8, 2013, <https://www.hydrocarbons-technology.com/features/featurethe-10-biggest-oil-consuming-countries-4141632/> (accessed June 10, 2019).
6. Focus Economics, "The World's Top 10 Largest Economies," November 8, 2018, <https://www.focus-economics.com/blog/the-largest-economies-in-the-world> (accessed May 22, 2019), and Jessica Jaganathan, "China Overtakes Japan as World's Top Natural Gas Importer," Reuters, November 12, 2018, <https://www.reuters.com/article/china-japan-Ing/china-overtakes-japan-as-worlds-top-natural-gas-importer-idUSL4N1XN3LO> (accessed June 10, 2019).
7. See, for example, The Heritage Foundation, "The 'Arab Spring': Heritage Foundation Recommendations," *Web Memo* No. 3222, April 13, 2011, <https://www.heritage.org/middle-east/report/the-arab-spring-heritage-foundation-recommendations>.
8. See, for example, "The Arab Winter," *The Economist*, January 9, 2016, <http://www.economist.com/news/middle-east-and-africa/21685503-five-years-after-wave-uprisings-arab-world-worse-ever> (accessed May 8, 2019).
9. See U.S. Department of the Treasury, Resource Center, "Joint Plan of Action (JPOA) Archive and Joint Comprehensive Plan of Action (JCPOA) Archive," last updated October 30, 2018, [https://www.treasury.gov/resource-center/sanctions/Programs/Pages/jpoa\\_archive.aspx](https://www.treasury.gov/resource-center/sanctions/Programs/Pages/jpoa_archive.aspx) (accessed June 12, 2019).
10. James Phillips, "U.S. Iran Policy After the Demise of the Nuclear Deal," Heritage Foundation *Backgrounder* No. 3335, August 6, 2018, <https://www.heritage.org/middle-east/report/us-iran-policy-after-the-demise-the-nuclear-deal>, and John Irish and Robin Emmot, "Europeans Push Last Bid to Salvage Iran Deal, but Work on Plan B," Reuters, May 3, 2018, <https://www.reuters.com/article/us-iran-nuclear-europe/europeans-push-last-bid-to-salvage-iran-deal-but-work-on-plan-b-idUSKBN1I42ES> (accessed June 10, 2019).
11. James Griffiths, Joshua Berlinger, and Sheena McKenzie, "Iranian Leader Announces Partial Withdrawal from Nuclear Deal," CNN, updated May 8, 2019, <https://www.cnn.com/2019/05/08/middleeast/iran-nuclear-deal-intl/index.html> (accessed June 10, 2019).
12. U.S. Department of the Treasury, "Resource Center: Iran Sanctions," last updated May 16, 2019, <https://www.treasury.gov/resource-center/sanctions/programs/pages/iran.aspx> (accessed June 10, 2019).
13. Robert Berger, "Israel Welcomes Trump's 'Bold' Decision to Leave Iran Deal," Voice of America, May 9, 2018, <https://www.voanews.com/a/israel-welcomes-donald-trump-decision-leave-iran-nuclear-deal/4386422.html> (accessed June 10, 2019), and "Saudi Arabia Welcomes US Withdrawal from Iran Nuclear Deal," *Arab News*, updated May 9, 2018, <http://www.arabnews.com/node/1299156/saudi-arabia> (accessed June 10, 2019).
14. Sune Engel Rasmussen and Zahra Nader, "Iran Covertly Recruits Afghan Shias to Fight in Syria," *The Guardian*, June 30, 2016, <https://www.theguardian.com/world/2016/jun/30/iran-covertly-recruits-afghan-soldiers-to-fight-in-syria> (accessed May 8, 2019).
15. BBC News, "Hague Fury as 'Iranian Arms' Bound for Taliban Seized," March 9, 2011, <http://www.bbc.com/news/uk-12694266> (accessed June 10, 2019).
16. Chris Massaro, "US Has the Military Might, but Iran Will Lean on Proxies and Militias If They Get Dragged into the Conflict," Fox News, May 20, 2019, <https://www.foxnews.com/world/us-military-might-iran-proxies-militias-conflict> (accessed June 10, 2019); Bruce Clingan, "Commentary: The U.S. Is Right to Restore Aid to Egypt," Reuters, July 30, 2018, <https://www.reuters.com/article/us-clingan-egypt-commentary/commentary-the-u-s-is-right-to-restore-aid-to-egypt-idUSKBN1K1IYE> (accessed June 10, 2019); and Fact Sheet, "Jordan," United Nations High Commissioner for Refugees, June 2018, <http://reporting.unhcr.org/sites/default/files/UNHCR%20Jordan%20Fact%20Sheet%20-%20June%202018.pdf> (accessed June 10, 2019).
17. Fact Sheet, "Jordan."

18. Bethan McKernan, "Past Month 'Deadliest on Record' for Syrian Civilians Killed in US-Led Air Strikes," *Independent*, May 23, 2017, <http://www.independent.co.uk/news/world/middle-east/syria-war-us-air-strikes-civilian-death-toll-deadliest-on-record-isis-donald-trump-a7751911.html> (accessed June 10, 2019), and United Nations High Commissioner for Refugees, "Syria Emergency," April 19, 2018, <https://www.unhcr.org/en-us/syria-emergency.html> (accessed June 10, 2019).
19. Les Picker, "Where Are ISIS's Foreign Fighters Coming From?" National Bureau of Economic Research *Digest*, June 2016, p. 6, <https://www.nber.org/digest/jun16/jun16.pdf> (accessed June 10, 2019).
20. Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.
21. Yasmine Farouk, "The Middle East Strategic Alliance Has a Long Way to Go," Carnegie Endowment for International Peace, February 8, 2019, <https://carnegieendowment.org/2019/02/08/middle-east-strategic-alliance-has-long-way-to-go-pub-78317> (accessed June 10, 2019).
22. Joshua Meservey, "The Saudi-Qatari Dispute: Why the U.S. Must Prevent Spillover into East Africa," Heritage Foundation *Backgrounder* No. 3268, November 29, 2017, <https://www.heritage.org/africa/report/the-saudi-qatari-dispute-why-the-us-must-prevent-spillover-east-africa>.
23. Tamara Qiblawi, Mohammed Tawfeeq, Elizabeth Roberts, and Hamdi Alkhshali, "Qatar Rift: Saudi, UAE, Bahrain, Egypt Cut Diplomatic Ties," CNN, updated July 27, 2017, <https://www.cnn.com/2017/06/05/middleeast/saudi-bahrain-egypt-uae-qatar-terror/index.html> (accessed June 10, 2019).
24. Frank Gardner, "Gulf Ambassadors Pulled from Qatar over 'Interference,'" BBC News, March 5, 2014, <https://www.bbc.com/news/world-middle-east-26447914> (accessed June 10, 2019).
25. Pieter D. Wezeman, "Conventional Strategic Military Capabilities in the Middle East," EU Non-Proliferation Consortium *Background Paper*, July 2011, p. 8, <https://www.sipri.org/sites/default/files/2016-03/Conventional-strategic-military-capabilities-in-the-Middle-East.pdf> (accessed June 10, 2019).
26. Isabel Kershner, "9 Things to Know About Jerusalem as U.S. Embassy Opens," *The New York Times*, May 13, 2018, <https://www.nytimes.com/2018/05/13/world/middleeast/israel-jerusalem-us-embassy.html> (accessed June 10, 2019).
27. The GCC was founded in 1981 to offset the threat from Iran, which became hostile to Sunni-led Arab states after its 1979 revolution.
28. World Bank, "Military Expenditure (% of GDP)," <https://data.worldbank.org/indicator/ms.mil.xpnd.gd.zsv> (accessed June 10, 2019). "Use and distribution of these data are subject to Stockholm International Peace Research Institute (SIPRI) terms and conditions."
29. Nan Tian, Aude Fleurant, Alexandra Kuimova, Pieter D. Wezeman, and Siemon T. Wezeman, "Trends in World Military Expenditure, 2018," Stockholm International Peace Research Institute *Fact Sheet*, April 2019, p. 9, <https://www.sipri.org/publications/2019/sipri-fact-sheets/trends-world-military-expenditure-2018> (accessed June 10, 2019).
30. Nazila Fathi, "Wipe Israel 'Off the Map' Iranian Says," *The New York Times*, October 27, 2005, [http://www.nytimes.com/2005/10/26/world/africa/26iht-iran.html?\\_r=0](http://www.nytimes.com/2005/10/26/world/africa/26iht-iran.html?_r=0) (accessed June 10, 2019).
31. *Ibid.*
32. International Institute for Strategic Studies, *The Military Balance 2019: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2019), p. 346.
33. T. S. Allen, "Here Is How Israel's Military Dominates the Battlefield," *The National Interest*, February 27, 2018, <http://nationalinterest.org/blog/the-buzz/here-how-israels-military-dominates-the-battlefield-24679> (accessed June 11, 2019).
34. See, for example, Christopher P. Skroupa, "Cyber Warfare—Reasons Why Israel Leads the Charge," *Forbes*, September 7, 2017, <https://www.forbes.com/sites/christopherskroupa/2017/09/07/cyber-warfare-reasons-why-israel-leads-the-charge/#2f9ba2c6e366> (accessed June 11, 2019), and "Israel Is a Small Country, But a Cyber Superpower, Says Ex-CIA Director at CyberTech 2018," NoCamels, January 20, 2018, <http://nocamels.com/2018/01/israel-cyber-superpower-cia-cybertech-2018/> (accessed June 11, 2019).
35. Ruth Eglash and William Booth, "Israel to Launch One of the Most Advanced Missile Defense Systems in the World, with U.S. Help," *The Washington Post*, March 3, 2016, [https://www.washingtonpost.com/world/middle\\_east/israel-to-launch-one-of-the-most-advanced-missile-defense-systems-in-the-world-with-us-help/2016/03/03/6383cb88-dfd5-11e5-8c00-8aa03741dced\\_story.html](https://www.washingtonpost.com/world/middle_east/israel-to-launch-one-of-the-most-advanced-missile-defense-systems-in-the-world-with-us-help/2016/03/03/6383cb88-dfd5-11e5-8c00-8aa03741dced_story.html) (accessed June 11, 2019), and GlobalSecurity.org, "Iron Dome," last modified May 27, 2019, <http://www.globalsecurity.org/military/world/israel/iron-dome.htm> (accessed June 10, 2019).
36. International Institute for Strategic Studies, *The Military Balance 2019: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2019), pp. 365–368.
37. "Top Falcons: The UAE's F-16 Block 60/61 Fighters," *Defense Industry Daily*, January 26, 2014, <http://www.defenseindustrydaily.com/the-uaes-f-16-block-60-desert-falcon-fleet-04538/> (accessed June 11, 2019).

38. Reuters, "Qatar Goes Ahead with \$6.7 Billion Typhoon Combat Jets Deal with UK's BAE Systems," December 10, 2017, <https://www.reuters.com/article/us-britain-qatar-typhoons/qatar-goes-ahead-with-6-7-billion-typhoon-combat-jets-deal-with-uks-bae-systems-idUSKBNIE40QM> (accessed June 11, 2019).
39. U.S. Naval Command Forces Central Command, "Combined Maritime Forces," <https://www.cusnc.navy.mil/Combined-Maritime-Forces/> (accessed June 11, 2019).
40. Helene Cooper and Anne Barnard, "Jordan and Emirates Carry out Airstrikes in Syria Against ISIS," *The New York Times*, February 10, 2015, [www.nytimes.com/2015/02/11/world/middleeast/united-arab-emirates-resume-airstrikes-against-isis.html](http://www.nytimes.com/2015/02/11/world/middleeast/united-arab-emirates-resume-airstrikes-against-isis.html) (accessed June 11, 2019).
41. International Institute for Strategic Studies, *The Military Balance 2019*, p. 336.
42. GlobalSecurity.org, "Egypt Military Guide: Introduction," last modified April 4, 2012, <http://www.globalsecurity.org/military/world/egypt/intro.htm> (accessed June 11, 2019).
43. Reuters and Jack Khoury, "Isis Claims Responsibility for Attack That Killed 15 Egyptian Military Personnel," *Haaretz*, February 16, 2019, <https://www.haaretz.com/middle-east-news/egypt/15-egyptian-military-personnel-killed-or-wounded-in-sinai-attack-army-says-1.6938947> (accessed June 11, 2019), and Jason Hanna, Michael Martinez, and Jennifer Deaton, "ISIS Publishes Photo of What It Says Is Bomb that Downed Russian Plane," CNN, updated November 19, 2015, <https://www.cnn.com/2015/11/18/middleeast/metrojet-crash-dabiq-claim/index.html> (accessed June 11, 2019).
44. International Institute for Strategic Studies, *The Military Balance 2018*, pp. 349–351.
45. See, for example, Florence Gaub, "An Unhappy Marriage: Civil–Military Relations in Post-Saddam Iraq," Carnegie Endowment for International Peace Middle East Center, January 13, 2016, <https://carnegieendowment.org/files/ACMR-Gaub-final.pdf> (accessed June 11, 2019).
46. Reuters, "Iraq Says It Found 50,000 'Ghost Soldiers' on Payroll," December 1, 2014, <https://www.reuters.com/article/us-mideast-crisis-iraq-soldiers-idUSKCN0JF2RZ2014I201> (accessed June 11, 2019).
47. Ned Parker, Isabel Coles, and Raheem Salman, "Special Report: How Mosul Fell – An Iraqi General Disputes Baghdad's Story," Reuters, October 14, 2014, <https://www.reuters.com/article/us-mideast-crisis-gharawi-special-report/special-report-how-mosul-fell-an-iraqi-general-disputes-baghdads-story-idUSKCN0I30Z82014I014> (accessed June 11, 2019).
48. Tim Arango and Michael R. Gordon, "Iraqi Prime Minister Arrives in Mosul to Declare Victory Over ISIS," *The New York Times*, July 9, 2017, <https://www.nytimes.com/2017/07/09/world/middleeast/mosul-isis-liberated.html> (accessed May 20, 2019).
49. During 1967 and 1990, South Yemen, officially known as the People's Democratic Republic of Yemen, was a socialist state in the southeastern provinces of the present-day Republic of Yemen.
50. U.S. Central Command, "U.S. Central Command History," <http://www.centcom.mil/ABOUT-US/HISTORY/> (accessed June 11, 2019).
51. *Ibid.*
52. Lieutenant Colonel Joseph P. Englehardt, *Desert Shield and Desert Storm: A Chronology and Troop List for the 1990–1991 Persian Gulf Crisis*, U.S. Army War College, Strategic Studies Institute *Special Report* AD-A234 743, March 25, 1991, p. 5, <https://apps.dtic.mil/dtic/tr/fulltext/u2/a234743.pdf> (accessed June 11, 2019).
53. Associated Press, "A Timeline of Iraq War, Troop Levels," Internet Archive, updated May 25, 2011, [https://web.archive.org/web/20141023033147/http://www.huffingtonpost.com/2008/04/07/a-timeline-of-iraq-war-tr\\_n\\_95534.html](https://web.archive.org/web/20141023033147/http://www.huffingtonpost.com/2008/04/07/a-timeline-of-iraq-war-tr_n_95534.html) (accessed June 11, 2019).
54. BBC News, "Iraq War in Figures," December 14, 2011, <http://www.bbc.com/news/world-middle-east-11107739> (accessed June 11, 2019).
55. Reuters, "Timeline: Invasion, Surge, Withdrawal; U.S. Forces in Iraq," December 18, 2011, <http://www.reuters.com/article/2011/12/18/us-iraq-usa-pullout-idUSTRE7BH08E2011I218> (accessed June 11, 2019).
56. Qassim Abdul-Zahra and Zeina Karam, "Why Iraq's President Says There's No Serious Opposition to US Troops in His Country," *Military Times*, March 31, 2019, <https://www.militarytimes.com/flashpoints/2019/03/31/why-iraqs-president-says-theres-no-serious-opposition-to-us-troops-in-his-country/> (accessed June 11, 2019).
57. Julia Zorthian and Heather Jones, "This Graphic Shows Where U.S. Troops Are Stationed Around the World," *Time*, October 16, 2015, <http://time.com/4075458/afghanistan-drawdown-obama-troops/> (accessed June 11, 2019).
58. Kenneth Katzman, "Kuwait: Governance, Security, and U.S. Policy," Congressional Research Service *Report for Members and Committees of Congress*, updated March 14, 2019, pp. 8–9, <https://fas.org/sgp/crs/mideast/RS21513.pdf> (accessed June 11, 2019).
59. Kenneth Katzman, "The United Arab Emirates (UAE): Issues for U.S. Policy," Congressional Research Service *Report for Members and Committees of Congress*, updated May 3, 2019, pp. 19 and 23, <https://fas.org/sgp/crs/mideast/RS21852.pdf> (accessed June 11, 2019).

60. Kenneth Katzman, "Oman: Politics, Security, and U.S. Policy," Congressional Research Service *Report for Members and Committees of Congress*, updated March 28, 2019, p. 16, <https://fas.org/sgp/crs/mideast/RS21534.pdf> (accessed June 11, 2019).
61. Kenneth Katzman, "Bahrain: Unrest, Security, and U.S. Policy," Congressional Research Service *Report for Members and Committees of Congress*, updated May 23, 2019, pp. 2, 16–19, and 22–23, <https://fas.org/sgp/crs/mideast/95-1013.pdf> (accessed June 11, 2019).
62. Marie Harnley, "Wing Leadership Visits Eskan Village," U.S. Air Forces Central Command, July 5, 2013, <http://www.afcent.af.mil/Units/379thAirExpeditionaryWing/News/Display/tabid/5382/Article/350180/wing-leadership-visits-eskan-village.aspx> (accessed June 11, 2019).
63. General Joseph L. Votel, Commander, U.S. Central Command, statement on "The Posture of U.S. Central Command" before the Committee on Armed Services, U.S. Senate, March 13, 2018, p. 31, [http://www.centcom.mil/Portals/6/Documents/Transcripts/Votel\\_03-13-18.pdf](http://www.centcom.mil/Portals/6/Documents/Transcripts/Votel_03-13-18.pdf) (accessed June 11, 2019).
64. U.S. Army Central, "Eager Lion," April 11, 2018, STAND-TO!, <https://www.army.mil/standto/2018-04-11> (accessed June 11, 2019).
65. Jeremy M. Sharp, "Jordan: Background and U.S. Relations," Congressional Research Service *Report for Members and Committees of Congress*, updated April 9, 2019, p. 12, <https://fas.org/sgp/crs/mideast/RL33546.pdf> (accessed June 11, 2019).
66. United States Central Command, "Mission, Vision & Strategic Approach," <https://www.centcom.mil/ABOUT-US/> (accessed June 11, 2019).
67. International Institute for Strategic Studies, *The Military Balance 2019*, p. 162.
68. George Allison, "Five Ships to Be Permanently Based in Bahrain," *UK Defence Journal*, May 22, 2017, <https://ukdefencejournal.org.uk/five-ships-to-be-permanently-based-in-bahrain/> (accessed August 16, 2019).
69. Royal Navy, "HMS Montrose's Arrival in Bahrain Heralds New Era in Gulf," April 11, 2019, <https://www.royalnavy.mod.uk/news-and-latest-activity/news/2019/april/11/190411-montrose-arrival-bahrain-new-era-in-gulf> (accessed August 15, 2019).
70. Associated Press, "U.K. Opens Persian Gulf Military Base in Bahrain," Bloomberg, updated April 5, 2018, <https://www.bloomberg.com/news/articles/2018-04-05/uk-opens-persian-gulf-naval-base-in-bahrain> (accessed June 11, 2019).
71. U.K. Ministry of Defence and The Rt. Hon. Sir Michael Fallon, MP, "Multi-Million Pound Joint Venture Announced Between Britain and Oman," March 30, 2016, <https://www.gov.uk/government/news/multi-million-pound-joint-venture-announced-between-britain-and-oman> (accessed June 11, 2019).
72. Frank Gardner, "'East of Suez': Are UK Forces Returning?" BBC News, April 29, 2013, <http://www.bbc.com/news/uk-22333555> (accessed June 11, 2019).
73. Harriet Alexander, "Where Are the World's Major Military Bases?" *The Telegraph*, July 11, 2013, <http://www.telegraph.co.uk/news/uknews/defence/10173740/Where-are-the-worlds-major-military-bases.html> (accessed June 11, 2019).
74. International Institute for Strategic Studies, *The Military Balance 2019*, p. 109.
75. U.S. Department of Energy, Energy Information Administration, "Three Important Oil Trade Chokepoints Are Located Around the Arabian Peninsula," *Today in Energy*, August 4, 2017, <https://www.eia.gov/todayinenergy/detail.php?id=32352> (accessed June 11, 2019).
76. Commander, Navy Installations Command, "Welcome to Camp Lemonnier, Djibouti: Installation Information," United States Navy, [https://www.cnic.navy.mil/regions/cnreurafswa/installations/camp\\_lemonnier\\_djibouti.html](https://www.cnic.navy.mil/regions/cnreurafswa/installations/camp_lemonnier_djibouti.html) (accessed June 11, 2019).
77. Associated Press, "The New Military Powerhouse on the Red Sea: Tiny Djibouti," August 10, 2018, <https://www.haaretz.com/middle-east-news/the-new-military-powerhouse-on-the-red-sea-tiny-djibouti-1.5990505> (accessed June 11, 2019).
78. Donna Miles, "Centcom Undertakes Massive Logistical Drawdown in Afghanistan," U.S. Department of Defense, June 21, 2013, <http://archive.defense.gov/news/newsarticle.aspx?id=120348> (accessed June 11, 2019).
79. U.S. Central Intelligence Agency, *The World Factbook 2018*, "Roadways: Country Comparison Ranking," <https://www.cia.gov/library/publications/the-world-factbook/fields/385.html> (accessed June 11, 2019).
80. Katzman, "Bahrain: Unrest, Security, and U.S. Policy," p. 18, and Katzman, "The United Arab Emirates (UAE): Issues for U.S. Policy," p. 19.
81. Katzman, "The United Arab Emirates (UAE): Issues for U.S. Policy," p. 19.
82. Katzman, "Oman: Politics, Security, and U.S. Policy," p. 16.
83. Table 1, "NO & Net Ton Evolution (1975–2018)," in Suez Canal Information Center, *Suez Canal Traffic Statistics: Annual Report 2018*, <https://www.suezcanal.gov.eg/English/Downloads/DownloadsDocLibrary/Navigation%20Reports/Annual%20Reports%E2%80%8B%E2%80%8B%E2%80%8B/2018.pdf> (accessed August 15, 2019).

84. Michael Wahid Hanna, "Getting Over Egypt: Time to Rethink Relations," *Foreign Affairs*, November/December 2015, <https://www.foreignaffairs.com/articles/egypt/getting-over-egypt> (accessed June 11, 2019).
85. Associated Press, "US Carrier Crosses Suez Canal into Red Sea," *The Times of Israel*, November 8, 2013, <http://www.timesofisrael.com/us-carrier-crosses-suez-canal-into-red-sea/> (accessed June 11, 2019).
86. U.S. Department of Energy, Energy Information Administration, "Three Important Oil Trade Chokepoints Are Located Around the Arabian Peninsula." Emphasis in original.
87. U.S. Department of Energy, Energy Information Administration, "World Oil Transit Chokepoints," last updated July 25, 2017, p. 4, [http://www.eia.gov/beta/international/analysis\\_includes/special\\_topics/World\\_Oil\\_Transit\\_Chokepoints/wotc.pdf](http://www.eia.gov/beta/international/analysis_includes/special_topics/World_Oil_Transit_Chokepoints/wotc.pdf) (accessed May 8, 2019).
88. U.S. Department of Energy, Energy Information Administration, "Three Important Oil Trade Chokepoints Are Located Around the Arabian Peninsula."
89. Seth J. Frantzman, "Is Iran's Influence in Iraq Growing, or Has it Reached a Plateau?" *The Jerusalem Post*, January 2, 2019, <https://www.jpost.com/Middle-East/Is-Irans-influence-in-Iraq-growing-or-has-it-reached-a-plateau-576104> (accessed June 11, 2019).
90. See, for example, World Bank, "Logistics Performance Index: Quality of Trade and Transport-Related Infrastructure (1=Low to 5=High)," 2007–2018, <https://data.worldbank.org/indicator/lp.lpi.infr.xq> (accessed June 11, 2019).





# Asia

Ever since the founding of the American Republic, Asia has been a key U.S. area of interest for both economic and security reasons. One of the first ships to sail under an American flag was the aptly named *Empress of China*, which inaugurated America's participation in the lucrative China trade in 1784. In the more than 200 years since then, the United States has worked under the strategic assumption that allowing any single nation to dominate Asia would be inimical to American interests. Asia constitutes too important a market and is too great a source of key resources for the United States to be denied access. Thus, beginning with U.S. Secretary of State John Hay's "Open Door" policy toward China in the 19th century, the United States has worked to prevent the rise of a regional hegemon in Asia, whether it was imperial Japan or the Soviet Union.

In the 21st century, Asia's importance to the United States will continue to grow. In 2018, almost 40 percent of U.S. trade in goods was with Asia,<sup>1</sup> which hosts nine of the world's 10 busiest seaports and 60 percent of global maritime traffic.<sup>2</sup> As the U.S. Department of Defense (DOD) 2019 *Indo-Pacific Strategy Report* notes, "America's annual two-way trade with the region is \$2.3 trillion, with U.S. foreign direct investment of \$1.3 trillion in the region – more than China's, Japan's, and South Korea's combined."<sup>3</sup>

Asia is a key source of vital natural resources and a crucial part of the global value chain in areas like electronic components. As of October 2017, it was reported to be America's second-largest trading partner in services.<sup>4</sup> Disruption in Asia can affect the production

of things like cars, aircraft, and computers around the world, as well as the global financial system.

Asia is of more than just economic concern, however. Seven of the world's 10 largest standing armies are in Asia, including those of China, India, North and South Korea, Pakistan, Russia, and Vietnam.<sup>5</sup> The United States also maintains a network of treaty alliances and security partnerships, as well as a significant military presence, in Asia, and five Asian states (China, North Korea, India, Pakistan, and Russia) possess nuclear weapons. According to the DOD *Indo-Pacific Strategy Report*:

USINDOPACOM currently has more than 2,000 aircraft; 200 ships and submarines; and more than 370,000 Soldiers, Sailors, Marines, Airmen, DoD civilians, and contractors assigned within its area of responsibility. The largest concentration of forces in the region are [*sic*] in Japan and the ROK. A sizable contingent of forces (more than 5,000 on a day-to-day basis) are also based in the U.S. territory of Guam....<sup>6</sup>

The region is a focus of American security concerns both because of the presence of substantial military forces and because of its legacy of conflict. Both of the two major "hot" wars fought by the United States during the Cold War (Korea and Vietnam) were fought in Asia. Moreover, the Asian security environment is unstable. For one thing, the Cold War has not ended in Asia. Of the four states divided between Communism and democracy by the

Cold War, three (China, Korea, and Vietnam) are in Asia. Neither the Korean situation nor the China–Taiwan situation was resolved despite the fall of the Berlin Wall and the collapse of the Soviet Union.

The Cold War itself was an ideological conflict layered atop long-standing—and still lingering—historical animosities. Asia is home to several major territorial disputes, among them:

- Northern Territories/Southern Kuriles (Japan and Russia);
- Senkakus/Diaoyutai/Diaoyu Dao (Japan, China, and Taiwan);
- Dok-do/Takeshima (Korea and Japan);
- Paracels/Xisha Islands (Vietnam, China, and Taiwan);
- Spratlys/Nansha Islands (China, Taiwan, Vietnam, Brunei, Malaysia, and the Philippines);
- Kashmir (India and Pakistan); and
- Aksai Chin and parts of the Indian state of Arunachal Pradesh (India and China).

Even the various names applied to the disputed territories reflect the fundamental differences in point of view, as each state uses different names when referring to the disputed areas. Similarly, different names are applied to the various major bodies of water: for example, “East Sea” or “Sea of Japan” and “Yellow Sea” or “West Sea.” China and India do not even agree on the length of their disputed border, with Chinese estimates as low as 2,000 kilometers and Indian estimates generally in the mid-3,000s.

These disputes over names also reflect the broader tensions rooted in historical animosities that still scar the region. Most notably, Japan’s actions leading up to and during World War II remain a major source of controversy, particularly in China and South Korea where

debates over issues such as what is incorporated in textbooks and governmental statements prevent old wounds from healing. Similarly, a Chinese claim that much of the Korean Peninsula was once Chinese territory aroused reactions in both Koreas. The end of the Cold War did little to resolve any of these underlying disagreements.

It is in this light and in light of many regional states’ reluctance to align with great powers that one should consider the lack of a political–security architecture. There is no equivalent of NATO in Asia despite an ultimately failed mid-20th century effort to forge a parallel multilateral security architecture through the Southeast Asia Treaty Organization (SEATO). Regional security entities like the Five Power Defense Arrangement (involving the United Kingdom, Australia, New Zealand, Malaysia, and Singapore in an “arrangement” rather than an alliance) or discussion forums like the ASEAN Regional Forum (ARF) and the ASEAN Defence Ministers Meeting-Plus (ADMM-Plus) have been far weaker. There also is no Asian equivalent of the Warsaw Pact.

Instead, Asian security has been marked by a combination of bilateral alliances, mostly centered on the United States, and individual nations’ efforts to maintain their own security. In recent years, these core aspects of the regional security architecture have been supplemented by “mini-lateral” consultations like the U.S.–Japan–Australia and India–Japan–Australia trilaterals and the quadrilateral security dialogue involving all four countries.

Nor is there much of an economic architecture undergirding East Asia. Despite substantial trade and expanding value chains among the various Asian states, as well as with the rest of the world, formal economic integration is limited. There is no counterpart to the European Union or even to the European Economic Community, just as there is no parallel with the European Coal and Steel Community, the precursor to European economic integration.

The Association of Southeast Asian Nations (ASEAN) is a far looser agglomeration of disparate states, although they have succeeded in

expanding economic linkages among themselves over the past 50 years through a range of economic agreements like the ASEAN Free Trade Area (AFTA). Less important to regional stability has been the South Asia Association of Regional Cooperation (SAARC), which includes Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. The SAARC is largely ineffective, both because of the lack of regional economic integration and because of the historical rivalry between India and Pakistan.

With regard to Asia-wide free trade agreements, the 11 countries remaining in the Trans-Pacific Partnership (TPP) after U.S. withdrawal subsequently modified and signed it. The Regional Comprehensive Economic Partnership—the ASEAN-centric agreement that includes China, Japan, South Korea, India, Australia, and New Zealand—has gone through 25 rounds of negotiations. When fully implemented, these agreements will help to remedy the lack of regional economic integration.

### **Important Alliances and Bilateral Relations in Asia**

The keys to America's position in the Western Pacific are its alliances with Japan, the Republic of Korea (ROK), the Philippines, Thailand, and Australia, supplemented by very close security relationships with New Zealand and Singapore and evolving relationships with other nations in the region like India, Vietnam, Malaysia, and Indonesia. The U.S. also has a robust unofficial relationship with Taiwan. In South Asia, American relationships with Afghanistan and Pakistan are critical to establishing peace and security.

The United States also benefits from the interoperability gained from sharing common weapons and systems with many of its allies. Many nations, for example, have equipped their ground forces with M-16/M-4–based infantry weapons and share the 5.56mm caliber ammunition; they also field F-15 and F-16 combat aircraft and employ LINK-16 data links. Australia, Japan, and South Korea are partners in production of the F-35 Joint Strike Fighter;

Australia and Japan have already taken delivery of aircraft, and South Korea is due to take delivery soon.

Consequently, in the event of conflict, the region's various air, naval, and even land forces will be able to share information in such key areas as air defense and maritime domain awareness. This advantage is further expanded by the constant ongoing range of both bilateral and multilateral exercises, which acclimate various forces to operating together and familiarize both American and local commanders with each other's standard operating procedures (SOPs), as well as training, tactics, and (in some cases) war plans.

**Japan.** The U.S.–Japan defense relationship is the linchpin of the American network of relations in the Western Pacific. The U.S.–Japan Treaty of Mutual Cooperation and Security, signed in 1960, provided for a deep alliance between two of the world's largest economies and most sophisticated military establishments, and changes in Japanese defense policies are now enabling an even greater level of cooperation on security issues, both between the two allies and with other countries in the region.

Since the end of World War II, Japan's defense policy has been distinguished by Article 9 of the Japanese constitution, which states in part that “the Japanese people forever renounce war as a sovereign right of the nation and the threat or use of force as means of settling international disputes.”<sup>7</sup> In effect, this article prohibits the use of force by Japan's governments as an instrument of national policy. It also has led to several other associated policies.

One such policy is a prohibition against “collective self-defense.” Japan recognized that nations have a right to employ their armed forces to help other states defend themselves (i.e., to engage in collective defensive operations) but rejected that policy for itself: Japan would employ its forces only in defense of Japan. This changed, however, in 2015. The U.S. and Japan revised their defense cooperation guidelines, and the Japanese passed legislation to enable their military to exercise limited

collective self-defense in certain cases involving threats to both the U.S. and Japan, as well as in multilateral peacekeeping operations.

A similar policy decision was made in 2014 regarding Japanese arms exports. Until then, for a variety of economic and political reasons, Tokyo had chosen to rely on domestic or licensed production to meet most of its military requirements while essentially banning defense-related exports. The relaxation of these export rules in 2014 enabled Japan, among other things, to pursue (ultimately unsuccessfully) an opportunity to build new state-of-the-art submarines in Australia for the Australians and a seemingly successful effort to sell amphibious search and rescue aircraft to the Indian navy.<sup>8</sup> Japan has also supplied multiple patrol vessels to the Philippine and Vietnamese coast guards and is exploring various joint development opportunities with the U.S. and a few other nations.

Tokyo relies heavily on the United States for its security. In particular, it depends on the United States to deter both conventional and nuclear attacks on the home islands. The combination of the pacifist constitution and Japan's past (the atomic bombings of Hiroshima and Nagasaki, which ended World War II in the Pacific) has forestalled much public interest in obtaining an independent nuclear deterrent. Similarly, throughout the Cold War, Japan relied on the American conventional and nuclear commitment to deter Soviet and Chinese aggression.

As part of its relationship with Japan, the United States maintains some 54,000 military personnel and another 8,000 DOD civilian employees in Japan under the rubric of U.S. Forces Japan (USFJ).<sup>9</sup> These forces include, among other things, a forward-deployed carrier battle group centered on the USS *Ronald Reagan*; an amphibious assault ship at Sasebo; and the bulk of the Third Marine Expeditionary Force (III MEF) on Okinawa. U.S. forces exercise regularly with their Japanese counterparts, and this collaboration has expanded in recent years from air and naval exercises to include joint amphibious exercises.

The American presence is supported by a substantial American defense infrastructure throughout Japan, including Okinawa. The array of major bases provides key logistical and communications support for U.S. operations throughout the Western Pacific, cutting travel time substantially compared with deployments from Hawaii or the West Coast of the United States. They also provide key listening posts to monitor Russian, Chinese, and North Korean military operations. This is supplemented by Japan's growing array of space systems, including new reconnaissance satellites.

The Japanese government "pays roughly \$2 billion per year to defray the cost of stationing U.S. military personnel in Japan."<sup>10</sup> These funds cover a variety of expenses, including utility and labor costs at U.S. bases, improvements to U.S. facilities in Japan, and the cost of relocating training exercises away from populated areas in Japan. Japan is also covering nearly all of the expenses related to relocation of the Futenma Marine Corps Air Station from its crowded urban location to a less densely populated part of the island and facilities in Guam to accommodate some Marines being moved off the island.

At least since the 1990 Gulf War, the United States has sought to expand Japanese participation in international security affairs. Japan's political system, grounded in Japan's constitution, legal decisions, and popular attitudes, has generally resisted this effort. Similarly, attempts to expand Japan's range of defense activities, especially away from the home islands, have often been vehemently opposed by Japan's neighbors, especially China and South Korea, because of unresolved differences on issues ranging from territorial claims and boundaries to historical grievances, including visits by Japanese leaders to the Yasukuni Shrine, a controversial memorial to Japan's war dead that includes some who are deemed war criminals for their conduct in World War II. Even with the incremental changes allowing for broader Japanese defense contributions, these issues will doubtless continue to constrain Japan's contributions to the alliance.

These historical issues have been serious enough to torpedo efforts to improve defense cooperation between Seoul and Tokyo. In 2012, for example, South Korea decided at the last minute not to sign an agreement to share sensitive military data, including details about the North Korean threat to both countries.<sup>11</sup> In December 2014, the U.S., South Korea, and Japan signed a military data-sharing agreement limited to information on the North Korean military threat and requiring both allies to pass information through the United States military. This was supplemented in 2016 by a Japan–ROK bilateral agreement on sharing military intelligence. In August 2019, South Korea announced it would not extend the General Security of Military Information Agreement, an intelligence-sharing agreement.

South Korean–Japanese relations took another downturn in 2018 when the South Korean Supreme Court ruled that Japanese companies could be forced to pay occupation reparations. In December 2018, an incident between a South Korean naval ship and a Japanese air force plane further exacerbated tensions.

**Republic of Korea.** The United States and the Republic of Korea signed their Mutual Defense Treaty in 1953. That treaty codified the relationship that had grown from the Korean War, when the United States dispatched troops to help South Korea defend itself against invasion by Communist North Korea. Since then, the two states have forged an enduring alliance supplemented by a substantial trade and economic relationship that includes a free trade agreement.

The U.S. is committed to maintaining 28,500 troops on the Korean Peninsula. This presence is centered mainly on the U.S. 2nd Infantry Division, rotating brigade combat teams, and a significant number of combat aircraft.

The U.S.–ROK defense relationship involves one of the more integrated and complex command-and-control structures. A United Nations Command (UNC) established in 1950 was the basis for the American intervention and remained in place after the armistice was

signed in 1953. UNC has access to a number of bases in Japan in order to support U.N. forces in Korea. In concrete terms, however, it only oversaw South Korean and American forces as other nations' contributions were gradually withdrawn or reduced to token elements.

In 1978, operational control of frontline South Korean and American military forces passed from UNC to Combined Forces Command (CFC). Headed by the American Commander of U.S. Forces Korea, who is also Commander, U.N. Command, CFC reflects an unparalleled degree of U.S.–South Korean military integration. Similarly, the system of Korean Augmentees to the United States Army (KATUSA), which places South Korean soldiers into American units assigned to Korea, allows for an atypical degree of tactical-level integration and cooperation.

Current command arrangements for the U.S. and ROK militaries are for CFC to exercise operational control (OPCON) of all forces on the peninsula in time of war; peacetime control rests with respective national authorities, although the U.S. exercises peacetime OPCON over non-U.S., non-ROK forces located on the peninsula. In 2003, South Korean President Roh Moo-hyun, as agreed with the U.S., began to transfer wartime operational control from CFC to South Korean commanders, thereby establishing the ROK military as fully independent of the United States. This decision engendered significant opposition within South Korea and raised serious military questions about the transfer's impact on unity of command. Faced with various North Korean provocations, including a spate of missile tests as well as attacks on South Korean military forces and territory in 2010, Washington and Seoul agreed in late 2014 to postpone wartime OPCON transfer,<sup>12</sup> and there is little indication that this will change in the foreseeable future.

The domestic political constraints under which South Korea's military operates are less stringent than those that govern the operations of the Japanese military. South Korea rotated several divisions, for example, to fight alongside Americans in Vietnam. In the first

Gulf War, the Iraq War, and Afghanistan, however, South Korea limited its contributions to noncombatant forces and monetary aid.

South Korean defense planning remains focused on North Korea, especially as Pyongyang has deployed its forces in ways that optimize a southward advance and has carried out several penetrations of ROK territory over the years by ship, submarine, commandos, and drones. The sinking of the South Korean frigate *Cheonan* and shelling of Yongpyeong-do in 2010, which together killed 48 military personnel, wounded 16, and killed two civilians, have only heightened concerns about North Korea.

Over the past several decades, the American presence on the peninsula has slowly declined. In the early 1970s, President Richard Nixon withdrew the 7th Infantry Division, leaving only the 2nd Infantry Division on the peninsula. Those forces have been positioned farther back so that there are now few Americans deployed on the Demilitarized Zone (DMZ).

Traditionally, U.S. military forces have regularly engaged in major exercises with their ROK counterparts, including the Key Resolve and Foal Eagle series, both of which involved the actual deployment of a substantial number of forces and were partly intended to deter Pyongyang, as well as to give U.S. and ROK forces a chance to practice operating together. However, after the 2018 U.S.–North Korean Summit, President Donald Trump unilaterally announced that he was cancelling major bilateral military exercises. This decision was made without consulting the Department of Defense, U.S. Forces Korea, or allies South Korea and Japan. As of mid-2019, the U.S. and South Korea have cancelled 11 exercises and imposed constraints on additional exercises. General Robert Abrams, Commander, U.S. Forces Korea, testified in February that he had reduced the “size, scope, volume, and timing” of allied military exercises in Korea.<sup>13</sup> Despite this, “We have observed no significant changes to size, scope, or timing of [North Korea’s] ongoing exercises.”<sup>14</sup> He added that Pyongyang’s annual Winter Training Cycle involved one million troops.<sup>15</sup>

The ROK government provides substantial resources to defray the costs of U.S. Forces Korea. “In February 2019, U.S. and ROK negotiators announced a preliminary one-year ‘Special Measures Agreement’ (SMA) for dividing the cost of hosting U.S. troops in South Korea that increased South Korea’s contribution by approximately 8%, to \$924 million.” In addition, “The U.S. military is relocating its forces farther south from bases near the border with North Korea, with South Korea paying \$9.7 billion for construction of new large-scale military facilities.”<sup>16</sup> The 2019 bilateral Special Measures Agreement negotiations were particularly contentious. The U.S. had demanded an increase of 50 percent–100 percent in South Korea’s contribution. Washington eventually agreed to an 8 percent increase in return for renegotiating the agreement every year rather than every five years.

**The Philippines.** America’s oldest defense relationship in Asia is with the Philippines. The United States seized the Philippines from the Spanish more than a century ago as a result of the Spanish–American War and a subsequent conflict with Philippine indigenous forces. Unlike other colonial states, however, the U.S. also put in place a mechanism for the Philippines to gain its independence, transitioning through a period as a commonwealth until the archipelago received full independence in 1946. Just as important, substantial numbers of Filipinos fought alongside the United States against Japan in World War II, establishing a bond between the two peoples. Following World War II and after assisting the newly independent Filipino government against the Communist Hukbalahap movement in the 1940s, the United States and the Philippines signed a mutual security treaty.

For much of the period between 1898 and the end of the Cold War, the largest American bases in the Pacific were in the Philippines, centered on the U.S. Navy base in Subic Bay and the complex of airfields that developed around Clark Field (later Clark Air Base). While the Philippines have never had the ability to provide substantial financial support

for the American presence, the unparalleled base infrastructure provided replenishment and repair facilities and substantially extended deployment periods throughout the East Asian littoral.

These bases, being reminders of the colonial era, were often centers of controversy. In 1991, a successor to the Military Bases Agreement between the U.S. and the Philippines was submitted to the Philippine Senate for ratification. After a lengthy debate, the Philippines rejected the treaty, compelling American withdrawal from Philippine bases. Given the effects of the 1991 eruption of Mount Pinatubo, which devastated Clark Air Base and damaged many Subic Bay facilities, and the end of the Cold War, it was not felt that closure of the bases would fundamentally damage America's posture in the region.

Moreover, despite the closing of the American bases and consequent slashing of American military assistance, U.S.–Philippine military relations remained close, and assistance began to increase again after 9/11 as U.S. forces supported Philippine efforts to counter Islamic terrorist groups, including the Abu Sayyaf Group (ASG), in the South of the archipelago. From 2002–2015, the U.S. rotated 500–600 special operations forces regularly through the Philippines to assist in counterterrorism operations. That operation, Joint Special Operations Task Force–Philippines (JSOTF–P), ended during the first part of 2015. The U.S. presence in Mindanao continued at a reduced level until the Trump Administration, alarmed by the terrorist threat there, began Operation Pacific Eagle–Philippines (OPE–P). The presence of 200–300 American advisers proved very valuable to the Philippines in its 2017 battle against Islamist insurgents in Marawi,<sup>17</sup> and these advisers remain there as part of a continuing advise-and-assist mission. Other continuing support over the past year has included the presence of 12 aircraft, eight unmanned ISR platforms, three medium-lift helicopters, and one medium-lift airplane.<sup>18</sup>

The Philippines continues to have problems with Islamist insurgencies and terrorists in its

South. This affects the government's priorities and, potentially, its stability. Although not a direct threat to the American homeland, it also bears on the U.S. military footprint in the Philippines and the type of cooperation that the two militaries undertake. In addition to the current threat from ISIS-affiliated groups like the ASG, trained ISIS fighters returning to the Philippines could pose a threat similar to that of the “mujahedeen” who returned from Afghanistan after the Soviet war there in the 1980s.

Thousands of U.S. troops participate in combined exercises with Philippine troops, most notably as a part of the annual Balikatan exercises. In all, 261 activities with the Philippines were planned for 2018, “slowly expanding parameters of military-to-military cooperation.”<sup>19</sup> In 2019, in addition to American and Philippine forces, Balikatan involved more than 60 Australian Defence Force personnel and the deployment of American F-35Bs embarked on an amphibious assault ship.<sup>20</sup> In all, activities with the Philippines were scheduled to increase in 2019 from 261 military engagements to 281.

One long-standing difference between the U.S. and the Philippines involves the application of the U.S.–Philippine Mutual Defense Treaty to disputed islands in the South China Sea. The U.S. has long maintained that the treaty does not extend American obligations to disputed areas and territories, but Filipino officials occasionally have held otherwise.<sup>21</sup> The U.S.–Philippine Enhanced Defense Cooperation Agreement (EDCA) does not settle this question, but tensions in the South China Sea, most recently around the most developed island claimed by the Philippines, Pag-asa,<sup>22</sup> have highlighted Manila's need for support from Washington. Moreover, the U.S. government has long made it clear that any attack on Philippine government ships or aircraft, or on the Philippine armed forces, would be covered under the treaty, “thus separating the issue of territorial sovereignty from attack on Philippine military and public vessels.”<sup>23</sup> In March 2019, Secretary of State Mike Pompeo

reiterated this position and reaffirmed that the South China Sea is part of the Pacific for purposes of the treaty's application.<sup>24</sup>

In 2016, the Philippines elected a very unconventional President, Rodrigo Duterte, to a six-year term. His rhetorical challenges to current priorities in the U.S.–Philippine alliance have raised questions about both the trajectory of the alliance and initiatives that are important to it. With the support of the Philippine government at various levels, however, the two militaries have continued to work together with some adjustment in the size and purpose of their cooperation.<sup>25</sup>

**Thailand.** The U.S.–Thai security relationship is built on the 1954 Manila Pact, which established the now-defunct SEATO, and the 1962 Thanat–Rusk agreement.<sup>26</sup> These were supplemented by the 2012 Joint Vision Statement for the Thai–U.S. Defense Alliance.<sup>27</sup> In 2003, Thailand was designated a “major, non-NATO ally,” a status that gave it improved access to American arms sales.

Thailand's central location has made it an important component of the network of U.S. alliances in Asia. During the Vietnam War, American aircraft based in Thailand ranged from fighter-bombers and B-52s to reconnaissance aircraft. In the first Gulf War and again in the Iraq War, some of those same air bases were essential for the rapid deployment of American forces to the Persian Gulf. Access to these bases remains critical to U.S. global operations.

U.S. and Thai forces exercise together regularly, most notably in the annual Cobra Gold exercises, first begun in 1982. This builds on a partnership that began with the dispatch of Thai forces to the Korean War, where over 1,200 Thai troops died out of some 6,000 deployed. The Cobra Gold exercises are among the world's largest multilateral military exercises. In 2019, it involved roughly 10,000 troops from nine countries, including 4,500 from the US.<sup>28</sup>

U.S.–Thai relations have been strained since 2006. Domestic unrest and two coups in Thailand limited the extent of U.S.–Thai military cooperation, as U.S. law prohibits funding for

many kinds of assistance to a foreign country in which a military coup deposes a duly elected head of government. Nonetheless, the two states managed to cooperate in joint military exercises and counterterrorism operations, and elections held in Thailand in March 2019 should allow full restoration of the two countries' military-to-military relations.

Thailand has also been drawing closer to the People's Republic of China (PRC). This process, underway since the end of the Vietnam War, is accelerating partly because of expanding economic relations between the two states. As of 2016, China was the second-largest destination for Thailand's exports and the leading source of its imports.<sup>29</sup> Relations are also expanding because of the aforementioned complications in U.S.–Thai relations arising from coups in Thailand.

Relations between the Thai and Chinese militaries also have improved over the years. Intelligence officers began formal meetings in 1988. Thai and Chinese military forces have engaged in joint naval exercises since 2005, joint counterterrorism exercises since 2007, and joint marine exercises since 2010 and conducted their first joint air force exercises in 2015.<sup>30</sup> The Thais have been buying Chinese military equipment for many years. Purchases in recent years have included significant buys of battle tanks and armored personnel carriers.<sup>31</sup>

In 2017, Thailand made the first of three planned submarine purchases in one of the most expensive arms deals in its history.<sup>32</sup> Submarines could be particularly critical to Sino–Thai relations because the attendant training and maintenance will require a greater Chinese military presence at Thai military facilities. There has been discussion of a possible China–Thai arms factory in Thailand, as well as Chinese repair and maintenance facilities to service Chinese-made equipment.<sup>33</sup>

**Australia.** Australia is one of America's most important allies in the Asia–Pacific. U.S.–Australia security ties date back to World War I, when U.S. forces fought under Australian command on the Western Front in Europe, and deepened during World War II when, after



Japan commenced hostilities in the Western Pacific (and despite British promises), Australian forces committed to the North Africa campaign were not returned to defend the continent. As Japanese forces attacked the East Indies and secured Singapore, Australia turned to the United States to bolster its defenses, and American and Australian forces cooperated closely in the Pacific War. Those ties and America's role as the main external supporter for Australian security were codified in the Australia–New Zealand–U.S. (ANZUS) pact of 1951.

A key part of the Obama Administration's "Asia pivot" was to rotate additional United States Air Force units and Marines through northern Australia.<sup>34</sup> Eventually expected to total some 2,500 by 2020, a record number of approximately 1,700 marines are set to deploy in 2019 as part of the eighth rotation through Darwin.<sup>35</sup> Reports indicate that, building on improvements in the 2018 rotation, this one will be the most capable to date. It will include 10 Osprey tiltrotor aircraft, four Viper attack helicopters, and three Venom utility helicopters.<sup>36</sup>

The U.S. and Australia have also worked to upgrade air force and naval facilities in the area to "accommodate stealth warplanes and long-range maritime patrol drones" and to provide refueling for visiting warships.<sup>37</sup> The Air Force has deployed F-22 fighter aircraft and bombers to northern Australia for joint training exercises.<sup>38</sup> Meanwhile, the two nations engage in a variety of security cooperation efforts, including joint space surveillance activities. These were codified in 2014 with an agreement that allows space information data to be shared among the U.S., Australia, the U.K., and Canada.<sup>39</sup>

The two nations' chief defense and foreign policy officials meet annually (most recently in July 2018) in the Australia–United States Ministerial (AUSMIN) process to address such issues of mutual concern as security developments in the Asia–Pacific region, global security and development, and bilateral security cooperation.<sup>40</sup> Australia has also granted the United States access to a number of joint

facilities, including space surveillance facilities at Pine Gap and naval communications facilities on the North West Cape of Australia.<sup>41</sup>

Australia and the United Kingdom are two of America's closest partners in the defense industrial sector. In 2010, the United States approved Defense Trade Cooperation Treaties with Australia and the U.K. that allow for the expedited and simplified export or transfer of certain defense services and items between the U.S. and its two key partners without the need for export licenses or other approvals under the International Traffic in Arms Regulations. This also allows for much greater integration among the American, Australian, and British defense industrial establishments.<sup>42</sup>

**Singapore.** Although Singapore is not a security treaty ally of the United States, it is a key security partner in the region. The close U.S.–Singapore defense relationship was formalized in 2005 with the Strategic Framework Agreement (SFA) and expanded in 2015 with the U.S.–Singapore Defense Cooperation Agreement (DCA).

The 2005 SFA was the first agreement of its kind since the end of the Cold War. It built on the 1990 Memorandum of Understanding Regarding United States Use of Facilities in Singapore, as amended, which allows for U.S. access to Singaporean military facilities.<sup>43</sup> The 2015 DCA established "high-level dialogues between the countries' defense establishments" and a "broad framework for defense cooperation in five key areas, namely in the military, policy, strategic and technology spheres, as well as cooperation against non-conventional security challenges, such as piracy and transnational terrorism."<sup>44</sup>

In October 2017, it was announced that "Singapore trains approximately 1,000 military personnel in the United States each year" on American-produced equipment like F-15SG and F-16C/D fighter aircraft and CH-47 Chinook and AH-64 Apache helicopters.<sup>45</sup> Singapore has also announced an intention to buy the F-35, which would make it the fourth in the region to do so, next to three American treaty allies.<sup>46</sup>

**New Zealand.** For much of the Cold War, U.S. defense ties with New Zealand were similar to those between America and Australia. In 1986, as a result of controversies over U.S. Navy employment of nuclear power and the possible deployment of U.S. naval vessels with nuclear weapons, the U.S. suspended its obligations to New Zealand under the 1951 ANZUS Treaty. Defense relations improved, however, in the early 21st century as New Zealand committed forces to Afghanistan and dispatched an engineering detachment to Iraq. The 2010 Wellington Declaration and 2012 Washington Declaration, while not restoring full security ties, allowed the two nations to resume high-level defense dialogues.<sup>47</sup> As part of this warming of relations, New Zealand rejoined the multinational U.S.-led RIMPAC (Rim of the Pacific Exercises) naval exercises in 2012 and has participated in each iteration since then.

In 2013, U.S. Secretary of Defense Chuck Hagel and New Zealand Defense Minister Jonathan Coleman announced the resumption of military-to-military cooperation,<sup>48</sup> and in July 2016, the U.S. accepted an invitation from New Zealand to make a single port call, reportedly with no change in U.S. policy to confirm or deny the presence of nuclear weapons on the ship.<sup>49</sup> At the time of the visit in November 2016, both sides claimed to have satisfied their respective legal requirements.<sup>50</sup> The Prime Minister expressed confidence that the vessel was not nuclear-powered and did not possess nuclear armaments, and the U.S. neither confirmed nor denied this. The visit occurred in a unique context, including an international naval review and relief response to the Kaikoura earthquake, but the arrangement may portend a longer-term solution to the nuclear impasse between the two nations. Since then, there have been several other ship visits by the U.S. Coast Guard,<sup>51</sup> and in 2017, New Zealand lent the services of one its naval frigates to the U.S. Seventh Fleet following a deadly collision between the destroyer USS *Fitzgerald* and a Philippine container ship that killed seven American sailors.<sup>52</sup>

New Zealand is a member of the elite “five eyes” intelligence alliance with the U.S., Canada, Australia, and the U.K.

**Taiwan.** When the United States shifted its recognition of the government of China from the Republic of China (on Taiwan) to the People’s Republic of China (PRC, the mainland), it also declared certain commitments concerning the security of Taiwan. These commitments are embodied in the Taiwan Relations Act (TRA) and the subsequent “Six Assurances.”

The TRA is an American law and not a treaty. Under the TRA, the United States maintains programs, transactions, and other relations with Taiwan through the American Institute in Taiwan (AIT). Except for the Sino–U.S. Mutual Defense Treaty, which had governed U.S. security relations with Taiwan and was terminated by President Jimmy Carter following the shift in recognition to the PRC, all other treaties and international agreements made between the Republic of China and the United States remain in force.

Under the TRA, it is the policy of the United States “to provide Taiwan with arms of a defensive character.”<sup>53</sup> The TRA also states that the U.S. “will make available to Taiwan such defense articles and services in such quantity as may be necessary to enable Taiwan to maintain a sufficient self-defense capability.”<sup>54</sup> The U.S. has implemented these provisions of the TRA through sales of weapons to Taiwan.

The TRA states that it is U.S. policy “to consider any effort to determine the future of Taiwan by other than peaceful means, including by boycotts or embargoes, a threat to the peace and security of the Western Pacific area and of grave concern to the United States.” It also states that it is U.S. policy “to maintain the capacity of the United States to resist any resort to force or other forms of coercion that would jeopardize the security, or the social or economic system, of the people on Taiwan.”<sup>55</sup> To this end:

The President is directed to inform the Congress promptly of any threat to the security or the social or economic system

of the people on Taiwan and any danger to the interests of the United States arising therefrom. The President and the Congress shall determine, in accordance with constitutional processes, appropriate action by the United States in response to any such danger.<sup>56</sup>

Supplementing the TRA are the “Six Assurances” issued by President Ronald Reagan in a secret July 1982 memo, later publicly released and the subject of a Senate hearing. These assurances were intended to moderate the third Sino–American communiqué, itself generally seen as one of the “Three Communiqués” that form the foundation of U.S.–PRC relations. These assurances of July 14, 1982, were that:

In negotiating the third Joint Communiqué with the PRC, the United States:

1. *has not agreed to set a date for ending arms sales to Taiwan;*
2. *has not agreed to hold prior consultations with the PRC on arms sales to Taiwan;*
3. *will not play any mediation role between Taipei and Beijing;*
4. *has not agreed to revise the Taiwan Relations Act;*
5. *has not altered its position regarding sovereignty over Taiwan;*
6. *will not exert pressure on Taiwan to negotiate with the PRC.*<sup>57</sup>

Although the United States sells Taiwan a variety of military equipment and sends observers to its major annual exercises, it does not engage in joint exercises with the Taiwan armed forces. Some Taiwan military officers, however, attend professional military education institutions in the United States. There also are regular high-level meetings between senior U.S. and Taiwan defense officials, both uniformed and civilian.

The United States does not maintain any bases in Taiwan. In 2017, however, the U.S. Congress authorized the DOD to consider ship visits to Taiwan as part of the FY 2018 National Defense Authorization Act. Coupled with the Taiwan Travel Act passed in 2018, this could lead to a significant increase in the number and/or grade of American military officers visiting Taiwan in the coming years.

**Vietnam, Malaysia, and Indonesia.** The U.S. has security relationships with several key Southeast Asian countries. None of these relationships is as extensive and formal as America’s relationship with Singapore and its treaty allies, but all are of growing significance. The U.S. “rebalance” to the Pacific incorporated a policy of “rebalance within the rebalance” that included efforts to expand relations with this second tier of America’s security partners and diversify the geographical spread of forward-deployed U.S. forces. This requirement remains in effect.

Since shortly after the normalization of diplomatic relations between the two countries in 1995, the U.S. and Vietnam also have gradually normalized their defense relationship. The relationship was codified in 2011 with a Memorandum of Understanding “advancing bilateral defense cooperation” that covers five areas of operations, including maritime security. The MOU was updated with the 2015 Joint Vision Statement on Defense Cooperation, which includes a reference to “cooperation in the production of new technologies and equipment,”<sup>58</sup> and is scheduled for implementation under a three-year “2018–2020 Plan of Action for United States–Viet Nam Defense Cooperation” agreed upon in 2017.<sup>59</sup>

The most significant development with respect to security ties over the past several years has been the relaxation of the ban on sales of arms to Vietnam. The U.S. lifted the embargo on maritime security–related equipment in the fall of 2014 and then ended the embargo on arms sales completely in 2016. The embargo had long served as a psychological obstacle to Vietnamese cooperation on security issues, but lifting it does not

necessarily change the nature of the articles that are likely to be sold.

Transfers to date have been to the Vietnamese Coast Guard. These include the provision under the Excess Defense Articles (EDA) program of a decommissioned *Hamilton*-class cutter and 18 Metal Shark patrol boats, as well as infrastructure support.<sup>60</sup> Vietnam is also considering purchasing American UAVs for its Coast Guard.<sup>61</sup> Discussions of bigger-ticket items like P-3 maritime patrol aircraft, although conducted since the relaxation of the embargo, have yet to be concluded. In his 2019 force posture statement, INDOPACOM Commander Admiral Philip Davidson cited as a priority “enhancing Vietnam’s maritime capacity, which will be bolstered by Vietnam’s acquisition of Scan Eagle UAVs, T-6 trainer aircraft, and a second U.S. Coast Guard cutter.”<sup>62</sup>

The Cooperative Humanitarian and Medical Storage Initiative (CHAMSI) is designed to enhance cooperation on humanitarian assistance and disaster relief by, among other things, prepositioning related American equipment in Da Nang, Vietnam.<sup>63</sup> During Vietnamese Prime Minister Nguyen Xuan Phuc’s visit to Washington in 2017, the U.S. and Vietnam reaffirmed their commitment to this initiative, which is being implemented. In 2018, Vietnam participated in RIMPAC for the first time. The military-to-military relationship, however, suffered a setback in 2018 when Vietnam abruptly cancelled 15 defense activities with the U.S. that were slated for 2019.<sup>64</sup>

There has been an increase in cooperation between the two nations’ coast guards. In March 2018, the U.S. Embassy and Consulate in Hanoi announced an official transfer that “comprises 20 million dollars’ worth of infrastructure and equipment including a training center, a maintenance facility, a boat lift, vehicles, a navigation simulator, and six brand-new fast-response Metal Shark boats—capable of reaching up to 50 knots.”<sup>65</sup> Beginning in 2017 and through the spring of 2019, the U.S. delivered to Vietnam 18 of these patrol boats.<sup>66</sup> In early 2018, the USS *Carl Vinson* visited Da Nang with its escort ships in the first port call

by a U.S. aircraft carrier since the Vietnam War.

Nevertheless, significant limits on the U.S.–Vietnam security relationship persist, including a Vietnamese defense establishment that is very cautious in its selection of defense partners, party-to-party ties between the Communist Parties of Vietnam and China, and a Vietnamese foreign policy that seeks to balance relationships with all major powers. The U.S., like others among Vietnam’s security partners, remains officially restricted to one port call a year, with an additional one to two calls on Vietnamese bases being negotiable.

The U.S. and Malaysia, despite occasional political differences, “have maintained steady defense cooperation since the 1990s.” Examples include Malaysian assistance in the reconstruction of Afghanistan and involvement in counter-piracy operations “near the Malacca Strait and...off the Horn of Africa.” Each year, the U.S. and Malaysia participate jointly in dozens of bilateral and multilateral exercises to promote effective cooperation across a range of missions.<sup>67</sup> The U.S. has occasionally flown P-3 and/or P-8 patrol aircraft out of Malaysian bases in Borneo.

The U.S. relationship with Malaysia was strengthened under President Barack Obama and has continued on a positive trajectory under the Trump Administration. During former Prime Minister Najib Razak’s 2017 visit to Washington, he and President Trump committed to strengthening their two countries’ bilateral defense ties, including cooperation in the areas of “maritime security, counterterrorism, and information sharing between our defense and security forces.” They also “committed to pursu[ing] additional opportunities for joint exercises and training.”<sup>68</sup> To this end, in 2018, Malaysia for the first time sent a warship to participate in U.S.-led RIMPAC exercises.<sup>69</sup> The new government in Malaysia is not likely to reverse these gains. Close U.S.–Malaysia defense ties can be expected to continue, albeit quietly.

The U.S.–Indonesia defense relationship was revived in 2005 following a period of estrangement caused by American concerns

about human rights. It now includes regular joint exercises, port calls, and sales of weaponry. Because of their impact on the operating environment in and around Indonesia, as well as the setting of priorities in the U.S.–Indonesia relationship, the U.S. is also working closely with Indonesia’s defense establishment to institute reforms in Indonesia’s strategic defense planning processes.

The United States carried through on the transfer of 24 refurbished F-16s to Indonesia under its EDA program in 2018 and is talking with Indonesian officials about recapitalizing their aging and largely Russian-origin air force with new F-16s.<sup>70</sup> In 2018, the U.S. also completed delivery of eight Apache helicopters. The Navy characterized the August 2018 CARAT (Cooperation, Afloat Readiness and Training) exercise with Indonesia as “build[ing] upon more than 200 military exercises between the two partner nations.”<sup>71</sup>

The U.S. is working across the board at modest levels of investment to help build Southeast Asia’s maritime security capacity. Most notable in this regard is the Maritime Security Initiative (MSI) announced by Secretary of Defense Ashton Carter in 2015, which pledged \$425 million in equipment and training for Southeast Asia over a five-year period and was authorized by Congress in 2016 for a five-year term from 2016–2020. The 2019 National Defense Authorization Act reauthorized the program through 2025, rebranding it the Indo-Pacific Maritime Security Initiative and making Bangladesh, Sri Lanka, and India eligible for funds.<sup>72</sup> In August 2018, Secretary of State Mike Pompeo announced the commitment of another \$290.5 million in Foreign Military Financing to strengthen maritime security, High Availability/Disaster Recovery (HA/DR), and peacekeeping capabilities in Southeast Asia.<sup>73</sup>

**Afghanistan.** On October 7, 2001, U.S. forces invaded Afghanistan in response to the September 11, 2001, terrorist attacks on the United States. This marked the beginning of Operation Enduring Freedom to combat al-Qaeda and its Taliban supporters. The U.S., in alliance with the U.K. and the anti-Taliban Afghan Northern

Alliance forces, ousted the Taliban from power in December 2001. Most Taliban and al-Qaeda leaders fled across the border into Pakistan’s Federally Administered Tribal Areas (FATA), where they regrouped and started an insurgency in Afghanistan in 2003.

In August 2003, NATO joined the war in Afghanistan and assumed control of the International Security Assistance Force (ISAF). In 2011, at the height of the war, there were 50 troop-contributing nations and nearly 150,000 NATO and U.S. forces on the ground in Afghanistan.

On December 28, 2014, NATO formally ended combat operations and relinquished responsibility to the Afghan security forces, which numbered around 352,000 (including army and police).<sup>74</sup> After Afghan President Ashraf Ghani signed a bilateral security agreement with the U.S. and a Status of Forces Agreement with NATO, the international coalition launched Operation Resolute Support to train and support Afghan security forces. As of May 2019, slightly more than 17,000 U.S. and NATO forces were stationed in Afghanistan. Most U.S. and NATO forces are stationed at bases in Kabul, with tactical advise-and-assist teams located there and in Mazar-i-Sharif, Herat, Kandahar, and Laghman.<sup>75</sup>

In August 2017, while declining to announce specific troop levels, President Trump recommitted America to the effort in Afghanistan and announced that “[c]onditions on the ground—not arbitrary timetables—will guide our strategy from now on.”<sup>76</sup> According to the most recent available public information, the U.S. currently has around 14,000 troops in Afghanistan split between the NATO-led Resolute Support training mission and the U.S.-led Operation Freedom’s Sentinel counterterrorism mission.

Since 2018, U.S. Special Envoy Zalmay Khalilzad has been leading talks with the Taliban in an attempt to find a political solution to the fighting, but there has been little progress. The Afghan government has not participated in the talks because the Taliban refuse to meet with them, and this has caused tension

between the U.S. and Afghan governments. Whether the U.S. will be able to bring all parties to the table and succeed in achieving a politically acceptable conclusion to the war remains an open question.

**Pakistan.** During the early stages of the war in Afghanistan, the U.S. and NATO relied heavily on logistical supply lines running through Pakistan to resupply anti-Taliban coalition forces. Supplies and fuel were carried on transportation routes from the port at Karachi to Afghan–Pakistani border crossing points at Torkham in the Khyber Pass and Chaman in Baluchistan province. For roughly the first decade of the war, about 80 percent of U.S. and NATO supplies traveled through Pakistani territory. This amount has decreased progressively as the U.S. and allied troop presence has shrunk.

U.S.–Pakistan relations have grown more acrimonious since 2011, when U.S. special forces conducted a raid on Osama bin Laden’s hideout in Abbottabad not far from facilities run by the Pakistani military. In addition, President Donald Trump has suspended U.S. military assistance to Pakistan and increased pressure on Islamabad for its continued support of the Taliban.

Since 2001, Pakistan has received roughly \$30 billion in aid and “reimbursements” from the U.S. in the form of coalition support funds (CSF) for its military deployments and operations along the border with Afghanistan. Pakistan has periodically staged offensives into the Federally Administered Tribal Areas, though its operations have tended to target anti-Pakistan militant groups like the Pakistani Taliban rather than those attacking Afghanistan and U.S.-led coalition forces operating there. In recent years, frustration with Pakistan’s inaction toward such groups has led the U.S. to withhold ever-larger sums of reimbursement and support funds. In 2016, reflecting a trend of growing congressional resistance to military assistance for Pakistan, Congress blocked funds for the provision of eight F-16s to Pakistan.

According to the Congressional Research Service (CRS), U.S. aid appropriations and

military reimbursements have fallen continuously since 2013, from \$2.60 billion that year to \$2.18 billion in 2014, \$1.60 billion in 2015, \$1.20 billion in 2016, \$590 million in 2017, and \$108 million in 2018. This is mostly the product of a major drop in reimbursements from CSF, which once accounted for roughly half of all U.S. aid to Pakistan. This fell from \$1.20 billion in 2014 to \$700 million in 2015, \$550 million in 2016, and zero dollars in 2017, 2018, and 2019. Since 2015, U.S. Administrations have refused to certify that Pakistan has met requirements to crack down on the Haqqani Network, an Afghan terrorist group that resides in northern Pakistan. As the CRS notes, “The NDAA for FY2019 revamped the CSF program, authorizing \$350 million to support security enhancement activities along Pakistan’s western border, subject to certification requirements that have not been met to date.”<sup>77</sup>

As frustration with Pakistan has mounted on Capitol Hill, the Trump Administration has signaled a series of measures designed to hold Pakistan to account for its “double game.”<sup>78</sup> In 2018, the U.S. military suspended all \$800 million in Coalition Support Funds “due to a lack of Pakistani decisive actions in support of the [U.S.] South Asia Strategy.”<sup>79</sup> The Administration has also supported both Pakistan’s addition to the Financial Action Task Force (FATF) “grey list” for failing to fulfil obligations to prevent the financing of terrorism and its designation on a special watch list for violations of religious freedom.

**India.** During the Cold War, U.S.–Indian military cooperation was minimal, except for a brief period during the Sino–Indian border war in 1962 when the U.S. supplied India with arms and ammunition. The rapprochement was short-lived, however, and the U.S. suspended aid to India following the Second Indo-Pakistan War of 1965. The Indo–U.S. relationship was again characterized by suspicion and mistrust, especially during the 1970s under the Nixon Administration. The principal source of tension was India’s robust relationship with Moscow, with which it signed a major defense treaty in 1971, and the U.S. provision of military

aid to Pakistan. America's ties with India hit a nadir during the 1971 Indo-Pakistani war when the U.S. deployed the aircraft carrier USS *Enterprise* toward the Bay of Bengal in a show of support for Pakistani forces.

Military ties between the U.S. and India have improved significantly over the past decade as the two sides have moved toward establishment of a strategic partnership based on their mutual concern about rising Chinese military and economic influence and converging interests in countering regional terrorism. The U.S. has contracted to supply between \$15 billion and \$20 billion worth of U.S. military equipment to India, including C-130J and C-17 transport aircraft, P-8 maritime surveillance aircraft, Chinook airlift helicopters, Apache attack helicopters, anti-submarine warfare helicopters, artillery batteries, and AN-TPQ-37 firefinder radar. The two countries also have several information-sharing and intelligence-sharing agreements in place, including one that covers "white" or commercial shipping in the Indian Ocean.

Defense ties between the two countries are poised to expand further as India moves forward with an ambitious military modernization program. In 2015, the U.S. and India agreed to renew and upgrade their 10-year Defense Framework Agreement. During Prime Minister Narendra Modi's visit to the U.S. in June 2016, the two governments finalized the text of a logistics and information-sharing agreement that would allow each country to access the other's military supplies and refueling capabilities through ports and military bases. The signing of the agreement, formally called the Logistics Exchange Memorandum of Agreement (LEMOA), marked a major milestone in the Indo-U.S. defense partnership. During that visit, the U.S. also designated India a "major defense partner," a designation unique to India that is intended to facilitate its access to American defense technology. Since then, Indian and U.S. warships have begun to offer each other refueling and resupply services at sea.

The Trump Administration subsequently reaffirmed this status<sup>80</sup> and has taken several

additional steps to advance the defense relationship. A Communications and Information Security Memorandum of Agreement (CIS-MOA), successfully negotiated in 2018, allows for the exchange of encrypted communications and communications equipment, and negotiations on the last "foundational" military cooperation agreement, the Basic Exchange and Cooperation Agreement (BECA), which would facilitate the exchange of geospatial intelligence and navigation services, are ongoing. Also in 2018, the Trump Administration granted India Strategic Trade Authorization-1 (STA-1), which eases export control regulations on arms sales to India, among other things. India is only the third Asian country after Japan and South Korea to be granted STA-1 status. The same year, India established a permanent naval attaché representative to U.S. Central Command in Bahrain, fulfilling a long-standing request from New Delhi.

New Delhi and Washington regularly hold joint annual military exercises across all services, including the Yudh Abhyas army exercises, Red Flag air force exercises, and Malabar naval exercise, which added Japan as a regular participant in 2012. The Indian government and the Trump Administration are currently negotiating several prospective arms sales and military cooperation agreements, including the sale of armed MQ-9 Guardian/Predator-B unmanned drones to India.

### **Quality of Key Allied or Partner Armed Forces in Asia**

Because of the lack of an integrated, regional security architecture along the lines of NATO, the United States partners with most of the nations in the region on a bilateral basis. This means that there is no single standard to which all of the local militaries aspire; instead, there is a wide range of capabilities that are influenced by local threat perceptions, institutional interests, physical conditions, historical factors, and budgetary considerations.

Moreover, most Asian militaries have limited combat experience, particularly in high-intensity air or naval combat. Some, like

Malaysia, have never fought an external war since gaining independence in the mid-20th century. The Indochina wars, the most recent high-intensity conflicts, are now 40 years in the past. It is therefore unclear how well Asian militaries have trained for future warfare and whether their doctrine will meet the exigencies of wartime realities.

Based on examinations of equipment, however, we assess that several Asian allies and friends have substantial potential military capabilities supported by robust defense industries and significant defense spending. Japan's, South Korea's, and Australia's defense budgets are estimated to be among the world's 15 largest, and their military forces field some of the world's most advanced weapons, including F-15s in the Japan Air Self Defense Force and ROK Air Force; airborne early warning (AEW) platforms; Aegis-capable surface combatants and modern diesel-electric submarines; and third-generation main battle tanks. As noted, all three nations are involved in the production and purchase of F-35 fighters.

At this point, both the Japanese and Korean militaries are arguably more capable than most European militaries, at least in terms of conventional forces. Japan's Self Defense Forces, for example, field more tanks, principal surface combatants, and combat-capable aircraft (667, 49, and 547, respectively) than their British counterparts field (227, 20, and 250, respectively).<sup>81</sup> Similarly, South Korea fields a larger military of tanks, principal surface combatants, and combat-capable aircraft (more than 2,514, 26, and 590, respectively) than their German counterparts field (236, 14, and 217, respectively).<sup>82</sup>

Both the ROK and Japan are also increasingly interested in developing missile defense capabilities, including joint development and coproduction in the case of Japan. After much negotiation and indecision, South Korea deployed America's THAAD missile defense system on the peninsula in 2017. It is also pursuing an indigenous missile defense capability. As for Japan, its Aegis-class destroyers are equipped with SM-3 missiles, and it decided in 2017 to

install the Aegis Ashore missile defense system to supplement its Patriot missile batteries.<sup>83</sup>

Australia also has very capable armed forces. They are smaller than NATO militaries but have major operational experience, having deployed to both Iraq and Afghanistan as well as to help the Philippines with its Southern insurgency. Australia's military is today involved in 13 different operations from the Middle East to the South China Sea.<sup>84</sup>

Singapore's small population and physical borders limit the size of its military, but in terms of equipment and training, it has Southeast Asia's largest defense budget<sup>85</sup> and fields some of the region's highest-quality forces. For example, Singapore's ground forces can deploy third-generation Leopard II main battle tanks, and its fleet includes four conventional submarines (with four new, more capable submarines on their way from Germany to replace them<sup>86</sup>), including one with air-independent propulsion systems, as well as six frigates and six missile-armed corvettes. Its air force not only has F-15E Strike Eagles and F-16s, but also has one of Southeast Asia's largest fleets of airborne early warning and control aircraft (G550-AEW aircraft) and a squadron of KC-130 tankers that can help to extend range or time on station.<sup>87</sup>

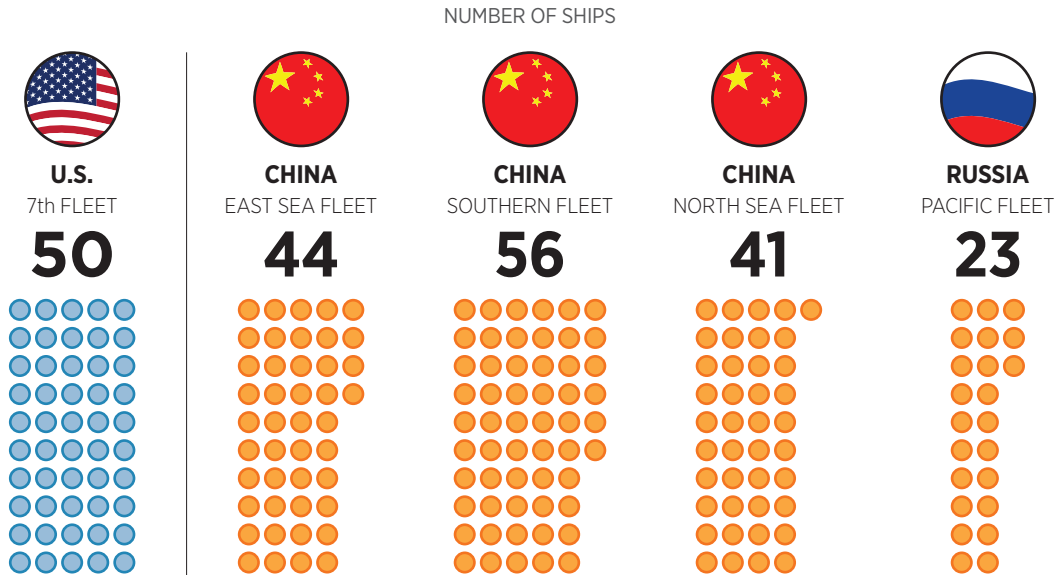
At the other extreme, the Armed Forces of the Philippines are among the region's weakest military forces. Having long focused on waging counterinsurgency campaigns while relying on the United States for its external security, the Philippines, like Thailand, spends only 1.4 percent of GDP on its military.<sup>88</sup> In absolute numbers, its defense budget in 2019 is \$3.24 billion.<sup>89</sup> The most modern ships in the Philippine navy are three former U.S. *Hamilton*-class Coast Guard cutters. In 2017, however, South Korea completed delivery of 12 light attack fighter aircraft to the Philippines; the Philippine air force had possessed no jet fighter aircraft since 2005 when the last of its F-5s were decommissioned. The Duterte government has expressed interest in supplementing its current fleet with a follow-on purchase of 12 more.<sup>90</sup>



FIGURE 1

## U.S. Faces Daunting Force in Pacific

The Eastern Hemisphere is home to the two most formidable naval threats to the U.S., China and Russia, and the bulk of this area is the responsibility of the U.S. Navy's 7th Fleet. The 7th Fleet must contend with all three of China's fleets in addition to Russia's Pacific Fleet.



**NOTES:** Figures are estimates. Figures exclude patrol boats and other vessels smaller than a frigate.

**SOURCES:** International Institute for Strategic Studies, *The Military Balance 2019* (New York: Routledge, 2019), and Heritage Foundation research and analysis.

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The armed forces of American allies from outside the region, particularly those of France and the United Kingdom, should also be mentioned. France has overseas bases in New Caledonia and the South Pacific, locally based assets, and 2,900 personnel in the region.<sup>91</sup> It also conducts multiple naval deployments a year out of Metropolitan France. The U.K. is also very active in the region, and given its unparalleled integration with U.S. forces, can employ its capability directly in pursuit of shared objectives. It has a naval logistics facility in

Singapore and Royal Gurkhas stationed in Brunei and has been an integral part of a U.S.-led mission to monitor seaborne evasions.

### Current U.S. Presence in Asia

**U.S. Indo-Pacific Command.** Established in 1947 as U.S. Pacific Command (PACOM), USINDOPACOM is the oldest and largest of America's unified commands. According to its Web site:

USINDOPACOM protects and defends, in concert with other U.S. Government agencies,

the territory of the United States, its people, and its interests. With allies and partners, USINDOPACOM is committed to enhancing stability in the Asia–Pacific region by promoting security cooperation, encouraging peaceful development, responding to contingencies, deterring aggression, and, when necessary, fighting to win. This approach is based on partnership, presence, and military readiness.<sup>92</sup>

USINDOPACOM’s area of responsibility (AOR) includes not only the expanses of the Pacific, but also Alaska and portions of the Arctic, South Asia, and the Indian Ocean. Its 36 nations represent more than 50 percent of the world’s population and include two of the three largest economies and nine of the 10 smallest; the most populous nation (China); the largest democracy (India); the largest Muslim-majority nation (Indonesia); and the world’s smallest republic (Nauru). The region is a vital driver of the global economy and includes the world’s busiest international sea-lanes and nine of its 10 largest ports. By any meaningful measure, the Indo–Pacific is also the world’s most militarized region, with seven of its 10 largest standing militaries and six of its nuclear nations.<sup>93</sup>

Under INDOPACOM are a number of component commands, including:

- **U.S. Army Pacific.** USARPAC is the Army’s component command in the Pacific. With 80,000 soldiers, it supplies Army forces as necessary for various global contingencies. It administers (among others) the 25th Infantry Division headquartered in Hawaii, U.S. Army Japan, and U.S. Army Alaska.<sup>94</sup>
- **U.S. Pacific Air Force.** PACAF is responsible for planning and conducting defensive and offensive air operations in the Asia–Pacific region. It has three numbered air forces under its command: 5th Air Force in Japan; 7th Air Force in Korea; and 11th Air Force, headquartered in Alaska. These air forces field two squadrons of F-15s, two squadrons of F-22s, five squadrons of F-16s, and a single squadron of

A-10 ground attack aircraft as well as two squadrons of E-3 early-warning aircraft, tankers, and transports.<sup>95</sup> Other forces that regularly come under PACAF command include B-52, B-1, and B-2 bombers.

- **U.S. Pacific Fleet.** PACFLT normally controls all U.S. naval forces committed to the Pacific, which usually represents 60 percent of the Navy’s fleet. It is organized into Seventh Fleet, headquartered in Japan, and Third Fleet, headquartered in California. Seventh Fleet comprises the forward-deployed element of PACFLT and includes the only American carrier strike group (CTF-70) and amphibious group (CTF-76) home-ported abroad, ported at Yokosuka and Sasebo, Japan, respectively. The Third Fleet’s AOR spans the West Coast of the United States to the International Date Line and includes the Alaskan coastline and parts of the Arctic. In recent years, this boundary between the two fleets’ areas of operation has been blurred under a concept called “Third Fleet Forward.” This has made it easier for the Third Fleet’s five carrier strike groups to operate in the Western Pacific. Beginning in 2015, the conduct of Freedom of Navigation Operations (FONOPS) that challenge excessive maritime claims, a part of the Navy’s mission since 1979, has assumed a higher profile as a result of several well-publicized operations in the South China Sea. Under the Trump Administration, the frequency of these operations has increased significantly.
- **U.S. Marine Forces Pacific.** With its headquarters in Hawaii, MARFORPAC controls elements of the U.S. Marine Corps operating in the Asia–Pacific region. Because of its extensive responsibilities and physical span, MARFORPAC controls two-thirds of Marine Corps forces: the I Marine Expeditionary Force (MEF), centered on the 1st Marine Division, 3rd Marine Air Wing, and 1st Marine Logistics

## The Tyranny of Distance

Steam times are in parentheses.



**SOURCE:** Heritage Foundation estimates based on data from Shirley A. Kan, "Guam: U.S. Defense Deployments," Congressional Research Service, April 29, 2014, Table 1, <https://www.hsdl.org/?view&did=752725> (accessed January 13, 2015).

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Group, and the III Marine Expeditionary Force, centered on the 3rd Marine Division, 1st Marine Air Wing, and 3rd Marine Logistics Group. The I MEF is headquartered at Camp Pendleton, California, and the III MEF is headquartered on Okinawa, although each has various subordinate

elements deployed at any time throughout the Pacific on exercises, maintaining presence, or engaged in other activities. MARFORPAC is responsible for supporting three different commands: It is the U.S. Marine Corps component of USINDOPACOM, provides the Fleet Marine Forces to

PACFLT, and provides Marine forces for U.S. Forces Korea (USFK).<sup>96</sup>

- **U.S. Special Operations Command Pacific.** SOCPAC has operational control of various special operations forces, including Navy SEALs; Naval Special Warfare units; Army Special Forces (Green Berets); and Special Operations Aviation units in the Pacific region, including elements in Japan and South Korea. It supports the Pacific Command's Theater Security Cooperation Program as well as other plans and contingency responses. SOCPAC forces support various operations in the region other than warfighting, such as counterdrug operations, counterterrorism training, humanitarian assistance, and demining activities.
- **U.S. Forces Korea and U.S. Eighth Army.** Because of the unique situation on the Korean Peninsula, two subcomponents of USINDOPACOM—U.S. Forces Korea (USFK) and U.S. Eighth Army—are based in Korea. USFK, a joint headquarters led by a four-star U.S. general, is in charge of the various U.S. military elements on the peninsula. U.S. Eighth Army operates in conjunction with USFK as well as with the United Nations presence in the form of United Nations Command.

Other forces, including space capabilities, cyber capabilities, air and sealift assets, and additional combat forces, may be made available to USINDOPACOM depending on requirements and availability.

**U.S. Central Command—Afghanistan.** Unlike the U.S. forces deployed in Japan and South Korea, there is no permanent force structure committed to Afghanistan; instead, forces rotate through the theater under the direction of USINDOPACOM's counterpart in that region of the world, U.S. Central Command (CENTCOM). As of January 2017, these forces included:

- **Resolute Support Mission,** including U.S. Forces Afghanistan.
- **Special Operations Joint Task Force—Afghanistan.** This includes a Special Forces battalion, based out of Bagram Airfield, and additional allied special operations forces at Kabul.
- **9th Air and Space Expeditionary Task Force.** This includes the 155th Air Expeditionary Wing, providing air support from Bagram Airfield; the 451st Air Expeditionary Group and 455th Expeditionary Operations Group, operating from Kandahar and Bagram Airfields, respectively, providing air support and surveillance operations over various parts of Afghanistan; and the 421st Expeditionary Fighter Squadron, providing close air support from Bagram Airfield.
- **Combined Joint Task Force for Operation Freedom's Sentinel,** centered on Bagram Airfield. This is the main U.S. national support element and has a primary focus on counterterrorism operations.<sup>97</sup>
- **Five Train, Advise, Assist Commands** in Afghanistan, each of which is a multinational force tasked with improving local capabilities to conduct operations.<sup>98</sup>

### Key Infrastructure That Enables Expeditionary Warfighting Capabilities

Any planning for operations in the Pacific will be dominated by the "tyranny of distance." Because of the extensive distances that must be traversed in order to deploy forces, even Air Force units will take one or more days to deploy, and ships measure steaming time in weeks. For instance, a ship sailing at 20 knots requires nearly five days to get from San Diego to Hawaii. From there, it takes a further seven days to get to Guam; seven days to Yokosuka, Japan; and eight days to Okinawa—if ships encounter no interference along the journey.<sup>99</sup>

China's growing anti-access/area denial (A2/AD) capabilities, ranging from an expanding fleet of modern submarines to anti-ship ballistic and cruise missiles, increase the operational risk for deployment of U.S. forces in the event of conflict. China's capabilities not only jeopardize American combat forces that would flow into the theater for initial combat, but also would continue to threaten the logistical support needed to sustain American combat power for the subsequent days, weeks, and months.

American basing structure in the Indo-Pacific region, including access to key allied facilities, is therefore both necessary and increasingly at risk.

### **American Facilities**

Much as it was in the 20th century, Hawaii remains the linchpin of America's ability to support its position in the Western Pacific. If the United States cannot preserve its facilities in Hawaii, both combat power and sustainability become moot. The United States maintains air and naval bases, communications infrastructure, and logistical support on Oahu and elsewhere in the Hawaiian Islands. Hawaii is also a key site for undersea cables that carry much of the world's communications and data, as well as satellite ground stations.

The American territory of Guam is located 4,600 miles farther west. Obtained from Spain as a result of the Spanish-American War, Guam became a key coaling station for U.S. Navy ships. It was seized by Japan in World War II, was liberated by U.S. forces in 1944, and after the war became an unincorporated, organized territory of the United States. Key U.S. military facilities on Guam include U.S. Naval Base Guam, which houses several attack submarines and possibly a new aircraft carrier berth, and Andersen Air Force Base, one of a handful of facilities that can house B-2 bombers. U.S. task forces can stage out of Apra Harbor, drawing weapons from the Ordnance Annex in the island's South Central Highlands. There is also a communications and data relay facility on the island.

Guam's facilities have improved steadily over the past 20 years. B-2 bombers, for example, began to operate from Andersen Air Force Base in 2005.<sup>100</sup> These improvements have been accelerated and expanded even as China's A2/AD capabilities have raised doubts about the ability of the U.S. to sustain operations in the Asian littoral. The concentration of air and naval assets as well as logistical infrastructure, however, makes the island an attractive potential target in the event of conflict. The increasing reach of Chinese and North Korean ballistic missiles reflects this growing vulnerability.

The U.S. military has noncombatant maritime prepositioning ships (MPS), which contain large amounts of military equipment and supplies, in strategic locations from which they can reach areas of conflict relatively quickly as associated U.S. Army or Marine Corps units located elsewhere arrive in the areas. U.S. Navy units on Guam and in Saipan, Commonwealth of the Northern Marianas, support prepositioning ships that can supply Army or Marine Corps units deployed for contingency operations in Asia.

### **Allied and Friendly Facilities**

For the United States, access to bases in Asia has long been a vital part of its ability to support military operations in the region. Even with the extensive aerial refueling and replenishment skills of the U.S. Air Force and U.S. Navy, it is still essential for the United States to retain access to resupply and replenishment facilities, at least in peacetime. The ability of those facilities to survive and function will directly influence the course of any conflict in the Western Pacific region. Moreover, a variety of support functions, including communications, intelligence, and space support, cannot be accomplished without facilities in the region.

Today, maintaining maritime domain awareness or space situational awareness would be extraordinarily difficult without access to facilities in the Asia-Pacific region. The American alliance network is therefore a matter both of political partnership and of access to key facilities on allied soil.

**Japan.** In Japan, the United States has access to over 100 different facilities, including communications stations, military and dependent housing, fuel and ammunition depots, and weapons and training ranges, in addition to major bases such as air bases at Misawa, Yokota, and Kadena and naval facilities at Yokosuka, Atsugi, and Sasebo. The naval facilities support the USS *Ronald Reagan* carrier strike group (CSG), which is home-ported in Yokosuka, and a Marine Expeditionary Strike Group (ESG) centered on the USS *Wasp*, home-ported at Sasebo. Additionally, the skilled workforce at places like Yokosuka is needed to maintain American forces and repair equipment in time of conflict. Replacing them would take years, if not decades.

This combination of facilities and workforce, in addition to physical location and political support, makes Japan an essential part of any American military response to contingencies in the Western Pacific. Japanese financial support for the American presence also makes these facilities some of the most cost-effective in the world.

The status of one critical U.S. base has been a matter of public debate in Japan for many years. The U.S. Marine Corps' Third Marine Expeditionary Force, based on Okinawa, is the U.S. rapid reaction force in the Pacific. The Marine Air-Ground Task Force, comprised of air, ground, and logistics elements, enables quick and effective response to crises or humanitarian disasters. To improve the political sustainability of U.S. forces by reducing the impact on the local population in that densely populated area, the Marines are relocating some units to Guam and less-populated areas of Okinawa. The latter includes moving a helicopter unit from Futenma to a new facility in a more remote location in northeastern Okinawa. Because of local resistance, construction of the Futenma Replacement Facility at Camp Schwab will not be complete until 2025, but the U.S. and Japanese governments have affirmed their support for the project.

**South Korea.** The United States also maintains an array of facilities in South Korea, with

a larger Army footprint than in Japan, as the United States and South Korea remain focused on deterring North Korean aggression and preparing for any possible North Korean contingencies. The Army maintains four major facilities (which in turn control a number of smaller sites) at Daegu, Yongsan in Seoul, and Camps Red Cloud/Casey and Humphreys. These facilities support the U.S. 2nd Infantry Division, which is based in South Korea. Other key facilities include air bases at Osan and Kunsan and a naval facility at Chinhae near Pusan.

**The Philippines.** In 1992, the United States ended nearly a century-long presence in the Philippines when it withdrew from its base in Subic Bay as its lease there ended. The eruption of Mount Pinatubo had already forced the closure of Clark Air Base; the costs of repairing the facility were deemed too high to be worthwhile. In 2014, however, spurred by China's growing assertiveness in the South China Sea, including against Philippine claims such as Mischief Reef (seized in 1995) and Scarborough Shoal (2012), the U.S. and the Philippines negotiated the Enhanced Defense Cooperation Agreement, which will allow for the rotation of American forces through Philippine military bases.

In 2016, the two sides agreed on an initial list of five bases in the Philippines that will be involved. Geographically distributed across the country, they are Antonio Bautista Air Base in Palawaan, closest to the Spratlys; Basa Air Base on the main island of Luzon and closest to the hotly contested Scarborough Shoal; Fort Magsaysay, also on Luzon and the only facility on the list that is not an air base; Lumbia Air Base in Mindanao, where Manila remains in low-intensity combat with Islamist insurgents; and Mactan-Benito Ebuen Air Base in the central Philippines.<sup>101</sup> In 2018, construction was completed on a humanitarian assistance and disaster relief warehouse located at Basa Air Base in Pampanga, central Luzon, the main Philippine island.<sup>102</sup> In 2019, American F-16s based in South Korea deployed there for a 12-day exercise with Philippine fighter jets.<sup>103</sup>

It remains unclear precisely which additional forces would be rotated through the Philippines as a part of this agreement, which in turn affects the kinds of facilities that would be most needed. The base upgrades and deployments pursuant to the EDCA are part of a broader expansion of U.S.–Philippine defense ties begun under the Aquino government and continued under President Duterte with some adjustments.

**Singapore.** The United States does not have bases in Singapore, but it is allowed access to several key facilities that are essential for supporting American forward presence. Since the closure of its facilities at Subic Bay, the United States has been allowed to operate the principal logistics command for the Seventh Fleet out of the Port of Singapore Authority’s Sembawang Terminal. The U.S. Navy also has access to Changi Naval Base, one of the few docks in the world that can handle a 100,000-ton American aircraft carrier. A small U.S. Air Force contingent operates out of Paya Lebar Air Base to support U.S. Air Force combat units visiting Singapore and Southeast Asia, and Singapore hosts Littoral Combat Ships (LCS) and a rotating squadron of F-16 fighter aircraft.

**Australia.** A much-discussed element of the “Asia pivot” has been the 2011 agreement to deploy U.S. Marines to Darwin in northern Australia. While planned to amount to 2,500 Marines, the rotations fluctuate and have not yet reached that number. “In its mature state,” according to the Australian Department of Defence, “the Marine Rotational Force–Darwin (MRF–D) will be a Marine Air–Ground Task Force...with a variety of aircraft, vehicles and equipment.”<sup>104</sup> In keeping with Australian sensitivities about permanent American bases on Australian soil, the Marines do not constitute a permanent presence in Australia.<sup>105</sup> Similarly, the United States jointly staffs the Joint Defence Facility Pine Gap and the Joint Geological and Geophysical Research Station at Alice Springs and has access to the Harold E. Holt Naval Communication Station in western Australia, including the space surveillance radar system there.<sup>106</sup>

Finally, the United States is granted access to a number of facilities in Asian states on a contingency or crisis basis. Thus, U.S. Air Force units transited Thailand’s U-Tapao Air Base and Sattahip Naval Base during the first Gulf War and during the Iraq War, but they do not maintain a permanent presence there. Additionally, the U.S. Navy conducts hundreds of port calls throughout the region.

**Diego Garcia.** The American facilities on the British territory of Diego Garcia are vital to U.S. operations in the Indian Ocean and Afghanistan and provide essential support for operations in the Middle East and East Asia. The island is home to the 12 ships of Maritime Prepositioning Squadron-2 (MPS-2), which can support a Marine brigade and associated Navy elements for 30 days. Several elements of the U.S. global space surveillance and communications infrastructure, as well as basing facilities for the B-2 bomber, are also located on the island.

## Conclusion

The Asian strategic environment is extremely expansive, as it includes half the globe and is characterized by a variety of political relationships among states that have wildly varying capabilities. The region includes long-standing American allies with relationships dating back to the beginning of the Cold War as well as recently established states and some long-standing adversaries such as North Korea. American conceptions of the region must therefore recognize the physical limitations imposed by the tyranny of distance. Moving forces within the region (never mind to it) will take time and require extensive strategic lift assets as well as sufficient infrastructure, such as sea and aerial ports of debarkation that can handle American strategic lift assets, and political support. At the same time, the complicated nature of intra-Asian relations, especially unresolved historical and territorial issues, means that the United States, unlike Europe, cannot necessarily count on support from all of its regional allies in responding to any given contingency.

# Scoring the Asia Operating Environment

As with the operating environments of Europe and the Middle East, we assessed the characteristics of Asia as they would pertain to supporting U.S. military operations. Various aspects of the region facilitate or inhibit America's ability to conduct military operations to defend its vital national interests against threats. Our assessment of the operating environment utilized a five-point scale, ranging from "very poor" to "excellent" conditions and covering four regional characteristics of greatest relevance to the conduct of military operations:

- 1. Very Poor.** Significant hurdles exist for military operations. Physical infrastructure is insufficient or nonexistent, and the region is politically unstable. The U.S. military is poorly placed or absent, and alliances are nonexistent or diffuse.
  - 2. Unfavorable.** A challenging operating environment for military operations is marked by inadequate infrastructure, weak alliances, and recurring political instability. The U.S. military is inadequately placed in the region.
  - 3. Moderate.** A neutral to moderately favorable operating environment is characterized by adequate infrastructure, a moderate alliance structure, and acceptable levels of regional political stability. The U.S. military is adequately placed in the region.
  - 4. Favorable.** A favorable operating environment includes good infrastructure, strong alliances, and a stable political environment. The U.S. military is well placed in the region for future operations.
  - 5. Excellent.** An extremely favorable operating environment includes well-established and well-maintained infrastructure,
- strong and capable allies, and a stable political environment. The U.S. military is exceptionally well placed to defend U.S. interests.
- The key regional characteristics consisted of:
- a. Alliances.** Alliances are important for interoperability and collective defense, as allies would be more likely to lend support to U.S. military operations. Various indicators provide insight into the strength or health of an alliance. These include whether the U.S. trains regularly with countries in the region, has good interoperability with the forces of an ally, and shares intelligence with nations in the region.
  - b. Political Stability.** Political stability brings predictability for military planners when considering such things as transit, basing, and overflight rights for U.S. military operations. The overall degree of political stability indicates whether U.S. military actions would be hindered or enabled and considers, for example, whether transfers of power in the region are generally peaceful and whether there have been any recent instances of political instability in the region.
  - c. U.S. Military Positioning.** Having military forces based or equipment and supplies staged in a region greatly facilitates the ability of the United States to respond to crises and, presumably, achieve successes in critical "first battles" more quickly. Being routinely present in a region also assists in maintaining familiarity with its characteristics and the various actors that might act to assist or thwart U.S. actions. With this in mind, we assessed whether or not the U.S. military was well positioned in the region. Again,



indicators included bases, troop presence, prepositioned equipment, and recent examples of military operations (including training and humanitarian) launched from the region.

**d. Infrastructure.** Modern, reliable, and suitable infrastructure is essential to military operations. Airfields, ports, rail lines, canals, and paved roads enable the U.S. to stage, launch operations from, and logistically sustain combat operations. We combined expert knowledge of regions with publicly available information on critical infrastructure to arrive at our overall assessment of this metric.<sup>107</sup>

For Asia, we arrived at these average scores:

- Alliances: **4—Favorable**
- Political Stability: **4—Favorable**
- U.S. Military Positioning: **4—Favorable**
- Infrastructure: **4—Favorable**

Aggregating to a regional score of: **Favorable**

### Operating Environment: Asia

	VERY POOR	UNFAVORABLE	MODERATE	FAVORABLE	EXCELLENT
Alliances				✓	
Political Stability				✓	
U.S. Military Posture				✓	
Infrastructure				✓	
<b>OVERALL</b>				✓	

## Endnotes

1. U.S. Department of Commerce data on total goods trade with Asia and total goods trade globally in 2018 indicate that slightly more than 39 percent of total U.S. goods trade in 2018 was with Asia. See Table, “2018: U.S. Trade in Goods with Asia,” in U.S. Department of Commerce, U.S. Census Bureau, “Foreign Trade: Trade in Goods with Asia,” <https://www.census.gov/foreign-trade/balance/c0016.html> (accessed June 30, 2019), and Table, “Year-to-Date Total Trade,” in U.S. Department of Commerce, U.S. Census Bureau, “Foreign Trade: Top Trading Partners—December 2018,” <https://www.census.gov/foreign-trade/statistics/highlights/top/top1812yr.html> (accessed June 30, 2019).
2. U.S. Department of Defense, *The Department of Defense Indo-Pacific Strategy Report: Preparedness, Partnerships, and Promoting a Networked Region*, June 1, 2019, p. 1, [https://media.defense.gov/2019/May/31/2002139210/-1/-1/1/DOD\\_INDO\\_PACIFIC\\_STRATEGY\\_REPORT\\_JUNE\\_2019.PDF](https://media.defense.gov/2019/May/31/2002139210/-1/-1/1/DOD_INDO_PACIFIC_STRATEGY_REPORT_JUNE_2019.PDF) (accessed June 29, 2019).
3. *Ibid.*, p. 2.
4. Shari A. Allen and Alexis N. Grimm, “U.S. International Services: Trade in Services in 2016 and Services Supplied Through Affiliates in 2015,” U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, October 2017, p. 4, <https://apps.bea.gov/scb/pdf/2017/10-October/1017-international-services.pdf> (accessed June 29, 2019).
5. U.S. Department of Defense, *The Department of Defense Indo-Pacific Strategy Report: Preparedness, Partnerships, and Promoting a Networked Region*, p. 1.
6. *Ibid.*, p. 19.
7. “Aspiring sincerely to an international peace based on justice and order, the Japanese people forever renounce war as a sovereign right of the nation and the threat or use of force as means of settling international disputes. In order to accomplish the aim of the preceding paragraph, land, sea, and air forces, as well as other war potential, will never be maintained. The right of belligerency of the state will not be recognized.” Constitution of Japan, Article 9, promulgated November 3, 1946, came into effect May 3, 1947, [http://japan.kantei.go.jp/constitution\\_and\\_government\\_of\\_japan/constitution\\_e.html](http://japan.kantei.go.jp/constitution_and_government_of_japan/constitution_e.html) (accessed May 21, 2019).
8. Purnendra Jain, “A New High: India–Japan Defense Links,” Lowy Institute, *The Interpreter*, April 17, 2018, <https://www.lowyinstitute.org/the-interpreter/new-high-india-japan-defence-links> (accessed May 21, 2019).
9. U.S. Forces, Japan, “About USFJ,” <https://www.usfj.mil/About-USFJ/> (accessed April 12, 2019).
10. Emma Chanlett-Avery, Mark E. Manyin, and Brock R. Williams, “U.S.–Japan Relations,” Congressional Research Service *In Focus* No. 10199, updated May 20, 2019, <https://fas.org/sgp/crs/row/IF10199.pdf> (accessed May 22, 2019).
11. K. J. Kwon, “South Korea and Japan Put Military Intelligence Pact on Hold After Outcry,” CNN, updated June 29, 2012, <http://www.cnn.com/2012/06/29/world/asia/south-korea-japan-pact/index.html> (accessed May 22, 2019).
12. For further details, see Bruce Klingner, “The U.S. and South Korea Should Focus on Improving Alliance Capabilities Rather Than the OPCON Transition,” Heritage Foundation *Backgrounders* No. 2935, August 7, 2014, <https://www.heritage.org/global-politics/report/the-us-and-south-korea-should-focus-improving-alliance-capabilities-rather>.
13. General Robert B. Abrams, Commander, United Nations Command; Commander, United States–Republic of Korea Combined Forces Command; and Commander, United States Forces Korea, statement before the Committee on Armed Services, U.S. Senate, February 12, 2019, pp. 13 and 4, [https://www.armed-services.senate.gov/imo/media/doc/Abrams\\_02-12-19.pdf](https://www.armed-services.senate.gov/imo/media/doc/Abrams_02-12-19.pdf) (accessed May 22, 2019).
14. William Gallo, “US General Notes ‘Little to No’ Progress on North Korea’s Capabilities,” *VOA News*, February 12, 2019, <https://www.voanews.com/a/us-general-notes-little-to-no-progress-on-north-korea-capabilities/4783719.html> (accessed May 22, 2019).
15. Abrams, statement before Senate Committee on Armed Services, February 12, 2019, p. 4.
16. Mark E. Manyin, Emma Chanlett-Avery, and Brock R. Williams, “South Korea: Background and U.S. Relations,” Congressional Research Service *In Focus* No. 10165, updated May 20, 2019, <https://fas.org/sgp/crs/row/IF10165.pdf> (accessed May 22, 2019).
17. U.S. Department of Defense, Office of Inspector General; U.S. Department of State, Office of Inspector General; and U.S. Agency for International Development, Office of Inspector General, *Overseas Contingency Operations: Operation Inherent Resolve, Operation Pacific Eagle–Philippines*, Lead Inspector General Report to the United States Congress, October 1, 2017–December 31, 2017, pp. 99–100, [https://mronline.org/wp-content/uploads/2018/02/FY2018\\_LIG\\_OCO\\_OIR\\_Q1\\_12222017\\_2.pdf](https://mronline.org/wp-content/uploads/2018/02/FY2018_LIG_OCO_OIR_Q1_12222017_2.pdf) (accessed May 22, 2019).
18. U.S. Department of Defense, Office of Inspector General; U.S. Department of State, Office of Inspector General; and U.S. Agency for International Development, Office of Inspector General, *Operations: Operation Pacific Eagle–Philippines*, Lead Inspector General Report to the United States Congress, October 1, 2018–December 31, 2018, p.7, [https://www.stateoig.gov/system/files/fy2019\\_lig\\_ocoreport.pdf](https://www.stateoig.gov/system/files/fy2019_lig_ocoreport.pdf) (accessed May 22, 2019).

19. Admiral Harry B. Harris Jr., U.S. Navy, Commander, U.S. Pacific Command, statement “On U.S. Pacific Command Posture” before the Committee on Armed Services, U.S. House of Representatives, February 14, 2018, p. 41, <https://docs.house.gov/meetings/AS/AS00/20180214/106847/HHRG-115-AS00-Wstate-HarrisJrH-20180214.pdf> (accessed May 22, 2019).
20. Australian Government, Department of Defence, “Exercise Balikpapan,” <http://www.defence.gov.au/exercises/balikatan/> (accessed May 22, 2019), and news release, “USS Wasp, SPMAGTF 4 Arrive in the Philippines for Exercise Balikpapan,” Commander, U.S. 7th Fleet, March 31, 2019, <https://www.c7f.navy.mil/Media/News/Display/Article/1801132/uss-wasp-spmagtf-4-arrive-in-the-philippines-for-exercise-balikatan/> (accessed May 22, 2019).
21. See, for example, Ben Dolven, Mark E. Manyin, and Shirley A. Kan, “Maritime Territorial Disputes in East Asia: Issues for Congress,” Congressional Research Service *Report for Members and Committees of Congress*, May 14, 2014, p. 31, <https://fas.org/sgp/crs/row/R42930.pdf> (accessed May 22, 2019).
22. Ben Westcott and Brad Lendon, “Duterte Threatens ‘Suicide Mission’ If Beijing Oversteps in South China Sea,” *CNN*, updated April 5, 2019, <https://www.cnn.com/2019/04/05/asia/south-china-sea-duterte-beijing-intl/index.html> (accessed May 22, 2019).
23. Walter Lohman, “Scarborough Shoal and Safeguarding American Interests,” Heritage Foundation *Issue Brief* No. 3603, May 14, 2012, p. 2, <http://www.heritage.org/research/reports/2012/05/south-china-sea-dispute-between-china-and-the-philippines-safeguarding-americas-interests>.
24. Michael R. Pompeo, “Remarks with Philippine Foreign Secretary Teodoro Locsin, Jr.,” Manila, Philippines, March 1, 2019, <https://www.state.gov/remarks-with-philippine-foreign-secretary-teodoro-locsin-jr/> (accessed May 22, 2019).
25. Seth Robson, “US–Philippines Relations on an Uptick Ahead of Annual Balikpapan Drills,” *Stars and Stripes*, April 24, 2017, <https://www.stripes.com/news/us-philippines-relations-on-an-uptick-ahead-of-annual-balikatan-drills-1.465104#.WSXN72jyu70> (accessed May 22, 2019).
26. Named for Thai Foreign Minister Thanat Khoman and U.S. Secretary of State Dean Rusk.
27. News release, “2012 Joint Vision Statement for the Thai–U.S. Defense Alliance,” U.S. Department of Defense, November 15, 2012, <http://archive.defense.gov/releases/release.aspx?releaseid=15685> (accessed May 22, 2019).
28. Carlos M. Vazquez II, “Cobra Gold, One of World’s Largest Multinational Military Exercises, Kicks Off in Thailand,” *Stars and Stripes*, February 13, 2019, <https://www.stripes.com/news/cobra-gold-one-of-world-s-largest-multinational-military-exercises-kicks-off-in-thailand-1.568443> (accessed May 22, 2019).
29. See World Integrated Trade Solution, “Trade Summary for Thailand,” page refreshed May 22, 2019, <https://wits.worldbank.org/countrysnapshot/en/THA/textview> (accessed May 22, 2019).
30. Phuong Nguyen and Brittany Billingsley, “China’s Growing Military-to-Military Engagement with Thailand & Myanmar,” Center for Strategic and International Studies, Asia Program, cogitASIA blog, September 12, 2013, <http://cogitasia.com/chinas-growing-military-to-military-engagement-with-thailand-and-myanmar/> (accessed May 22, 2019), and Patpicha Tanakasempipat and Jutarat Skulpichetrat, “China, Thailand Joint Air Force Exercise Highlights Warming Ties,” Reuters, November 14, 2015, <https://uk.reuters.com/article/uk-china-thailand-military-idUKKBN0TDCB20151124> (accessed May 22, 2019).
31. Mike Yeo, “Thailand to Buy More Chinese Tanks, Reportedly for \$58M,” *Defense News*, April 4, 2017, <http://www.defensenews.com/articles/thailand-to-buy-more-chinese-tanks-reportedly-for-58m> (accessed May 22, 2019), and Reuters, “Thailand in \$67-Million Deal to Buy Armored Personnel Carriers from China,” June 14, 2017, <https://www.reuters.com/article/us-thailand-china-defence-idUSKBN1950IH> (accessed May 22, 2019).
32. Reuters, “Thailand Approves \$393-Mln Purchase of Chinese Submarines,” April 24, 2017, <http://in.reuters.com/article/thailand-china-idINKBN17Q150> (accessed May 22, 2019), and Prashanth Parameswaran, “When Will Thailand’s First China Submarine Arrive?” *The Diplomat*, January 31, 2017, <http://thediplomat.com/2017/01/will-thailand-seal-its-china-submarine-deal-this-year/> (accessed May 22, 2019).
33. Panu Wongcha-um, “Thailand Plans Joint Arms Factory with China,” Reuters, November 16, 2017, <https://www.reuters.com/article/us-thailand-defence/thailand-plans-joint-arms-factory-with-china-idUSKBN1DG0U4> (accessed May 22, 2019).
34. Australian Government, Department of Defence, “United States Force Posture Initiatives in Australia,” <http://defence.gov.au/usfpi/> (accessed May 22, 2019).
35. Shawn Snow, “MEU-Sized Rotation of US Marines Starting to Arrive in Australia for Largest Iteration Yet,” *Marine Times*, April 18, 2019, <https://www.marinecorpstimes.com/news/your-marine-corps/2019/04/18/largest-rotation-of-marines-to-arrive-in-australia/> (accessed May 22, 2019).
36. Seth Robson, “Marines Are Bringing More Air Power than Ever to Annual Training in Australia,” *Stars and Stripes*, April 19, 2019, <https://www.stripes.com/news/marines-are-bringing-more-air-power-than-ever-to-annual-training-in-australia-1.577549> (accessed May 22, 2019).

37. Rob Taylor, "Darwin Evolves: U.S. Military Turns Australian Outpost into Asia Launchpad," *The Wall Street Journal*, May 24, 2018, <https://www.wsj.com/articles/darwin-evolves-u-s-military-turns-australian-outpost-into-asia-launchpad-1527154203> (accessed May 22, 2019).
38. Andrew Greene, "Long-Range Heavy Bombers Could Be Based in Australia, US General Reveals," ABC News, updated March 8, 2016, <http://www.abc.net.au/news/2016-03-08/long-range-bombers-could-rotate-through-nt-general-says/7231098> (accessed May 22, 2019); "USAF F-22s Arrive in Australia for Joint Training Exercises with the RAAF," *Australian Aviation*, February 10, 2017, <http://australianaviation.com.au/2017/02/usaf-f-22s-head-to-australia-for-joint-training-exercises-with-the-raaf/> (accessed May 22, 2019); and U.S. Indo-Pacific Command, "U.S. Air Force Airmen, B-52H Bombers Arrive in Australia to Train with Australian Counterparts," March 30, 2018, <https://www.pacom.mil/Media/News/News-Article-View/Article/1481370/us-air-force-airmen-b-52h-bombers-arrive-in-australia-to-train-with-australian/> (accessed May 22, 2019).
39. Gene Blevins, "Canada Formalizes Joint Space Operations with Australia, U.S. and U.K.," *The Globe and Mail*, September 22, 2014, updated May 12, 2018, <https://www.theglobeandmail.com/news/national/canada-formalizes-joint-space-operations-with-australia-us-and-uk/article20735843/> (accessed May 22, 2019).
40. Australian Government, Department of Foreign Affairs and Trade, "AUSMIN—Australia—United States Ministerial Consultations," <https://dfat.gov.au/geo/united-states-of-america/ausmin/Pages/ausmin-australia-united-states-ministerial-consultations.aspx> (accessed May 22, 2019).
41. Stephen Smith, Minister of Defence and Deputy Leader of the House, Ministerial Statement on "Full Knowledge and Concurrence," Commonwealth of Australia, Parliamentary Debates, House of Representatives, June 26, 2013, pp. 7071–7075, [http://parlinfo.aph.gov.au/parlInfo/genpdf/chamber/hansardr/4d60a662-a538-4e48-b2d8-9a97b8276c77/0016/hansard\\_frag.pdf;fileType=application%2Fpdf](http://parlinfo.aph.gov.au/parlInfo/genpdf/chamber/hansardr/4d60a662-a538-4e48-b2d8-9a97b8276c77/0016/hansard_frag.pdf;fileType=application%2Fpdf) (accessed May 22, 2019).
42. U.S. Department of State, "Fact Sheet: U.S. Defense Trade Cooperation Treaties with the United Kingdom and Australia," September 30, 2010, <https://2009-2017.state.gov/r/pa/prs/ps/2010/09/148478.htm> (accessed May 22, 2019).
43. Emma Chanlett-Avery, "Singapore: Background and U.S. Relations," Congressional Research Service *Report for Congress*, July 26, 2013, pp. 3–4, <https://www.fas.org/sgp/crs/row/RS20490.pdf> (accessed May 22, 2019).
44. News release, "Carter, Singapore Defense Minister Sign Enhanced Defense Cooperation Agreement," U.S. Department of Defense, December 7, 2015, <https://www.defense.gov/News/Article/Article/633243/carter-singapore-defense-minister-sign-enhanced-defense-cooperation-agreement/> (accessed May 22, 2019).
45. "Joint Statement by the United States of America and the Republic of Singapore," The White House, October 24, 2017, <https://sg.usembassy.gov/remarks-president-trump-prime-minister-lee-singapore-joint-statements-october-23-2017/> (accessed May 22, 2019).
46. Mike Yeo, "Singapore Moves to Buy Four F-35s, Possibly Eight More Afterward," *Defense News*, March 1, 2019, <https://www.defensenews.com/digital-show-dailies/avalon/2019/03/01/singapore-moves-to-buy-four-f-35s-possibly-eight-more-afterward/> (accessed May 22, 2019).
47. See "Text of the Wellington Declaration," November 5, 2005, <http://usnzcouncil.org/us-nz-issues/wellington-declaration/> (accessed May 22, 2019), and "Text of the Washington Declaration on Defense Cooperation Between the Department of Defense of the United States of America and the Ministry of Defense of New Zealand and the New Zealand Defense Force," June 19, 2012, <http://usnzcouncil.org/us-nz-issues/washington-declaration/> (accessed May 22, 2019).
48. Nick Simeone, "U.S., New Zealand Announce Expanded Defense Cooperation," U.S. Department of Defense, October 28, 2013, <http://archive.defense.gov/news/newsarticle.aspx?id=121016> (accessed May 22, 2019).
49. David B. Larter, "In Port Visit, New Zealand and U.S. Seek to Bolster Military Ties," *Navy Times*, July 22, 2016, <http://www.navytimes.com/story/military/2016/07/22/port-visit-new-zealand-and-us-seek-bolster-military-ties/87450022/> (accessed May 22, 2019).
50. Associated Press, "US Warship to Visit New Zealand as USS Sampson's Arrival Ends Stalemate on Nuclear Vessels," ABC News, October 18, 2016, <http://www.abc.net.au/news/2016-10-18/new-zealand-to-end-stalemate-on-us-warships/7943252> (accessed August 10, 2017).
51. News release, "Enhancing U.S.–New Zealand Co-operation in Antarctica," U.S. Embassy and Consulate in New Zealand, February 15, 2019, <https://nz.usembassy.gov/enhancing-u-s-new-zealand-co-operation-in-antarctica/> (accessed May 22, 2019).
52. Royal New Zealand Navy, "HMNZS TE KAHA–F77," <http://navy.mil.nz/mtf/te-kaha/> (accessed May 22, 2019).
53. Taiwan Relations Act, Public Law 96-8, 96th Cong., January 1, 1979, Section 2, <https://www.ait.org.tw/our-relationship/policy-history/key-u-s-foreign-policy-documents-region/taiwan-relations-act/> (accessed May 28, 2019).
54. *Ibid.*, Section 3.

55. *Ibid.*, Section 2.
56. *Ibid.*, Section 3.
57. Shirley A. Kan, “China/Taiwan: Evolution of the ‘One China’ Policy—Key Statements from Washington, Beijing, and Taipei,” Congressional Research Service *Report for Members and Committees of Congress*, October 10, 2014, pp. 43–44, <https://www.fas.org/sgp/crs/row/RL30341.pdf> (accessed May 22, 2019). Emphasis in original.
58. Aaron Mehta, “New US–Vietnam Agreement Shows Growth, Challenges,” *Defense News*, June 1, 2015, <http://www.defensenews.com/story/defense/policy-budget/budget/2015/06/01/us-vietnam-joint-vision-statement-signed-in-hanoi/28291963/> (accessed May 22, 2019).
59. See “Joint Statement Between the United States of America and the Socialist Republic of Vietnam,” The White House, November 12, 2017, <https://www.whitehouse.gov/briefings-statements/joint-statement-united-states-america-socialist-republic-vietnam/> (accessed May 12, 2019).
60. U.S. Embassy and Consulate in Vietnam, “The United States Transfers Six Metal Shark Patrol Boats to Vietnam,” March 29, 2018, <https://vn.usembassy.gov/pr03292018/> (accessed May 22, 2019).
61. Jon Grevall, “LIMA 2019: Vietnam Looks to Procure Boeing’s ScanEagle UAV,” *Jane’s 360*, March 27, 2019, <https://www.janes.com/article/87483/lima-2019-vietnam-looks-to-procure-boeing-s-scanegale-uav> (accessed May 22, 2019).
62. Admiral Philip S. Davidson, U.S. Navy, Commander, U.S. Indo-Pacific Command, statement “On U.S. Indo-Pacific Command Posture” before the Committee on Armed Services, U.S. Senate, February 12, 2019, p. 33, [https://www.armed-services.senate.gov/imo/media/doc/Davidson\\_02-12-19.pdf](https://www.armed-services.senate.gov/imo/media/doc/Davidson_02-12-19.pdf) (accessed May 22, 2019).
63. “Joint Statement: Between the United States of America and the Socialist Republic of Vietnam,” Indo-Pacific Command, May 23, 2016, <http://www.pacom.mil/Media/News/News-Article-View/Article/779376/joint-statement-between-the-united-states-of-america-and-the-socialist-republic/> (accessed May 22, 2019).
64. Le Hong Hiep, “Why Did Vietnam Cancel Its Defence Engagements with the US?” Yusof Ishak Institute, December 11, 2018, <https://www.iseas.edu.sg/medias/commentaries/item/8691-why-did-vietnam-cancel-its-defence-engagements-with-the-us-by-le-hong-hiep> (accessed May 22, 2019).
65. U.S. Embassy and Consulate in Vietnam, “The United States Transfers Six Metal Shark Patrol Boats to Vietnam.”
66. Jon Grevall, “Vietnam Takes Delivery of More US Patrol Boats,” *Jane’s 360*, April 1, 2019, <https://www.janes.com/article/87594/vietnam-takes-delivery-of-more-us-patrol-boats> (accessed May 22, 2019).
67. [Name redacted], Specialist in Asian Affairs, “Malaysia: Background and U.S. Relations,” Congressional Research Service *Report for Members and Committees of Congress*, May 18, 2017, pp. 9–10 and 17, [https://www.everycrsreport.com/files/20170518\\_R43505\\_025187722d007dc55f7f86a9a6ea62e4985d07b3.pdf](https://www.everycrsreport.com/files/20170518_R43505_025187722d007dc55f7f86a9a6ea62e4985d07b3.pdf) (accessed May 28, 2019).
68. “Joint Statement for Enhancing the Comprehensive Partnership Between the United States of America and Malaysia,” The White House, September 13, 2017, <https://www.whitehouse.gov/briefings-statements/joint-statement-enhancing-comprehensive-partnership-united-states-america-malaysia/> (accessed May 22, 2019).
69. Prashanth Parameswaran, “A First: Malaysia to Deploy Warship for RIMPAC 2018,” *The Diplomat*, April 20, 2018, <https://thediplomat.com/2018/04/a-first-malaysia-to-deploy-warship-for-rimpac-2018/> (accessed May 22, 2019).
70. Admiral Harry B. Harris Jr., U.S. Navy, Commander, U.S. Pacific Command, statement “On U.S. Pacific Command Posture” before the Committee on Armed Services, U.S. House of Representatives, February 14, 2018, pp. 43–44, <https://docs.house.gov/meetings/AS/AS00/20180214/106847/HRG-115-AS00-Wstate-HarrisJrH-20180214.pdf> (accessed May 22, 2019), and “Viper Ready to Strike,” *Janes 360*, <https://www.janes.com/article/84473/viper-ready-to-strike-id18d3> (accessed May 22, 2019).
71. Tristin Barth, “USS Rushmore Arrives in Jakarta, Kicks Off 24th CARAT Indonesia Exercise,” America’s Navy, Pacific Fleet Surface Ships, August 10, 2018, <https://www.public.navy.mil/surfor/lcd47/Pages/US-Rushmore-arrives-in-Jakarta,-kicks-off-24th-CARAT-Indonesia-exercise.aspx> (accessed May 22, 2019).
72. Dzirhan Mahadzir, “Pentagon Asia Policy Chief Talks South East Asia Military Cooperation, U.S. South China Sea Operations,” USNI News, updated August 16, 2018. <https://news.usni.org/2018/08/15/pentagon-asia-policy-chief-talks-south-east-asia-military-cooperation-u-s-south-china-sea-operations> (accessed May 23, 2019).
73. Gregory B. Poling, “Congress Fires a Warning Shot to China with Defense Budget,” *The Hill*, August 6, 2018, <https://thehill.com/opinion/national-security/400527-congress-fires-a-warning-shot-to-china-with-defense-budget> (accessed May 23, 2019).
74. U.S. Department of Defense, *Enhancing Security and Stability in Afghanistan*, December 2016, p. 33, <https://dod.defense.gov/Portals/1/Documents/pubs/Afghanistan-1225-Report-December-2016.pdf> (accessed May 22, 2019).

75. North Atlantic Treaty Organization, Resolute Support Mission, “Resolute Support Mission (RSM): Key Facts and Figures,” February 2019, [https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/pdf\\_2019\\_02/20190215\\_2019-02-RSM-Placemat.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2019_02/20190215_2019-02-RSM-Placemat.pdf) (accessed May 23, 2019).
76. “Remarks by President [Donald] Trump on the Strategy in Afghanistan and South Asia,” Fort Myer, Arlington, Virginia, August 21, 2017, <https://www.whitehouse.gov/the-press-office/2017/08/21/remarks-president-trump-strategy-afghanistan-and-south-asia> (accessed May 22, 2019).
77. Table, “Direct Overt U.S. Aid Appropriations for and Military Reimbursements to Pakistan, FY2002–FY2020,” Prepared by the Congressional Research Service for distribution to multiple congressional offices, March 12, 2019, <https://fas.org/sgp/crs/row/pakaid.pdf> (accessed May 23, 2019).
78. Rosie Perper, “Nikki Haley Accuses Pakistan of Playing ‘Double Game’ with the US, Vows to Withhold \$255 Million in Aid,” *Business Insider*, January 2, 2018, <https://www.businessinsider.com/us-to-withhold-255-million-in-aid-to-pakistan-2018-1> (accessed May 23, 2019).
79. Phil Stewart and Idrees Ali, “Exclusive: Pentagon Cancels Aid to Pakistan over Record on Militants,” Reuters, September 1, 2018, <https://www.reuters.com/article/us-usa-pakistan-military-exclusive/exclusive-pentagon-cancels-aid-to-pakistan-over-record-on-militants-idUSKCNILH3TA> (accessed May 23, 2019).
80. Vivek Raghuvanshi, “Trump Administration Reaffirms India as Major Defense Partner,” *Defense News*, April 19, 2017, <http://www.defensenews.com/articles/trump-administration-reaffirms-india-as-major-defense-partner> (accessed May 23, 2019).
81. International Institute for Strategic Studies, *The Military Balance 2018: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2018), pp. 160–165 and 270–274.
82. *Ibid.*, pp. 108–209 and 278–279.
83. Marie Yamaguchi, “Japan to Buy Aegis Ashore Missile Defense Systems,” *Defense News*, December 19, 2017, <https://www.defensenews.com/land/2017/12/19/japan-to-buy-aegis-ashore-missile-defense-systems/> (accessed May 23, 2019).
84. Australian Government, Department of Defence, “Global Operations,” <http://www.defence.gov.au/Operations/> (accessed May 23, 2019).
85. Stockholm International Peace Research Institute, “Military Expenditure by Country, in Constant (2016) US\$ m., 2009–2017,” 2018, [https://www.sipri.org/sites/default/files/1\\_Data%20for%20all%20countries%20from%201988%E2%80%932017%20in%20constant%20%282016%29%20USD.pdf](https://www.sipri.org/sites/default/files/1_Data%20for%20all%20countries%20from%201988%E2%80%932017%20in%20constant%20%282016%29%20USD.pdf) (accessed May 23, 2019).
86. Jeremy Koh, “Made for Singapore: First of Four Custom-Built RSN Submarines Launched in Germany,” CNA, updated February 19, 2019, <https://www.channelnewsasia.com/news/custom-submarine-for-singapore-navy-launched-germany-11254318> (accessed May 23, 2019).
87. International Institute for Strategic Studies, *The Military Balance 2018*, pp. 298–299.
88. Stockholm International Peace Research Institute, “Military Expenditure (% of GDP),” <https://data.worldbank.org/indicator/MS.MIL.XPND.GD.ZS?view=chart> (accessed May 23, 2019).
89. News release, “P188.2 Billion Allocated for Defense Department in 2019,” Philippine Information Agency, February 11, 2019, <https://pia.gov.ph/press-releases/releases/1018345> (accessed May 23, 2019).
90. Jun Hyun-Suk, “Philippines President Visits Korea,” *The Chosunilbo*, June 4, 2018, [http://english.chosun.com/site/data/html\\_dir/2018/06/04/2018060401451.html](http://english.chosun.com/site/data/html_dir/2018/06/04/2018060401451.html) (accessed May 23, 2019).
91. Government of France, Directorate General for International Relations and Strategy, *France and Security in the Indo-Pacific*, <https://www.defense.gouv.fr/content/download/532754/9176250/file/France%20and%20Security%20in%20the%20Indo-Pacific%20-%202018.pdf> (accessed May 23, 2019).
92. U.S. Indo–Pacific Command, “About USINDOPACOM,” <http://www.pacom.mil/About-USINDOPACOM/> (accessed May 23, 2019).
93. U.S. Department of Defense, *The Department of Defense Indo-Pacific Strategy Report: Preparedness, Partnerships, and Promoting a Networked Region*, p. 1.
94. United States Army, U.S. Army Pacific, “About Us,” <https://www.usarpac.army.mil/about.asp> (accessed May 23, 2019).
95. International Institute for Strategic Studies, *The Military Balance 2018*, pp. 298–299.
96. U.S. Marine Corps, “U.S. Marine Corps Forces, Pacific (MARFORPAC),” <https://www.globalsecurity.org/military/agency/usmc/marforpac.htm> (accessed May 23, 2019).
97. Wesley Morgan, “Afghanistan Order of Battle: Coalition Combat and Advisory Forces in Afghanistan,” Institute for the Study of War, January 1, 2017, p. 1, <http://www.understandingwar.org/sites/default/files/ORBAT%20January%202017.pdf> (accessed May 23, 2019).

98. U.S. Central Command, "Resolute Support," <http://www.centcom.mil/operations-and-exercises/resolute-support/> (accessed May 23, 2019).
99. These steaming times were calculated using Marine Vessel Traffic, "Sea Distance Calculator," <http://www.marinevesseltraffic.com/2013/07/distance-calculator.html> (accessed May 23, 2019).
100. Air Force Technology, "B-2 Spirit Stealth Bomber," <http://www.airforce-technology.com/projects/b2/> (accessed May 23, 2019).
101. News release, "Sixth United States–Philippines Bilateral Strategic Dialogue Joint Statement," U.S. Department of State, March 18, 2016, <https://2009-2017.state.gov/r/pa/prs/ps/2016/03/254833.htm> (accessed May 23, 2019).
102. News release, "U.S., Philippines Cut the Ribbon on Enhanced Defense Cooperation Agreement Project," U.S. Embassy in the Philippines, January 30, 2019, <https://www.pacom.mil/Media/News/News-Article-View/Article/1744271/us-philippines-cut-the-ribbon-on-enhanced-defense-cooperation-agreement-project/> (accessed May 23, 2019).
103. Anthony Small, "US, Philippine AF Concludes [sic] Bilateral Air Contingency Exchange," U.S. Air Force, February 6, 2019, <https://www.af.mil/News/Article-Display/Article/1749908/us-philippine-af-concludes-bilateral-air-contingency-exchange/> (accessed May 7, 2019).
104. Australian Government, Department of Defence, "United States Force Posture Initiatives in Australia."
105. See, for example, Wyatt Olson, "Deal to Bring More US Assets to Australia," *Stars and Stripes*, June 21, 2014, <http://www.military.com/daily-news/2014/06/21/deal-likely-to-bring-more-us-military-assets-to-australia.html> (accessed August 23, 2016).
106. Smith, Ministerial Statement on "Full Knowledge and Concurrence."
107. For an example of a very accessible database, see World Bank, "Logistics Performance Index: Quality of Trade and Transport-Related Infrastructure (1=Low to 5=High)," <http://data.worldbank.org/indicator/LP.LPI.INFR.XQ> (accessed May 23, 2019).





# Conclusion: Scoring the Global Operating Environment

The United States is a global power with global security interests, and threats to those interests can emerge from any region. Consequently, the U.S. military must be ready to operate in any region when called upon to do so and must account for the range of conditions that it might encounter when planning for potential military operations. This informs its decisions about the type and

amount of equipment it purchases (especially to transport and sustain the force); the location or locations from which it might operate; and how easily it can or cannot project and sustain combat power when engaged with the enemy.

Aggregating the three regional scores provides a Global Operating Environment score of **FAVORABLE** in the *2020 Index*.

## Global Operating Environment

	VERY POOR	UNFAVORABLE	MODERATE	FAVORABLE	EXCELLENT
Europe				✓	
Middle East			✓		
Asia				✓	
<b>OVERALL</b>				✓	

Scoring of the Global Security Environment remained “favorable” for the *2020 Index of U.S. Military Strength*, although scores increased for Asia and the Middle East in the political stability subcategory.

The Middle East Operating Environment remained “moderate” in the *2020 Index*. This shift reflects the continued decline of ISIS, the

Assad regime’s consolidation of control over much of Syria, the ebbing flow of refugees out of Syria, and a common regional commitment to countering the destabilizing influence of Iran and its proxies.

The Europe Operating Environment did not see categorical changes in any of its scores and remains “favorable.” The migrant crisis,

## Global Operating Environment: Summary



economic sluggishness, and political fragmentation increase the potential for instability, but the region remains generally stable and friendly to U.S. interests.

Overall scoring for the Asia Operating Environment remained “favorable” from the *2019 Index* to the *2020 Index*. The alliances, political stability, U.S. military posture, and infrastructure scores returned to “favorable” following the conclusion of South Korea’s presidential election.

# Threats to U.S. Vital Interests



# Assessing Threats to U.S. Vital Interests

The United States is a global power with global interests. Scaling its military power to threats requires careful judgments with regard to the importance and priority of those interests, whether the use of force is the most appropriate and effective way to address the threats to those interests, and how much and what types of force are needed to defeat such threats.

This *Index* focuses on three fundamental, vital national interests:

- Defense of the homeland;
- Successful conclusion of a major war that has the potential to destabilize a region of critical interest to the U.S.; and
- Preservation of freedom of movement within the global commons: the sea, air, and outer-space domains through which the nations of the world conduct their business.

The geographical focus of the threats in these areas is further divided into three broad regions: Asia, Europe, and the Middle East.

This is not to say that these are America's only interests. Among many others, the U.S. has an interest in the growth of economic freedom in trade and investment, the observance of internationally recognized human rights, and the alleviation of human suffering beyond our borders. None of these interests, however, can be addressed principally and effectively by the use of military force; nor would threats to these interests result in material damage to the

foregoing vital national interests. Thus, these additional American interests, however important they may be, are not used in this assessment of the adequacy of current U.S. military power.

In previous editions of this *Index*, we referenced two public sources as a mechanism with which to check our work against that of other recognized professional organizations in the field of threat analysis: *The Military Balance*, published annually by the London-based International Institute for Strategic Studies,<sup>1</sup> and the annual *Worldwide Threat Assessment of the US Intelligence Community* (WWTA).<sup>2</sup> The latter served as a reference point produced by the U.S. government against which each threat assessment in this *Index* was compared. We noted any differences between assessments in this *Index* and the work of the two primary references in summary comments.

The juxtaposition of our detailed, reviewed analysis against both *The Military Balance* and the WWTA revealed two stark limitations in these external sources.

- *The Military Balance* is an excellent and widely consulted source, but it is only a count of military hardware and lacks context in terms of equipment capability, maintenance and readiness, training, manpower, integration of services, doctrine, or the behavior of competitors that threaten the national interests of the U.S. as defined in this *Index*.
- The WWTA omits many threats, and its analysis of those that it does address is limited. Moreover, it does not reference

## Threat Categories

Behavior	HOSTILE	AGGRESSIVE	TESTING	ASSERTIVE	BENIGN
Capability	FORMIDABLE	GATHERING	CAPABLE	ASPIRATIONAL	MARGINAL

underlying strategic dynamics that are key to the evaluation of threats and that may be more predictive of future threats than is a simple extrapolation of current events.

With respect to the WWTA, its limitations are most likely caused by the withholding from public view of the intelligence community’s very sensitive assessments, which are derived from classified sources and/or result from analysis of unclassified, publicly available documents, with the resulting synthesized insights becoming classified by virtue of what they reveal about U.S. determinations and concerns. Given the need to avoid compromising sources, methods of collection, and national security findings, such a policy is understandable, but it also causes the WWTA’s threat assessments to be of limited value to policymakers, the public, and analysts working outside of the government. We have therefore decided to stop using the WWTA as a reference and trust that the reader will double-check our conclusions with the various sources cited in the following pages as well as other publicly available reporting on challenges to core U.S. security interests discussed in this section.

Measuring or categorizing a threat is problematic because there is no absolute reference that can be used in assigning a quantitative score. Two fundamental aspects of threats, however, are germane to this *Index*: the threatening entity’s desire or intent to achieve its objective and its physical ability to do so. Physical ability is the easier of the two to assess; intent is quite difficult. A useful surrogate for intent is observed behavior, because this is where intent becomes manifest through action. Thus, a provocative, belligerent pattern of behavior that seriously threatens U.S. vital interests

would be very worrisome. Similarly, a comprehensive ability to accomplish objectives even in the face of U.S. military power would cause serious concern for U.S. policymakers, while weak or very limited abilities would lessen U.S. concerns even if an entity behaved provocatively vis-à-vis U.S. interests.

Each categorization used in the *Index* conveys a word picture of how troubling a threat’s behavior and set of capabilities have been during the assessed year. The five ascending categories for observed behavior are:

- Benign,
- Assertive,
- Testing,
- Aggressive, and
- Hostile.

The five ascending categories for physical capability are:

- Marginal,
- Aspirational,
- Capable,
- Gathering, and
- Formidable.

These characterizations—behavior and capability—form two halves of an overall assessment of the threats to U.S. vital interests.

In another significant departure from previous editions, we have changed the

organizational structure from a U.S. interests-based approach, by region, to one that focuses squarely on threat actors. In our previous approach, the reader would see China assessed in each section per U.S. interest: threats to the U.S. homeland, threats to regional stability, and threats to free movement in the commons. This seemed confusing, so in this edition, the reader will see China addressed

once, with discussion of how it challenges U.S. interests. The same approach is used to discuss Russia, Iran, North Korea, and relevant terrorist groups.

We always hold open the potential to add or delete from this list of threat actors; inclusion of any state or non-state entity is based solely on our assessment of its ability to pose a meaningful challenge to a critical U.S. interest.

## Endnotes

1. International Institute for Strategic Studies, *The Military Balance 2014: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2014); *The Military Balance 2015: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2015); *The Military Balance 2016: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2016); *The Military Balance 2017: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2017); and *The Military Balance 2018: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2018).
2. James R. Clapper, Director of National Intelligence, "Worldwide Threat Assessment of the US Intelligence Community," statement before the Select Committee on Intelligence, U.S. Senate, January 29, 2014, [http://www.dni.gov/files/documents/Intelligence%20Reports/2014%20WWTA%20%20SFR\\_SSCI\\_29\\_Jan.pdf](http://www.dni.gov/files/documents/Intelligence%20Reports/2014%20WWTA%20%20SFR_SSCI_29_Jan.pdf); James R. Clapper, Director of National Intelligence, "Worldwide Threat Assessment of the US Intelligence Community," statement before the Committee on Armed Services, U.S. Senate, February 26, 2015, [http://www.armed-services.senate.gov/imo/media/doc/Clapper\\_02-26-15.pdf](http://www.armed-services.senate.gov/imo/media/doc/Clapper_02-26-15.pdf); James R. Clapper, Director of National Intelligence, "Worldwide Threat Assessment of the US Intelligence Community," statement before the Committee on Armed Services, U.S. Senate, February 9, 2016, [https://www.armed-services.senate.gov/imo/media/doc/Clapper\\_02-09-16.pdf](https://www.armed-services.senate.gov/imo/media/doc/Clapper_02-09-16.pdf); Daniel R. Coats, Director of National Intelligence, "Worldwide Threat Assessment of the US Intelligence Community," statement before the Select Committee on Intelligence, U.S. Senate, May 11, 2017, <https://www.dni.gov/files/documents/Newsroom/Testimonies/SSCI%20Unclassified%20SFR%20-%20Final.pdf>; and Daniel R. Coats, Director of National Intelligence, "Worldwide Threat Assessment of the US Intelligence Community," statement before the Select Committee on Intelligence, U.S. Senate, February 13, 2018, <https://www.dni.gov/files/documents/Newsroom/Testimonies/2018-ATA---Unclassified-SSCI.pdf>.





# Russia

Russia remains an acute and formidable threat both to the United States and to U.S. interests in Europe. From the Arctic to the Baltics, Ukraine, and the South Caucasus, and increasingly in the Mediterranean, Russia continues to foment instability in Europe. Despite economic problems, Russia continues to prioritize the rebuilding of its military and funding for its military operations abroad. Russia's military and political antagonism toward the United States continues unabated, and its efforts to undermine U.S. institutions and the NATO alliance are serious and troubling. Russia uses its energy position in Europe along with espionage, cyberattacks, and information warfare to exploit vulnerabilities and seeks to drive wedges into the transatlantic alliance and undermine people's faith in government and societal institutions.

Overall, Russia has significant conventional and nuclear capabilities and remains the principal threat to European security. Its aggressive stance in a number of theaters, including the Balkans, Georgia, Syria, and Ukraine, continues both to encourage destabilization and to threaten U.S. interests.

**Russian Military Capabilities.** According to the International Institute for Strategic Studies (IISS), among the key weapons in Russia's inventory are 334 intercontinental ballistic missiles; 2,750 main battle tanks; and more than 5,140 armored infantry fighting vehicles, more than 6,100 armored personnel carriers, and more than 4,342 pieces of artillery. The navy has one aircraft carrier; 58 submarines (including 10 ballistic missile submarines); four cruisers; 16 destroyers; 14 frigates; and 105

patrol and coastal combatants. The air force has 1,223 combat-capable aircraft. The IISS counts 280,000 members of the army. Russia also has a total reserve force of 2,000,000 for all armed forces.<sup>1</sup> Russian deep-sea research vessels include converted ballistic missile submarines, which hold smaller auxiliary submarines that can operate on the ocean floor.<sup>2</sup>

To avoid political blowback from military deaths abroad, Russia has increasingly deployed paid private volunteer troops trained at Special Forces bases and often under the command of Russian Special Forces. Russia has used such volunteers in Libya, Syria, and Ukraine because “[t]hey not only provide the Kremlin with plausible political deniability but also apparently take casualties the Russian authorities do not report.”<sup>3</sup> In February 2018, for example, at Deir al-Zour in eastern Syria, 500 pro-Assad forces and Russian mercenaries armed with Russian tanks, artillery, and mortars attacked U.S.-supported Kurdish forces.<sup>4</sup> Approximately 30 U.S. Rangers and Delta Force special operators were also at the base.<sup>5</sup> U.S. airstrikes helped to repulse the attack, and according to some estimates, 300 Russian mercenaries were either killed or wounded.<sup>6</sup>

In January 2019, reports surfaced that 400 Russian mercenaries from the Wagner Group were in Venezuela to bolster the regime of Nicolas Maduro.<sup>7</sup> Russian propaganda in Venezuela has supported the regime and stoked fears of American imperialism. According to one report, “Kremlin-backed media in Latin America is pounding hard on the narrative that Washington's recognition of Juan Guaidó as Venezuela's legitimate president is part of

a centuries-old pattern of meddling by the United States in the region.”<sup>8</sup> As the crisis metastasized and protests against the Maduro regime grew, Russia began to deploy Russian troops and supplies to bolster Maduro’s security forces.<sup>9</sup> In December, Russia temporarily deployed two TU-160 nuclear-capable bombers to Caracas.<sup>10</sup> Russia exports billions in arms to Venezuela (and has loaned the regime money to purchase Russian arms) along with \$70 million–\$80 million yearly in nonmilitary goods.<sup>11</sup>

In July 2016, Russian President Vladimir Putin signed a law creating a National Guard with a total strength (both civilian and military) of 340,000, controlled directly by him.<sup>12</sup> He created his National Guard, which is responsible for “enforcing emergency-situation regimes, combating terrorism, defending Russian territory, and protecting state facilities and assets,” by amalgamating “interior troops and various law-enforcement agencies.”<sup>13</sup> Although Putin could issue a directive to deploy the force abroad,<sup>14</sup> it is more likely to be used to stifle domestic dissent.

The World Bank projects that the Russian economy will grow by a tepid 1.4 percent in 2019.<sup>15</sup> In the first quarter of 2019, real disposable incomes in Russia declined by 2.3 percent.<sup>16</sup> Such low forecasts and economic results could imply that Russia will have difficulty funding military affairs, but economic problems at home also can incentivize regimes to pursue military adventures abroad to distract the public and generate positive news for the government. If an autocratic leader relies on military power to maintain political control, there is ample reason to maintain spending on the military in spite of glum economic news.

Russia spent \$61.4 billion on its military in 2018, which is 3.5 percent less than it spent in 2017.<sup>17</sup> One analyst, however, cautions that:

In reality Russia’s effective military expenditure, based on purchasing power parity (Moscow buys from Russian defense manufacturers in rubles), is more in the range of \$150–180 billion per year, with a much higher percentage dedicated to

procurement, research and development than Western defense budgets.... There is well over 1 trillion rubles of military expenditure in Russia outside of the regular defense budget.<sup>18</sup>

Much of Russia’s military expenditures go toward modernization of its armed forces. In January 2018, Chairman of the Joint Chiefs of Staff and U.S. Marine Corps General Joseph Dunford noted that “[t]here is not a single aspect of the Russian armed forces that has not received some degree of modernization over the past decade.”<sup>19</sup> In 2019, according to the Russian Ministry of Defense, Russia will spend \$21.5 billion on procurement.<sup>20</sup> Taking into account total military expenditure, Russia spent 4 percent of GDP on defense in 2018.<sup>21</sup>

In early 2018, Russia introduced the new State Armament Program 2018–2027, a \$306 billion investment in new equipment and force modernization. However, according to the Royal Institute of International Affairs, “as inflation has eroded the value of the rouble since 2011, the new programme is less ambitious than its predecessor in real terms.”<sup>22</sup>

Russia’s nuclear capabilities have been prioritized for modernization, and 82 percent of its nuclear forces have been modernized.<sup>23</sup> Russia plans to deploy the RS-28 (Satan 2) ICBM by 2021 as a replacement for the RS-36, which is being phased out in the 2020s.<sup>24</sup> The missile, which can carry up to 15 warheads, underwent flight development tests from April–June 2019.<sup>25</sup>

The armed forces also continue to undergo process modernization, which was begun by Defense Minister Anatoly Serdyukov in 2008.<sup>26</sup> Partially because of this modernization, former U.S. Deputy Assistant Secretary of Defense for Strategy and Force Development Elbridge Colby stated in January 2018 that the U.S. military advantage over Russia is eroding.<sup>27</sup> Approximately 46 percent of Russian land forces’ equipment has been modernized.

Russia reportedly will begin state trials for its T-14 Armata main battle tank in 2019,<sup>28</sup> although the Armata’s cost might prove

prohibitive, and “procurement in quantity will focus on modernized T-72, T-80, and T-90 tanks.”<sup>29</sup> Russia’s fifth-generation Su-27 fighter fell short of expectations, particularly with regard to stealth capabilities. In May 2018, the government cancelled mass production of the Su-27 because of its high costs and limited capability advantages over upgraded fourth-generation fighters.<sup>30</sup>

In October 2018, Russia’s sole aircraft carrier, the *Admiral Kuznetsov*, was severely damaged when a dry-dock sank and a crane fell, puncturing a hole in the deck and hull.<sup>31</sup> The carrier is not likely to be salvaged. In May 2019, reports surfaced that Russia is seeking to build a new nuclear-powered aircraft carrier, beginning in 2023 for delivery in the late 2030s, but the procurement’s financial and technological feasibility remains questionable.<sup>32</sup>

In March 2017, Russia announced life-extension programs for its *Akula*-class and *Oscar II*-class nuclear-powered submarines, which operate in both the Northern and Pacific Fleets.<sup>33</sup> Russia is also reportedly deploying Kalibr cruise missiles to submarines and surface vessels operating in the Western Atlantic.<sup>34</sup>

Following years of delays, the *Admiral Gorshkov* stealth guided missile frigate was commissioned in July 2018. The second *Admiral Gorshkov*-class frigate, the *Admiral Kasatonov*, began sea trials in April 2019; however, according to some analysts, tight budgets and the inability to procure parts from Ukrainian industry (importantly, gas turbine engines) make it difficult for Russia to build the two additional *Admiral Gorshkov*-class frigates as planned.<sup>35</sup> On April 23, 2019, keel-laying ceremonies took place for the fifth and sixth *Admiral Gorshkov*-class frigates.<sup>36</sup> Russia plans to procure eight *Lider*-class guided missile destroyers for its Northern and Pacific Fleets, but procurement has faced consistent delay, and construction will not begin until 2025 at the earliest.<sup>37</sup>

Russia recently sold three *Admiral Grigoryevich*-class frigates to India. The ships had been intended for the Black Sea Fleet, but Russia found itself unable to produce a replacement engine following Ukraine sanctions.

Similar problems have befallen the long-delayed *Admiral Gorshkov*-class procurements. Of the planned 14 frigates, Russia has engines for only two.<sup>38</sup>

Russia’s naval modernization continues to prioritize submarines. According to the IISS, “Submarine building will focus on completing the series of *Borey-A* ballistic-missile boats armed with *Bulava* missiles and Project 08851 *Yasen-M* multi-role submarines, though from the early 2020s construction is expected to begin on the first *Khaski*-class successor.”<sup>39</sup> The *Khaski*-class submarines are planned fifth-generation stealth nuclear-powered submarines. They are slated to begin construction in 2023 and to be armed with Zircon hypersonic missiles, which have a reported speed of from Mach 5 to Mach 6.<sup>40</sup> According to a Russian vice admiral, these submarines will be two times quieter than current subs.<sup>41</sup>

Russia also continues to upgrade its diesel electric *Kilo*-class subs.<sup>42</sup> Because of construction delays, the first of six planned Project 636.3 *Kilo*-class diesel-electric attack submarines will not be delivered until the end of 2020 or in 2021, with all six planned for delivery by 2025.<sup>43</sup> According to one analyst, the submarines’ improvement in noise reduction has led them to be nicknamed “Black Holes,” but “the submarine class lacks a functioning air-independent propulsion system, which reduced the boats’ overall stealth capabilities.”<sup>44</sup>

Transport remains a nagging problem, and Russia’s Defense Minister has stressed the paucity of transport vessels. Russia does not have enough air transport, for example, to air-drop its large paratrooper force at one time.<sup>45</sup> In 2017, Russia reportedly needed to purchase civilian cargo vessels and use icebreakers to transport troops and equipment to Syria at the beginning of major operations in support of the Assad regime.<sup>46</sup>

Although budget shortfalls have hampered modernization efforts overall, analysts believe that Russia will continue to focus on developing high-end systems such as the S-500 surface-to-air missile system.<sup>47</sup> In May 2018, it was reported that Russian testing of the S-500

system struck a target 299 miles away. If true, this is the longest surface-to-air missile test ever conducted, and the S-500's range could have significant implications for European security when the missile becomes operational.<sup>48</sup>

Russia's counterspace and countersatellite capabilities are formidable. A Defense Intelligence Agency report released in February 2019 summarized Russian capabilities:

[O]ver the last two decades, Moscow has been developing a suite of counterspace weapons capabilities, including EW [electronic warfare] to deny, degrade, and disrupt communications and navigation and DEW [directed energy weapons] to deny the use of space-based imagery. Russia is probably also building a ground-based missile capable of destroying satellites in orbit.<sup>49</sup>

In 2018 and 2019, Russia continued tests on an anti-satellite weapon built to target imagery and communications satellites in low Earth orbit.<sup>50</sup> According to the IISS, modernization priorities for Russia's space force include "restor[ing] Russia's early-warning satellite network, with the re-equipping of the ground-based warning system with *Voronezh* radars nearing completion."<sup>51</sup>

**Russian Exercises.** Russian military exercises, especially snap exercises, are a source of serious concern because they have masked real military operations in the past. Their purpose is twofold: to project strength and to improve command and control. According to Army General Curtis M. Scaparrotti, former Commander, U.S. European Command, "their exercise program demonstrates increasingly sophisticated command and control and integration across multiple warfare areas."<sup>52</sup>

Exercises in the Baltic Sea in April 2018, a day after the leaders of the three Baltic nations met with President Donald Trump in Washington, were meant as a message. Russia stated twice in April that it planned to conduct three days of live-fire exercises in the Exclusive Economic Zone of Latvia, which forced

a rerouting of commercial aviation as Latvia closed some of its airspace.<sup>53</sup> Sweden issued warnings to commercial aviation and sea traffic.<sup>54</sup> It turned out that Russia did not actually fire any live missiles, and the Latvian Ministry of Defense described the event as "a show of force, nothing else."<sup>55</sup> The exercises took place near the Karlskrona Naval Base, the Swedish navy's largest base.<sup>56</sup>

Russia's snap exercises are conducted with little or no warning and often involve thousands of troops and pieces of equipment.<sup>57</sup> In February 2017, for example, Russia ordered snap exercises involving 45,000 troops, 150 aircraft, and 200 anti-aircraft pieces.<sup>58</sup> The reintroduction of snap exercises has "significantly improved the Russian Armed Forces' warfighting and power-projection capabilities," according to one account. "These, in turn, support and enable Russia's strategic destabilisation campaign against the West, with military force always casting a shadow of intimidation over Russia's sub-kinetic aggression."<sup>59</sup>

Snap exercises have been used for military campaigns as well. According to General Scaparrotti, "the annexation of Crimea took place in connection with a snap exercise by Russia."<sup>60</sup>

Snap exercises also provide Russian leadership with a hedge against unpreparedness or corruption. "In addition to affording combat-training benefits," the IISS reports, "snap inspections appear to be of increasing importance as a measure against corruption or deception. As a result of a snap inspection in the Baltic Fleet in June 2016, the fleet's commander, chief of staff and dozens of high-ranking officers were dismissed."<sup>61</sup>

Russia conducted its VOSTOK ("East") strategic exercises, held primarily in the Eastern Military District, mainly in August and September of 2018 and purportedly with 300,000 troops, 1,000 aircraft, and 900 tanks taking part.<sup>62</sup> Russia's Defense Minister claimed that the exercises were the largest to take place in Russia since 1981; however, some analysis suggests that the actual number of participating combat troops was in the range 75,000–100,000.<sup>63</sup> One analyst described the extent of the exercise:

[T]he breadth of the exercise was impressive. It uniquely involved several major military districts, as troops from the Central Military District and the Northern Fleet confronted the Eastern Military District and the Pacific Fleet. After establishing communication links and organizing forces, live firing between September 13–17 [sic] included air strikes, air defence operations, ground manoeuvres and raids, sea assault and landings, coastal defence, and electronic warfare.<sup>64</sup>

Chinese and Mongolian forces also took part, with China sending 3,200 soldiers from the People's Liberation Army along with 900 tanks and 30 fixed-wing aircraft.<sup>65</sup> Chinese participation was a significant change from past iterations of VOSTOK. However, Chinese forces were likely restricted largely to the Tsugol training ground, and an uninvited Chinese intelligence ship shadowed the Russian Navy's sea exercises during the exercise.<sup>66</sup>

### Threats to the Homeland

Russia is the only state adversary in the region that possesses the capability to threaten the U.S. homeland with both conventional and non-conventional means. Although there is no indication that Russia plans to use its capabilities against the United States absent a broader conflict involving America's NATO allies, the plausible potential for such a scenario serves to sustain the strategic importance of those capabilities.

Russia's National Security Strategy describes NATO as a threat to the national security of the Russian Federation:

The buildup of the military potential of the North Atlantic Treaty Organization (NATO) and the endowment of it with global functions pursued in violation of the norms of international law, the galvanization of the bloc countries' military activity, the further expansion of the alliance, and the location of its military infrastructure closer to Russian borders are creating a threat to national security.<sup>67</sup>

The same document also clearly states that Russia will use every means at its disposal to achieve its strategic goals: "Interrelated political, military, military-technical, diplomatic, economic, informational, and other measures are being developed and implemented in order to ensure strategic deterrence and the prevention of armed conflicts."<sup>68</sup> A new version of Russia's military doctrine signed by Putin in December 2014 similarly emphasizes the threat allegedly posed by NATO and global strike systems.<sup>69</sup>

**Russian Strategic Nuclear Threat.** Russia possesses the largest arsenal of nuclear weapons among the nuclear powers (when short-range nuclear weapons are included). It is one of the few nations with the capability to destroy many targets in the U.S. homeland and in U.S.-allied nations and to threaten and prevent free access to the commons by other nations.

Russia has both intercontinental-range and short-range ballistic missiles and a varied arsenal of nuclear weapons that can be delivered by sea, land, and air. It also is investing significant resources in modernizing its arsenal and maintaining the skills of its workforce, and modernization of the nuclear triad will remain a top priority under the new State Armaments Program.<sup>70</sup> However, an aging nuclear workforce could impede this modernization: "[A]lthough Russia's strategic-defence enterprises appear to have preserved some of their expertise, problems remain, for example, in transferring the necessary skill sets and experience to the younger generation of engineers."<sup>71</sup>

Russia currently relies on its nuclear arsenal to ensure its invincibility against any enemy, intimidate European powers, and deter counters to its predatory behavior in its "near abroad," primarily in Ukraine but also concerning the Baltic States.<sup>72</sup> This arsenal serves as a protective umbrella under which Russia can modernize its conventional forces at a deliberate pace. But while this nuclear deterrent protects it from a large-scale attack, Russia also needs a modern and flexible military to fight local wars such as those against

Georgia in 2008 and the ongoing war against Ukraine that began in 2014. Under Russian military doctrine, the use of nuclear weapons in conventional local and regional wars is seen as de-escalatory because it would cause an enemy to concede defeat. In May 2017, for example, a Russian parliamentarian threatened that nuclear weapons might be used if the U.S. or NATO were to move to retake Crimea or defend eastern Ukraine.<sup>73</sup>

General Scaparrotti discussed the risks presented by Russia's possible use of tactical nuclear weapons in his 2019 EUCOM posture statement: "Russia's non-strategic nuclear weapons stockpile is of concern because it facilitates Moscow's mistaken belief that limited nuclear first use, potentially including low-yield weapons, can provide Russia a coercive advantage in crises and at lower levels of conflict."<sup>74</sup>

Russia has two strategies for nuclear deterrence. The first is based on a threat of massive launch-on-warning and retaliatory strikes to deter a nuclear attack; the second is based on a threat of limited demonstration and "de-escalation" nuclear strikes to deter or terminate a large-scale conventional war.<sup>75</sup> Russia's reliance on nuclear weapons is based partly on their small cost relative to the cost of conventional weapons, especially in terms of their effect, and on Russia's inability to attract sufficient numbers of high-quality servicemembers. In other words, Russia sees its nuclear weapons as a way to offset the lower quantity and quality of its conventional forces.

Moscow has repeatedly threatened U.S. allies in Europe with nuclear deployments and even preemptive nuclear strikes.<sup>76</sup> The Russians justify their aggressive behavior by pointing to deployments of U.S. missile defense systems in Europe even though these systems are not scaled or postured to mitigate Russia's advantage in ballistic missiles and nuclear weapons to any significant degree.

Russia continues to violate the Intermediate-Range Nuclear Forces (INF) Treaty, which bans the testing, production, and possession of intermediate-range missiles.<sup>77</sup> Russia first

violated the treaty in 2008 and then systematically escalated its violations, moving from testing to producing to deploying the prohibited missile into the field. In early 2017, Russia fully deployed the SSC-X-8 cruise missile in violation of the INF Treaty. Russia has deployed battalions with the cruise missile at a missile test site, Kapustin Yar, in southern Russia; at Kamyshlov, near the border with Kazakhstan; in Shuya, east of Moscow; and in Mozdok, in occupied North Ossetia.<sup>78</sup> U.S. officials consider the banned cruise missiles to be fully operational.<sup>79</sup> In December 2018, in response to Russian violations, the U.S. declared Russia to be in material breach of the INF Treaty, a position with which NATO allies were in agreement.<sup>80</sup> On February 2, 2019, the U.S. suspended its obligations under the INF Treaty.<sup>81</sup>

### **Threat of Regional War**

In the view of many U.S. allies, Russia poses a genuine threat. At times, this threat is of a military nature. At other times, Russia uses less conventional tactics such as cyberattacks, utilization of energy resources, and propaganda. Today as in Imperial times, Russia's influence is exerted by both the pen and the sword. Organizations like the Collective Security Treaty Organization (CSTO) or the Eurasian Economic Union (EEU) attempt to bind regional capitals to Moscow through a series of agreements and treaties.

Espionage is another tool that Russia uses in ways that are damaging to U.S. interests. In May 2016, a Russian spy was sentenced to prison for gathering intelligence for Russia's Foreign Intelligence Service (SVR) while working as a banker in New York. The spy specifically transmitted intelligence on "potential U.S. sanctions against Russian banks and the United States' efforts to develop alternative energy resources."<sup>82</sup> The European External Action Service, diplomatic service of the European Union (EU), estimates that 200 Russian spies are operating in Brussels, which also is the headquarters of NATO.<sup>83</sup>

On March 4, 2018, Sergei Skripal, a former Russian GRU colonel who was convicted in

2006 of selling secrets to the United Kingdom and freed in a spy swap between the U.S. and Russia in 2010, and his daughter Yulia were poisoned with Novichok nerve agent by Russian security services in Salisbury, U.K. Hundreds of residents could have been contaminated, including a police officer who was exposed to the nerve agent after responding.<sup>84</sup> It took a year and the work of 190 U.K. Army and Air Force personnel plus contractors to complete the physical cleanup of Salisbury.<sup>85</sup> On March 15, France, Germany, the U.K., and the U.S. issued a joint statement condemning Russia's use of the nerve agent: "This use of a military-grade nerve agent, of a type developed by Russia, constitutes the first offensive use of a nerve agent in Europe since the Second World War."<sup>86</sup> U.S. intelligence officials have reportedly linked Russia to the deaths of 14 people in the U.K. alone, many of them Russians who ran afoul of the Kremlin.<sup>87</sup>

Russian intelligence operatives are reportedly mapping U.S. telecommunications infrastructure around the United States, focusing especially on fiber optic cables.<sup>88</sup> In March 2017, the U.S. charged four people, including two Russian intelligence officials, with directing hacks of user data involving Yahoo and Google accounts.<sup>89</sup> In December 2016, the U.S. expelled 35 Russian intelligence operatives, closed two compounds in Maryland and New York that were used for espionage, and levied additional economic sanctions against individuals who took part in interfering in the 2016 U.S. election.<sup>90</sup>

Russia has also used its relations with friendly nations—especially Nicaragua—for espionage purposes. In April 2017, Nicaragua began using a Russian-provided satellite station at Managua that, even though the Nicaraguan government denies it is intended for spying, is of concern to the U.S.<sup>91</sup> The Russian-built "counter-drug" center at Las Colinas that opened in November 2017 will likely be "supporting Russian security engagement with the entire region."<sup>92</sup> Russia also has an agreement with Nicaragua, signed in 2015, that allows access to Nicaraguan ports for its naval vessels.<sup>93</sup>

**Russian Pressure on Central and Eastern Europe.** Moscow poses a security challenge to members of NATO that border Russia. Although a conventional Russian attack against a NATO member is unlikely, primarily because it would trigger a NATO response, it cannot be entirely discounted. Russia continues to use cyberattacks, espionage, its significant share of the European energy market, and propaganda to sow discord among NATO member states and undermine the alliance. The Estonian Foreign Intelligence Service's *International Security and Estonia 2019* report states clearly that "The only serious threat to regional security, including the existence and sovereignty of Estonia and other Baltic Sea states, emanates from Russia. It involves not only asymmetrical, covert or political subversion, but also a potential military threat."<sup>94</sup>

After decades of Russian domination, the countries in Central and Eastern Europe factor Russia into their military planning and foreign policy formulation in a way that is simply unimaginable in many Western European countries and North America. Estonia and Latvia have sizable ethnic Russian populations, and there is concern that Russia might exploit this as a pretext for aggression—a view that is not without merit in view of Moscow's irredentist rhetoric and Russia's use of this technique to annex Crimea.

Lithuania's *National Threat Assessment 2019* states that "Russia exploits democratic freedoms and rights for its subversive activity. Under the veil of care for its diaspora, Russia tries to fragment Lithuanian society. Furthermore, while pretending to develop cultural relations, Russia actually promotes its aggressive foreign policy."<sup>95</sup> Latvian authorities similarly describe the means used by Russia to claim that it is defending the rights of citizens or Russian compatriots: TV propaganda to push discrediting messages about Latvia and stories in which the rights of Russian citizens are allegedly violated; "spreading interpretations of history favourable to Russia within Russia and abroad, as well as actively engaging in military-memorial work";

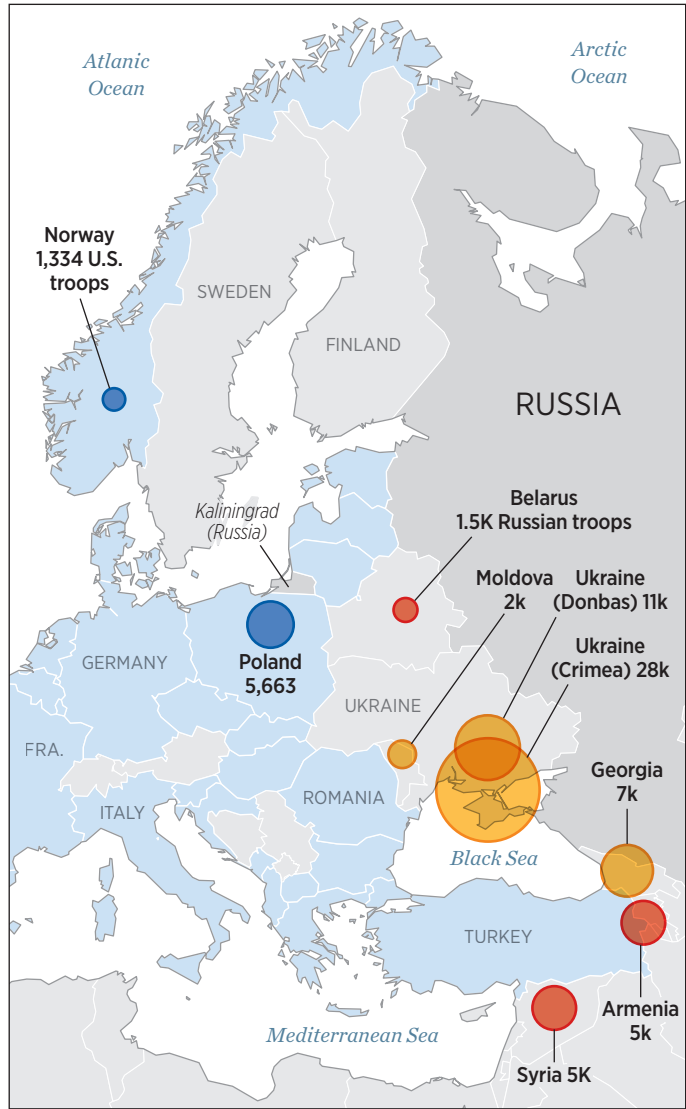
## U.S. Troops Greatly Outnumbered Near Russian Border

There are only two NATO nations that directly border Russia and also have U.S. troops stationed inside its borders: Norway and Poland. Even when including rotational troops, U.S. troops there number about 7,000—far less than the 59,500 Russian troops that are, for all intents and purposes, permanently stationed outside its borders on NATO’s perimeter.

- NATO nations
- U.S. troops in NATO nations adjacent to Russia
- Russian troops
- Russian troops in occupied territories

**SOURCE:** U.S. Department of Defense, Defense Manpower Data Center, March 2019, and Heritage Foundation research.

 heritage.org



and the use of “compatriot support funds and other compatriot policy bodies” targeted at Latvian youth.<sup>96</sup>

Russia has also sought to undermine the statehood and legitimacy of the Baltic States. In January 2018, for example, Putin signed a decree renaming an air force regiment the “Tallinn Regiment” to “preserve holy historical military traditions” and “raise [the] spirit of military obligation.”<sup>97</sup> General Scaparrotti testified in March 2017 that Russian propaganda and disinformation should be viewed as an extension of Russia’s military capabilities:

“The Russians see this as part of that spectrum of warfare, it’s their asymmetric approach.”<sup>98</sup>

Russia has sought to use misinformation to undermine NATO’s Enhanced Forward Presence in the Baltics. In April 2017, Russian hackers planted a false story about U.S. troops being poisoned by mustard gas in Latvia on the Baltic News Service website.<sup>99</sup> Lithuanian parliamentarians and media outlets began to receive e-mails in February 2017 containing a false story that German soldiers had sexually assaulted an underage Lithuanian girl.<sup>100</sup> U.K. forces in Estonia have also been targeted with a



fake news story about British troops harassing an elderly Estonian at a hospital.<sup>101</sup>

U.S. troops stationed in Poland for NATO's EFP have been the target of similar Russian misinformation campaigns.<sup>102</sup> A fake story that a U.S. Army vehicle had hit and killed a Lithuanian boy during Saber Strike 2018 in June was meant to undermine public support for NATO exercises.<sup>103</sup> One report summarized that "Russia's state propaganda channels RT and Sputnik remain very keen to exploit to the maximum any incidents involving eFP personnel, and to repeat the Kremlin's anti-NATO and anti eFP narrative."<sup>104</sup> In particular, recent Russian propaganda focuses on portraying EFP as an "occupying force."<sup>105</sup>

Russia has also demonstrated a willingness to use military force to change the borders of modern Europe. When Kremlin-backed Ukrainian President Viktor Yanukovich failed to sign an Association Agreement with the EU in 2013, months of street demonstrations led to his ouster early in 2014. Russia responded by sending troops, aided by pro-Russian local militia, to occupy the Crimean Peninsula under the pretext of "protecting Russian people." This led to Russia's eventual annexation of Crimea, the first such forcible annexation of territory in Europe since the Second World War.<sup>106</sup>

Russia's annexation of Crimea has effectively cut Ukraine's coastline in half, and Russia has claimed rights to underwater resources off the Crimean Peninsula.<sup>107</sup> In May 2018, Russia inaugurated the first portion of a \$7.5 billion, 11.8-mile bridge connecting Russia with Kerch in occupied Crimea. The project will be completed in 2023.<sup>108</sup> The effect on Ukraine's regional economic interests can be seen in the fact that 30 percent of the cargo ships that served Mariupol could not clear the span.<sup>109</sup>

Russia has deployed 28,000 troops to Crimea and has embarked on a major program to build housing, restore airfields, and install new radars there.<sup>110</sup> Deployment of the Monolit-B radar system, for instance, which has a passive range of 450 km, "provides the Russian military with an excellent real-time picture of

the positions of foreign surface vessels operating in the Black Sea."<sup>111</sup> In addition, "Russian equipment there includes 40 main battle tanks, 680 armored personnel carriers and 174 artillery systems of various kinds" along with 113 combat aircraft.<sup>112</sup> In March 2019, Russia announced the deployment of nuclear-capable Tupolev Tu-22M3 strategic bombers to Gvardeyskoye air base in occupied Crimea.<sup>113</sup>

Control of Crimea has allowed Russia to use the Black Sea as a platform to launch and support naval operations in the Eastern Mediterranean.<sup>114</sup> The Black Sea fleet has received six *Kilo* diesel submarines and three *Admiral Grigorovich*-class frigates equipped with Kalibr-NK long-range cruise missiles.<sup>115</sup> Kalibr cruise missiles have a range of at least 2,500 km, which places cities from Rome to Vilnius within range of Black Sea-based cruise missiles.<sup>116</sup>

Russia has deployed five S-400 air defense systems with a potential range of around 250 miles to Crimea.<sup>117</sup> In addition, "local capabilities have been strengthened by the Pantsir-S1 (SA-22 Greyhound) short-to-medium-range surface-to-air missile (SAM) and anti-aircraft artillery weapons system, which particularly complements the S-400."<sup>118</sup> Russia also deploys the Bastion P coastal defenses armed with the P-800 Oniks anti-ship cruise missile, which "has a range of up to 300 kilometers and travels at nearly mach 2.5, making it extraordinarily difficult to defeat with kinetic means."<sup>119</sup>

In eastern Ukraine, Russia has helped to foment and sustain a separatist movement. Backed, armed, and trained by Russia, separatist leaders in eastern Ukraine have declared the so-called Lugansk People's Republic and Donetsk People's Republic. Russia has backed separatist factions in the Donbas region of eastern Ukraine with advanced weapons, technical and financial assistance, and Russian conventional and special operations forces. Around 3,000 Russian soldiers are operating in Ukraine.<sup>120</sup> Russian-backed separatists daily violate the September 2014 and February 2015 cease-fire agreements, known respectively as Minsk I and Minsk II.<sup>121</sup> The Minsk cease-fire

agreements have led to the de facto partition of Ukraine and have created a frozen conflict that remains both deadly and advantageous for Russia. The war in Ukraine has cost 13,000 lives and left 30,000 people wounded.<sup>122</sup>

On November 25, 2018, Russian forces blocked the passage of three Ukrainian naval vessels through the Kerch strait and opened fire on the ships before boarding and seizing them along with 24 Ukrainian sailors.<sup>123</sup> Russian harassment of ships sailing through the Kerch strait and impeding of free movement had taken place consistently before the November 25 aggression and continued afterwards.<sup>124</sup> Russian inspections of ships, blockages of the strait, and delays have coalesced to constrict the port of Mariupol, where shipping volumes in 2018 were 10 percent less than in 2017.<sup>125</sup>

In Moldova, Russia supports the breakaway enclave of Transnistria, where yet another frozen conflict festers to Moscow's liking. According to EUCOM's 2017 posture statement:

In addition to recent conventional and nuclear developments, Russia has employed a decades-long strategy of indirect action to coerce, destabilize, and otherwise exercise a malign influence over other nations. In neighboring states, Russia continues to fuel "protracted conflicts." In Moldova, for example, Russia has yet to follow through on its 1999 Istanbul summit commitments to withdraw an estimated 1,500 troops—whose presence has no mandate—from the Moldovan breakaway region of Transnistria. Russia asserts that it will remove its force once a comprehensive settlement to the Transnistrian conflict has been reached. However, Russia continued to undermine the discussion of a comprehensive settlement to the Transnistrian conflict at the 5+2 negotiations.<sup>126</sup>

Russia continues to occupy 12 percent of Moldova's territory. In August 2018, Russian and separatist forces equipped with APCs and armored reconnaissance vehicles exercised

crossing the Dniester River in the demilitarized security zone. Moldovan authorities called the exercises "provocative," and the Organization for Security and Co-operation in Europe (OSCE) "expressed its concern."<sup>127</sup>

On January 22, 2019, in an effort to enhance its control of the breakaway region, Russia opened an office in Moscow for the Official Representation of the Pridnestrovian Moldavian Republic in the Russian Federation.<sup>128</sup>

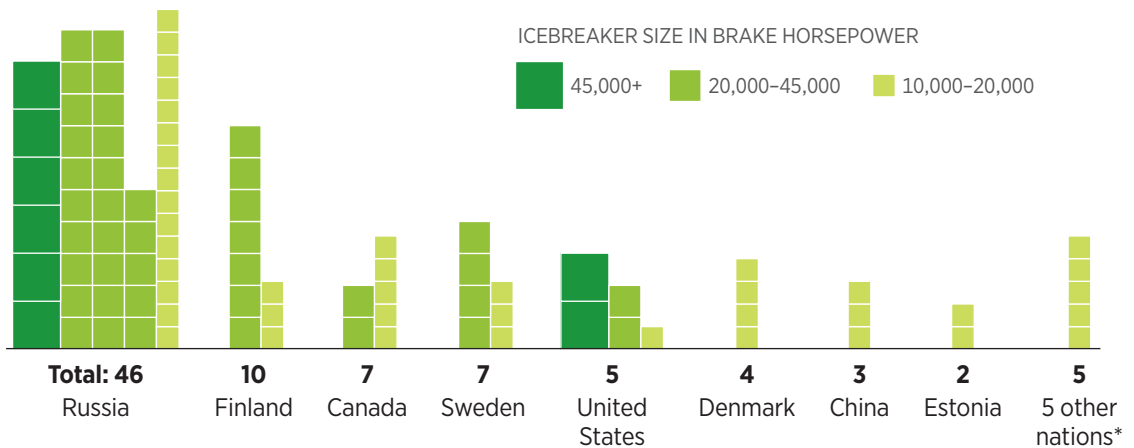
Russia's permanent stationing of Iskander missiles in Kaliningrad in 2018 occurred a year to the day after NATO's EFP deployed to Lithuania.<sup>129</sup> Russia reportedly has deployed tactical nuclear weapons, the S-400 air defense system, and P-800 anti-ship cruise missiles to Kaliningrad.<sup>130</sup> Additionally, it plans to reestablish a tank brigade and a "fighter aviation regiment and naval assault aviation (bomber) regiment" in Kaliningrad and to reequip the artillery brigade with new systems.<sup>131</sup>

Russia also has outfitted a missile brigade in Luga, Russia, a mere 74 miles from the Estonian city of Narva, with Iskander missiles.<sup>132</sup> Iskanders have been deployed to the Southern Military District at Mozdok near Georgia and Krasnodar near Ukraine as well, and Russian military officials have reportedly asked manufacturers to increase the Iskander missiles' range and improve their accuracy.<sup>133</sup>

Nor is Russia deploying missiles only in Europe. In November 2016, Russia announced that it had stationed Bal and Bastion missile systems on the Kurile Islands of Iturup and Kunashir, which are also claimed by Japan.<sup>134</sup> In February 2018, Russia approved the deployment of warplanes to an airport on Iturup, one of the largest islands.<sup>135</sup> Russia has stationed 3,500 troops on the Kurile Islands. In December 2018, Japan lodged a formal complaint over the building of four new barracks.<sup>136</sup>

Russia has deployed additional troops and capabilities near its western borders. Bruno Kahl, head of the German Federal Intelligence Service, stated in March 2017 that "Russia has doubled its fighting power on its Western border, which cannot be considered as defensive against the West."<sup>137</sup> In January 2017, Russia's

## Russia's Icebreaker Fleet Dominates the Arctic



\* Norway, Germany, Latvia, Japan, and South Korea.

**NOTE:** List includes both government-owned and privately owned icebreakers. List excludes icebreakers for southern hemisphere countries Chile, Australia, South Africa, and Argentina.

**SOURCE:** Ronald O'Rourke, "Coast Guard Polar Icebreaker Program: Background and Issues for Congress," Congressional Research Service Report RL34391, July 9, 2018, p. 10, <https://fas.org/sgp/crs/weapons/RL34391.pdf> (accessed August 1, 2018).

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Ministry of Defence announced that four S-400 air defense systems would be deployed to the Western Military District.<sup>138</sup> In January 2016, Commander in Chief of Russian Ground Forces General Oleg Salyukov announced the formation of four new ground divisions, three of them based in the Western Military District, allegedly in response to "intensified exercises of NATO countries."<sup>139</sup> According to an assessment published by the Carnegie Endowment for International Peace, "[t]he overall effect is to produce a line of substantial Russian combat forces along the western border, including opposite Belarus. By contrast with the ad hoc arrangements of the early stages of the conflict with Ukraine, these new forces are permanently established."<sup>140</sup>

**Militarization of the High North.** Russia has taken steps to militarize its presence in the Arctic region. In March 2017, a decree signed by Putin gave the Federal Security Service

(FSB), which controls law enforcement along the Northern Sea Route (NSR), an Arctic shipping route linking Asia and Europe, additional powers to confiscate land "in areas with special objects for land use, and in the border areas."<sup>141</sup> Russia's Arctic territory is included within this FSB-controlled border zone. The FSB and its subordinate coast guard have added patrol vessels and built up Arctic bases, including a new coast guard base in Murmansk opened in December 2018.<sup>142</sup>

The Russian National Guard, which reports to President Putin,<sup>143</sup> is also taking on an increased role in the Arctic and is now charged with protecting infrastructure sites that are deemed to be of strategic importance, including a new liquefied natural gas (LNG) export terminal at Sabetta that opened in December 2017.<sup>144</sup> The first shipment of LNG from the Sabetta terminal to China via the NSR took place in July 2018.<sup>145</sup> The National Guard is also

reportedly tasked with security at a planned floating nuclear power plant, currently in Murmansk, that is slated to be towed to the town of Pevek this summer.<sup>146</sup>

In May 2018, a presidential decree from Putin set a target of 80 million tons shipped across the NSR by 2024.<sup>147</sup> In 2018, only 18 million tons were shipped across the route.<sup>148</sup> To facilitate attainment of this goal, Russia's state-run Rosatom energy corporation was given nearly sole control of shipping across the NSR in 2018, with the Ministry of Transport retaining only some administrative responsibilities.<sup>149</sup> In March 2019, Russian media reported that the government was drafting stringent navigation rules for the entire length of the NSR outside Russian territorial waters. Under these rules, for example, foreign navies would be required to "post a request with Russian authorities to pass through the *Sevmorput* [NSR] 45 days in advance, providing detailed technical information about the ship, its crew and destination."<sup>150</sup>

The Arctic factors into Russia's basing, procurement, and military structuring. The Arctic-based Northern Fleet accounts for two-thirds of the Russian Navy. A new Arctic command was established in 2015 to coordinate all Russian military activities in the Arctic region.<sup>151</sup> Two Arctic brigades have been formed, and Arctic Coastal Defense divisions, which will be under the command of the Northern Fleet and stationed in the Kola Peninsula and in Russia's eastern Arctic, are planned.<sup>152</sup> A naval deep-water division, based in Gadzhiyevo in the Murmansk region and directly subordinate to the Minister of Defense, was established in January 2018.<sup>153</sup>

Russia is also investing in military bases in the Arctic. Its base on Alexandra Land, commissioned in 2017, can house 150 soldiers autonomously for up to 18 months.<sup>154</sup> In addition, old Soviet-era facilities have been reopened. The airfield on Kotelny Island, for example, was reactivated in 2013 for the first time in 20 years and "will be manned by 250 personnel and equipped with air defense missiles."<sup>155</sup>

In September 2018, the northern fleet announced construction plans for a new military

complex to house a 100-soldier garrison and anti-aircraft units at Tiksi; in January 2019, Russian authorities claimed that the base was 95 percent completed.<sup>156</sup> Also in 2018, Russia opened an Arctic airfield at Nagurskoye that is equipped with a 2,500-meter landing strip and a fleet of MiG-31 or Su-34 Russian fighters.<sup>157</sup>

In fact, air power in the Arctic is increasingly important to Russia, which has 14 operational airfields in the region along with 16 deep-water ports.<sup>158</sup> In March 2019, Mayor General Igor Kozhin, head of the Russian Naval Air Force, claimed that Russia had successfully tested a new airstrip cover that is effective in "temperatures down to minus 30 centigrades."<sup>159</sup> In 2018, according to the Russian Ministry of Defense, "Russian Tu-142 Bear and Il-38 May maritime patrol and anti-submarine warfare aircraft, as well as Su-24MR Fencer tactical reconnaissance jets, flew more than 100 sorties in total above the Arctic circle."<sup>160</sup>

Russia also intends to undertake regular fighter jet combat patrols in the Arctic in 2019.<sup>161</sup> As an example, the Russian Ministry of Defense announced that in January 2019, two Tu-160 bombers flew for 15 hours in international airspace over the Arctic.<sup>162</sup> Over the course of one week in April 2019, Russian fighter and bomber jets flew near the coast of Norway twice. In one instance, two TU-60 bombers and a MiG-31 flew 13 hours over the Barents, Norwegian, and North Seas. British and Danish jets scrambled to meet the Russian aircraft.<sup>163</sup>

Russian Arctic flights are often aggressive. In March 2017, nine Russian bombers simulated an attack on the U.S.-funded, Norwegian-run radar installation at Vardø, Norway, above the Arctic Circle.<sup>164</sup> In May 2017, 12 Russian aircraft simulated an attack against NATO naval forces taking part in the EASTLANT17 exercise near Tromsø, Norway, and later that month, Russian aircraft targeted aircraft from 12 nations, including the U.S., that took part in the Arctic Challenge 2017 exercise near Bodø.<sup>165</sup> In April 2018, Maritime Patrol Aircraft from Russia's Pacific Fleet for the first time exercised locating and bombing enemy submarines

in the Arctic, while fighter jets exercised repelling an air invasion in the Arctic region.<sup>166</sup>

The 45th Air Force and Air Defense Army of the Northern Fleet was formed in December 2015, and Russia reportedly has placed radar and S-300 missiles on the Arctic bases at Franz Joseph Land, New Siberian Islands, Novaya Zemlya, and Severnaya Zemlya.<sup>167</sup> In 2017, Russia activated a new radar complex on Wrangel Island.<sup>168</sup> This year, Russia plans to lay a nearly 8,000-mile fiber optic cable across its Arctic coast, linking military installations along the way from the Kola Peninsula through Vladivostok.<sup>169</sup> In November 2019, Russia announced rocket firings in the Norwegian Sea 20 to 40 nautical miles from the Norwegian coast. The test firings, with little advance notice, were designed to send a message as they took place in an area through which NATO ships were sailing during the Trident Juncture exercise.<sup>170</sup>

Russia's ultimate goal is to have a combined Russian armed force deployed in the Arctic by 2020,<sup>171</sup> and it appears that Moscow is on track to accomplish this. Russia is developing equipment optimized for Arctic conditions like the Mi-38 helicopter and three new nuclear icebreakers to add to the 40 icebreakers already in service, six of which are nuclear.<sup>172</sup> Former U.S. Coast Guard Commandant Admiral Paul F. Zukunft has expressed concern that "Russia is probably going to launch two icebreaking corvettes with cruise missiles on them over the course of the next several years."<sup>173</sup>

In July 2017, Russia released a new naval doctrine citing the alleged "ambition of a range of states, and foremost the United States of America and its allies, to dominate the high seas, including in the Arctic, and to press for overwhelming superiority of their naval forces."<sup>174</sup> In May 2017, Russia announced that its buildup of the Northern Fleet's nuclear capacity is intended "to phase 'NATO out of [the] Arctic.'"<sup>175</sup>

Russia's Northern Fleet is also building newly refitted submarines, including a newly converted *Belgorod* nuclear-powered submarine that is expected to be launched in the summer of 2019 and to enter active duty in 2020.<sup>176</sup>

The *Belgorod* is expected to carry six Poseidon drones, also known as nuclear torpedoes, and will carry out "covert missions."<sup>177</sup> The submarine will have a smaller mini-sub potentially capable of tampering with or destroying undersea telecommunications cables.<sup>178</sup> According to Russian media reports, the *Belgorod* "will be engaged in studying the bottom of the Russian Arctic shelf, searching for minerals at great depths, and also laying underwater communications."<sup>179</sup> A similar submarine, the *Khabarovsk*, is under construction and could enter active duty as early as 2022.<sup>180</sup>

**Russian Destabilization in the South Caucasus.** The South Caucasus sits at a crucial geographical and cultural crossroads and has proven to be strategically important, both militarily and economically, for centuries. Although the countries in the region (Armenia, Georgia, and Azerbaijan) are not part of NATO and therefore do not receive a security guarantee from the United States, they have participated to varying degrees in NATO and U.S.-led operations. This is especially true of Georgia, which aspires to join NATO.

Russia views the South Caucasus as part of its natural sphere of influence and stands ready to exert its influence in the region by force if necessary. In August 2008, Russia invaded Georgia, coming as close as 15 miles to the capital city of Tbilisi. A decade later, several thousand Russian troops occupied the two Georgian regions of South Ossetia and Abkhazia.

Russia has sought to deepen its relationship with the two occupied regions. In 2015, it signed so-called integration treaties with South Ossetia and Abkhazia that, among other things, call for a coordinated foreign policy, creation of a common security and defense space, and implementation of a streamlined process for Abkhazians and South Ossetians to receive Russian citizenship.<sup>181</sup> The Georgian Foreign Ministry criticized the treaties as a step toward "annexation of Georgia's occupied territories,"<sup>182</sup> both of which are still internationally recognized as part of Georgia. In January 2018, Russia ratified an agreement with the de facto leaders of South Ossetia to create

a joint military force—an agreement that the U.S. condemned.<sup>183</sup> In November 2017, the U.S. State Department approved an estimated \$75 million sale of Javelin missiles to Georgia.<sup>184</sup>

Russia’s “creeping annexation” of Georgia has left towns split in two and families separated by military occupation and the imposition of an internal border (known as “borderization”).<sup>185</sup> As summarized in a previous Heritage Foundation study:

The most egregious example of “borderization” since the 2008 war took place in July and August 2015, when Russia annexed an additional 300 acres of Georgian territory. During this time Russia built a fence within 550 yards of Georgia’s E60 highway, which is the main road in the South Caucasus linking the Black Sea to Azerbaijan. A “State Border” sign installed by Russian authorities is also visible from the highway. This annexation placed a one-mile segment of the BP-operated Baku-Supsa pipeline inside Russian-occupied territory.<sup>186</sup>

Today, Moscow continues to exploit ethnic divisions and tensions in the South Caucasus to advance pro-Russian policies that are often at odds with America’s or NATO’s goals in the region, but Russia’s influence is not restricted to soft power. In the South Caucasus, the coin of the realm is military might. It is a rough neighborhood surrounded by instability and insecurity reflected in terrorism, religious fanaticism, centuries-old sectarian divides, and competition for natural resources.

Russia maintains a sizable military presence in Armenia based on an agreement that gives Moscow access to bases in that country until at least 2044.<sup>187</sup> The bulk of Russia’s forces, consisting of 3,300 soldiers, dozens of fighter planes and attack helicopters, 74 T-72 tanks, almost 200 armored personnel carriers, and an S-300 air defense system, are based around the 102nd Military Base.<sup>188</sup> Russia and Armenia have also signed a Combined Regional Air Defense System agreement. Even after

the election of Prime Minister Nikol Pashinyan following the so-called Velvet Revolution, Armenia’s cozy relationship with Moscow remains unchanged.<sup>189</sup> Armenian troops have even deployed alongside Russian troops in Syria to the dismay of U.S. policymakers.<sup>190</sup>

Another source of regional instability is the Nagorno–Karabakh conflict, which began in 1988 when Armenia made territorial claims to Azerbaijan’s Nagorno–Karabakh Autonomous Oblast.<sup>191</sup> By 1992, Armenian forces and Armenian-backed militias had occupied 20 percent of Azerbaijan, including the Nagorno–Karabakh region and seven surrounding districts. A cease-fire agreement was signed in 1994, and the conflict has been described as frozen since then. Since August 2014, violence has increased noticeably along the Line of Contact between Armenian and Azerbaijani forces. Intense fighting in April 2016 left 200 dead.<sup>192</sup> In early summer 2018, Azerbaijani forces successfully launched an operation to retake territory around Gündüt, a small village strategically located in the mountainous region of Azerbaijan’s Nakhchivan Autonomous Republic.<sup>193</sup> The 2016 and 2018 incidents marked the only changes in territory since 1994.<sup>194</sup>

This conflict offers another opportunity for Russia to exert malign influence and consolidate power in the region. While its sympathies lie with Armenia, Russia is the largest supplier of weapons to both Armenia and Azerbaijan.<sup>195</sup> As noted by the late Dr. Alexandros Petersen, a highly respected expert on Eurasian security, it is no secret “that the Nagorno–Karabakh dispute is a Russian proxy conflict, maintained in simmering stasis by Russian arms sales to both sides so that Moscow can sustain leverage over Armenia, Azerbaijan and by its geographic proximity Georgia.”<sup>196</sup>

The South Caucasus might seem distant to many American policymakers, but the spillover effect of ongoing conflict in the region can have a direct impact both on U.S. interests and on the security of America’s partners, as well as on Turkey and other countries that depend on oil and gas transiting the region.

**Increased Russian Activity in the Mediterranean.** Although Russia has had a military presence in Syria for decades, in September 2015, it became the decisive actor in Syria’s ongoing civil war, having saved Bashar al-Assad from being overthrown and strengthened his hand militarily, thus enabling government forces to retake territory lost during the war. Russia’s activities in Syria, by allowing Assad to stay in power, have made achievement of a peaceful political settlement with rebel groups nearly impossible as a practical matter.

In January 2017, Russia signed an agreement with the Assad regime to expand the naval facility at Tartus (Russia’s only naval base on the Mediterranean) “under a 49-year lease that could automatically renew for a further 25 years.” The planned expansion reportedly would “provide simultaneous berthing for up to 11 warships, including nuclear-powered vessels, more than doubling [the facility’s] present known capacity.”<sup>197</sup> It was subsequently reported that Russia was expanding the Tartus base to include a submarine maintenance facility.<sup>198</sup>

The agreement with Syria also includes upgrades to the Hmeymim air base at Latakia, including repairs to a second runway.<sup>199</sup> Russia deployed the S-400 anti-aircraft missile system to Hmeymim in late 2015.<sup>200</sup> It also has deployed the Pantsir S1 system. “The two systems working in tandem provide a ‘layered defense,’” according to one account, “with the S-400 providing long-ranged protection against bombers, fighter jets, and ballistic missiles, and the Pantsir providing medium-ranged protection against cruise missiles, low-flying strike aircraft, and drones.”<sup>201</sup> Russia currently operates out of Hmeymim air base on a 40-year agreement and continues to entrench its position there, as demonstrated by its recent building of reinforced concrete aircraft shelters.<sup>202</sup>

Russia is using Syria as a testing ground for new weapons systems while obtaining valuable combat experience for its troops. According to Lieutenant General Ben Hodges, former Commander, U.S. Army Europe, Russia has used its intervention in Syria as a “live-fire training opportunity.”<sup>203</sup> According to the IISS, Russia has

used Syria as “a test bed for the development of joint operations and new weapons and tactics.”<sup>204</sup> Russia has tested hundreds of pieces of new equipment in Syria. In December 2018:

Russian Deputy Prime Minister Yury Borisov detailed to local media...the various new weapons systems [that] have been introduced to the conflict. These included the Pantsir S1 anti-aircraft and Iskander-M ballistic missile systems on the ground, Tupolev Tu-160 supersonic strategic bombers, Tu-22M3 supersonic bombers and Tu-95 propeller-driven bombers, as well as Mikoyan MiG-29K fighters and Ka-52K Katran helicopters in the air.<sup>205</sup>

Despite this display of Russian arms in Syria, however, Russian weapons exports have declined, in part because India and China are developing more weapons systems domestically, thereby reducing their desire to purchase items from Russia.<sup>206</sup> According to the Stockholm International Peace Research Institute, “[a]rms exports by Russia decreased by 17 percent between 2009–13 and 2014–18.”<sup>207</sup>

Russian pilots have occasionally acted dangerously in the skies over Syria. In May 2017, for example, a Russian fighter jet intercepted a U.S. KC-10 tanker, performing a barrel roll over the top of the KC-10.<sup>208</sup> That same month, Russia stated that U.S. and allied aircraft would be banned from flying over large areas of Syria because of a deal agreed to by Russia, Iran, and Turkey. The U.S. responded that the deal does not “preclude anyone from going after terrorists wherever they may be in Syria.”<sup>209</sup> The U.S. and Russia have a deconfliction hotline to avoid midair collisions and incidents, but incidents have occurred on the ground as well as in the air. In November 2018, Ambassador James Jeffrey, U.S. Special Representative for Syria Engagement, told news media that “American and Russian forces have clashed a dozen times in Syria—sometimes with exchanges of fire.”<sup>210</sup>

In October 2018, Egyptian President Abdel Fattah al-Sisi signed a strategic cooperation treaty with Russia.<sup>211</sup> In November 2018,

Russia sought to solidify its relations with Egypt, approving a five-year agreement for the two countries to use each other's air bases.<sup>212</sup> Russia is a major exporter of arms to Egypt, which agreed to purchase 20 Su-35 fighter jets in 2018 for \$2 billion.<sup>213</sup> In Libya, Russia continues to support Field Marshal Khalifa Haftar with weapons and military advisers. Russian Special Forces reportedly have been deployed to assist Haftar, and 300 mercenaries from Russia's Wagner Group are believed to be in Libya.<sup>214</sup> Despite its ties to Haftar, Russia has also focused on growing business ties with the Libyan government in Tripoli.<sup>215</sup>

Russia has stepped up its military operations in the Mediterranean significantly, often harassing U.S. and allied vessels taking part in counter-IS operations. In April 2018, for example, a fully armed Russian Su-24M Fencer and Su-30SM Flanker fighter aircraft flew aggressively low over the *Aquitaine*, a French frigate operating in the eastern Mediterranean.<sup>216</sup> That same month, one or two improved *Kilo*-class submarines, two Russian frigates, and Russian anti-submarine aircraft pursued a British *Astute*-class attack submarine operating in the Mediterranean near Syria. The British sub received assistance from U.S. P-8As operating in the region.<sup>217</sup>

In addition, the U.S., along with British, Dutch, and Spanish allies, tracked the *Krasnodar*, a *Kilo*-class submarine, as it sailed from the Baltic Sea to a Russian base in occupied Crimea from April–August 2017. The submarine stopped twice in the eastern Mediterranean to launch cruise missiles into Syria and conducted drills in the Baltic Sea and off the coast of Libya. This was one of the first times since the Cold War that the U.S. and NATO allies had tracked a Russian submarine during combat operations.<sup>218</sup> In March 2019, General Scaparrotti testified that:

The Kremlin has also demonstrated the ability and political will to deploy its modernized military and expand its operational footprint. Last year we observed a historically high combat maritime

presence in the East Mediterranean along with military deployments and demonstrations in Syria. Their most advanced and quietest guided missile submarine, the Severodvinsk, conducted extended deployments in the northern Atlantic.<sup>219</sup>

**The Balkans.** Security has improved dramatically in the Balkans since the 1990s, but violence based on religious and ethnic differences remains an ongoing possibility. These tensions are exacerbated by sluggish economies, high unemployment, and political corruption.

Russia's interests in the Western Balkans are at odds with the ongoing desire of the U.S. and its European allies to encourage closer ties between the region and the transatlantic community:

Russia seeks to sever the transatlantic bond forged with the Western Balkans... by sowing instability. Chiefly Russia has sought to inflame preexisting ethnic, historic, and religious tensions. Russian propaganda magnifies this toxic ethnic and religious messaging, fans public disillusionment with the West, as well as institutions inside the Balkan nations, and misinforms the public about Russia's intentions and interests in the region.<sup>220</sup>

Senior members of the Russian government have alleged that NATO enlargement in the Balkans is one of the biggest threats to Russia.<sup>221</sup> In June 2017, Montenegro became NATO's 29th member state, joining Albania and Croatia (and soon probably North Macedonia) as NATO members in the Balkans. Russia stands accused of being behind a failed plot to break into Montenegro's parliament on election day in 2016, assassinate its former prime minister, and install a pro-Russian government. Two Russian nationals believed to be the masterminds behind the plot were convicted in absentia in May 2019 along with 12 other individuals for organizing and carrying out the failed coup. The trial judge stated that



the convicted Russians who organized the plot “knowingly tried to terrorize Montenegrins, attack others, threaten and hurt basic constitutional and social structures.”<sup>222</sup>

After Russia annexed Crimea, the Montenegrin government backed European sanctions against Moscow and even implemented its own sanctions. Nevertheless, Russia has significant economic influence in Montenegro and in 2015 sought unsuccessfully to gain access to Montenegrin ports for the Russian navy to refuel and perform maintenance. In 2018, “Russia account[ed] for one-third of [foreign direct investment] to Montenegro, and Russian nationals or companies own 40 percent of real estate in the nation—as well as almost one-third of all Montenegrin companies.”<sup>223</sup>

Similarly, North Macedonia’s accession to NATO has been heavily targeted by Russia, which had warned the nation against joining the alliance<sup>224</sup> and sought to derail the Prespa agreement that paved the way for membership by settling long-standing Greek objections to Macedonia’s name. In 2018, after North Macedonia was invited to join NATO, Russia’s ambassador to the EU stated that “there are errors that have consequences.”<sup>225</sup> In July 2018, Greece expelled two Russian diplomats and banned entry by two Russian nationals because of their efforts to undermine the name agreement; Russian actions in Macedonia included disinformation surrounding the vote, websites and social media posts opposing the Prespa agreement, and payments to protesters as well as politicians and organizations opposing the agreement.<sup>226</sup>

Serbia in particular has long served as Russia’s foothold in the Balkans:

Russia’s influence in the Balkans centers on Serbia, a fellow religiously orthodox nation with whom it enjoys a close economic, political, and military relationship. Serbia and Russia have an agreement in place allowing Russian soldiers to be based at Niš airport in Serbia. The two countries signed a 15-year military cooperation agreement in 2013 that includes sharing of intelligence, officer exchanges,

and joint military exercises. In October, Russia gave Serbia six MiG-29 fighters (which while free, will require Serbia to spend \$235 million to have them overhauled). Additionally, Russia plans to supply Serbia with helicopters, T-72 tanks, armored vehicles, and potentially even surface-to-air missile systems.<sup>227</sup>

The so-called Russian–Serbian Humanitarian Center at Niš is “widely believed to be a Russian spy base” and is located “only 58 miles from NATO’s Kosovo Force mission based in Pristina.”<sup>228</sup> Russia has used its cultural ties to Serbia to increase its role in the nation, positioning itself as the defender of orthodoxy and investing funds in the refurbishing of orthodox churches. Additionally, Russia has helped to establish more than 100 pro-Russian NGOs and media outlets in Macedonia.<sup>229</sup>

Serbia and Russia have signed a strategic partnership agreement focused on economic issues. Russia’s inward investment is focused on the transport and energy sectors. Except for those in the Commonwealth of Independent States, Serbia is the only country in Europe that has a free trade deal with Russia. In January 2019, Serbia and Russia signed 26 agreements relating to energy, railway construction, and strategic education cooperation.<sup>230</sup>

In a January 2019 state visit to Serbia, Vladimir Putin stated a desire for a free trade agreement between Serbia and the Russian-led Eurasian Economic Union, to be signed by the end of the year. Additionally, Russia has held out the possibility of \$1.4 billion in infrastructure aid to Serbia aimed at building the Turk Stream pipeline and increasing Russia’s energy leverage in the region. Russia also has continued to oppose Kosovo’s recognition as an independent sovereign country and has condemned Kosovo’s creation of its own army.<sup>231</sup>

However, Serbia still participates in military exercises far more without Russia than with Russia. “In 2017,” for example, “Serbian forces participated in 2 joint exercises with Russia and Belarus but held 13 exercises with NATO members and 7 with U.S. units.”<sup>232</sup> Like

Russia, Serbia is a member of NATO's Partnership for Peace program. Additionally, Serbia has been part of the U.S. National Guard's State Partnership Program, partnering with the State of Ohio since 2006.

Russia is also active in Bosnia and Herzegovina—specifically, the ethnically Serb Republika Srpska, one of two substate entities inside Bosnia and Herzegovina that emerged from that country's civil war in the 1990s. Moscow knows that exploiting internal ethnic and religious divisions among the country's Bosniak, Croat, and Serb populations is the easiest way to prevent Bosnia and Herzegovina from entering the transatlantic community.

Republika Srpska's leader, Milorad Dodik, has long advocated independence for the region and has enjoyed a very close relationship with the Kremlin. Recent events in Ukraine, especially the annexation of Crimea, have inspired more separatist rhetoric in Republika Srpska. In September 2018, two weeks before elections in Bosnia-Herzegovina, Russian Foreign Minister Lavrov visited Sarajevo, but he also visited Banja Luka in Republika Srpska, where he visited the site of "a future Serbian-Russian Orthodox cultural center."<sup>233</sup>

In many ways, Russia's relationship with Republika Srpska is akin to its relationship with Georgia's South Ossetia and Abkhazia autonomous regions: more like a relationship with another sovereign state than a relationship with a semiautonomous region inside Bosnia and Herzegovina. When Putin visited Serbia in October 2014, Dodik was treated like a head of state and invited to Belgrade to meet with him. More recently, in September 2016, Dodik was treated like a head of state on a visit to Moscow just days before a referendum that chose January 9 as Republika Srpska's "statehood day," a date filled with religious and ethnic symbolism for the Serbs.<sup>234</sup> In October 2018, just days before elections, Dodik again visited Russia where he watched the Russian Grand Prix in a VIP box with Putin.<sup>235</sup> Republika Srpska continues to host its "statehood day" in defiance of a ruling by Bosnia's federal constitutional court that both the celebration

and the referendum establishing it were illegal.<sup>236</sup> The U.S. sanctioned Dodik in January 2017, saying that "by obstructing the Dayton accords, Milorad Dodik poses a significant threat to the sovereignty and territorial integrity of Bosnia-Herzegovina."<sup>237</sup>

On January 9, 2019, Bosnian Serbs again held "statehood day."<sup>238</sup> At the 2018 "statehood day," Dodik and the self-proclaimed leaders of South Ossetia "signed a memorandum on cooperation between the 'states.'"<sup>239</sup> Russia has reportedly trained a Republika Srpska paramilitary force in Russia at the nearby Niš airbase to defend the Serbian entity. It has been reported that "[s]ome of its members fought as mercenaries alongside the Kremlin's proxy separatists in Ukraine."<sup>240</sup> Veterans organizations in Russia and Republika Srpska have developed close ties.<sup>241</sup>

Russia has cultivated strong ties with the security forces of Republika Srpska. Russian police take part in exchanges with the security forces, and Russian intelligence officers reportedly teach at the police academy and local university. In addition:

The Republika Srpska authorities are also opening a new \$4 million dollar training center at the site of a former army barracks in Zaluzani, outside Banja Luka. Russia has already committed to provide Serb forces with anti-terrorism training at the center, which will serve as the headquarters for new anti-terrorist units, logistics units, and a department to combat organized crime. These additions will put the Serbian police closer on par with Bosnia's national security forces.

There is also ongoing discussion in Republika Srpska of creating of a Russian "humanitarian" center similar to one already established in the Serbian city of Nis. Officially, its purpose is to help the local government with natural disasters such as floods and fires. But the center in Nis has been suspected of serving as a Russian intelligence center and an unofficial

military base—not least because Russia has requested diplomatic immunity for its personnel stationed there.<sup>242</sup>

Russia does not want Kosovo to be seen as a successful nation pointed toward the West. Rather, it seeks to derail Kosovo's efforts to integrate into the West, often by exploiting the Serbian minority's grievances. In the most jarring example, in January 2017, a train traveling from Belgrade to Mitrovica, a heavily Serb town in Kosovo, was stopped at the Kosovar border. The Russian-made train was "painted in the colors of the Serbian flag and featured pictures of churches, monasteries, and medieval towns, as well as the words 'Kosovo is Serbian' in 21 languages."<sup>243</sup>

The U.S. has invested heavily in the Balkans since the end of the Cold War. Tens of thousands of U.S. servicemembers have served in the Balkans, and the U.S. has spent billions of dollars in aid there, all in the hope of creating a secure and prosperous region that will someday be part of the transatlantic community.

### Threats to the Commons

Other than cyberspace and (to some extent) airspace, the commons are relatively secure in the European region. Despite Russia's periodic aggressive maneuvers near U.S. and NATO vessels, this remains largely true with respect to the security of and free passage through shipping lanes (with the significant exception of the Kerch strait). The maritime domain is heavily patrolled by the navies and coast guards of NATO and NATO partner countries; except in remote areas in the Arctic Sea, search and rescue capabilities are readily available; maritime-launched terrorism is not a significant problem; and piracy is virtually nonexistent.

**Sea.** In May 2018, 17 Russian fighter jets buzzed the HMS *Duncan*, which was serving as the flagship of Standing NATO Maritime Group Two (SNMG2), operating in the Black Sea. Commodore Mike Utley, who was leading SNMG2, stated that the ship was "probably the only maritime asset that has seen a raid of that magnitude in the last 25 years," and

then-British Defense Minister Gavin Williamson described the behavior as "brazen Russian hostility."<sup>244</sup> In April 2018, a fully armed Russian jet buzzed a French frigate operating in the eastern Mediterranean.<sup>245</sup>

Russian threats to the maritime theater also include activity near undersea fiber optic cables. In December 2017, Rear Admiral Andrew Lennon, Commander, Submarines NATO, stated that "[w]e are now seeing Russian underwater activity in the vicinity of undersea cables that I don't believe we have ever seen."<sup>246</sup> On any given day, undersea cables "carry some \$10 trillion of financial transfers and process some 15 million financial transactions," to say nothing of the breadth of nonfinancial information and communications that they carry.<sup>247</sup>

The *Yantar*, a mother ship to two Russian mini submersibles, is often seen near undersea cables, which it is capable of tapping or cutting, and has been observed collecting intelligence near U.S. naval facilities, including the submarine base at Kings Bay, Georgia.<sup>248</sup> The Russian spy ship *Viktor Leonov* was spotted collecting intelligence within 20 miles of Kings Bay in March 2017 and within 30 miles of Groton, Connecticut, in February 2018.<sup>249</sup>

**Airspace.** Russia has continued its provocative military flights near U.S. and European airspace over the past year. In January 2018, a Russian Su-27 fighter intercepted a U.S. surveillance aircraft operating over the Black Sea, forcing it to return to base. "This interaction was determined to be unsafe," according to a statement from the U.S. 6th Fleet, "due to the SU-27 closing to within five feet and crossing directly through the EP-3's flight path, causing the EP-3 to fly through the SU-27's jet wash."<sup>250</sup>

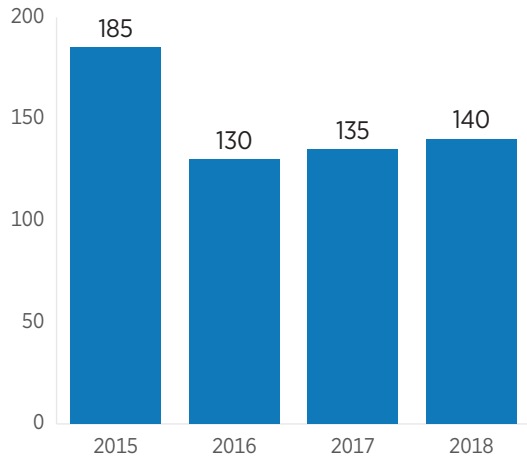
In November 2017, a Russian Su-30 fighter flew within 50 feet of a U.S. P-8A flying over the Black Sea in a 24-minute intercept that the U.S. also called "unsafe." Specifically, "the aircraft crossed in front of the US plane from right to left while engaging its afterburners, forcing the P-8 to enter its jet wash, an action that caused the US plane to experience 'a 15-degree roll and violent turbulence,'" according to a Pentagon spokeswoman.<sup>251</sup>

## NATO Frequently Scrambles Military Aircraft Over Baltics

NATO maintains a 24/7 air policing mission to safeguard the integrity of Baltic member states' airspace. NATO aircraft rotationally deployed are scrambled in response to aircraft that do not comply with international flight regulations and approach allies' airspace—such as common incursions by Russian jets.

**SOURCE:** Data provided by NATO's Supreme Headquarters Allied Power Europe.

NATO BALTIC-AREA JET SCRAMBLES



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In March and April 2019, the Royal Air Force scrambled fighters twice in five days to intercept Russian bombers flying near U.K. airspace off Scotland while the U.S., Australia, and 11 NATO allies were taking part in the Joint Warrior exercise in Scotland.<sup>252</sup> Also in March 2019, Italian jets operating from Keflavík intercepted two Russian Tu-142 Bear bombers flying in Iceland's air surveillance area.<sup>253</sup> In January 2019, a day after a new government was formed in Stockholm, a Russian IL-20 reconnaissance plane escorted by two Russian Su-27 fighter jets violated Swedish airspace, flying with transponders turned off.<sup>254</sup>

Aggressive Russian flying has occurred near North American airspace as well. In January 2019, two U.S. F-22s and two Canadian CF-18 fighters scrambled when two Russian Tu-160 Blackjack bombers flew into Arctic airspace patrolled by the Royal Canadian Air Force.<sup>255</sup>

Russian flights have also targeted U.S. ally Japan. In incidents in January, March, and May 2019, Japan scrambled fighter jets to intercept a Russian Il-38N maritime patrol aircraft (MPA) flying over the Sea of Japan.<sup>256</sup> Nor is it only MPA that fly near Japan; for instance, Russian Su-24 attack aircraft were intercepted

in December 2018 and January 2019 incidents.<sup>257</sup> Between April 1, 2018, and March 31, 2019, Japan had to scramble jets 343 times to intercept Russian aircraft, although that was 47 times less than the year prior.<sup>258</sup>

The main threat from Russian airspace incursions, however, remains near NATO territory in Eastern Europe, specifically in the Black Sea and Baltic regions. In the Baltics, through mid-November, NATO aircraft had conducted 85 Alpha scrambles in 2018, compared with 130 Alpha scrambles of Russian military aircraft in 2017.<sup>259</sup> The situation remains the same in 2019. In one week in March, NATO jets scrambled six times to escort Russian aircraft flying over the Baltic Sea. The Lithuanian Defense Ministry reported that “several of them had not kept in radio contact with regional air traffic control, nor filed a pre-flight plan, nor had onboard transponders functioning.”<sup>260</sup>

In July 2018, Vladimir Putin's plane briefly flew over Estonian airspace without either filing a flight plan or contacting Estonian air traffic control on the way to Helsinki for a meeting with President Trump.<sup>261</sup> Similar provocative flights took place in the Black Sea region in 2018, including one in August when

two British Typhoons that were taking part in NATO's enhanced air policing mission scrambled to intercept and escort two Russian planes that were flying in Romanian airspace.<sup>262</sup>

In addition, there have been several incidents involving Russian military aircraft flying in Europe without using their transponders. In February 2015, for example, civilian aircraft in Ireland had to be diverted or were prevented from taking off when Russian bombers flying with their transponders turned off flew across civilian air lanes.<sup>263</sup> Similarly, in March 2014, a Scandinavian Airlines plane almost collided with a Russian signals intelligence (SIGINT) plane when the two came within 90 meters of each other.<sup>264</sup> In a December 2014 incident, a Cimber Airlines flight from Copenhagen to Poznan nearly collided with a Russian intelligence plane that was flying with its transponder turned off.<sup>265</sup>

**Cyber.** Russian cyber capabilities are sophisticated and active, regularly threatening economic, social, and political targets around the world. Even more, Moscow appears to be increasingly aggressive in its use of digital techniques, often employing only the slightest veneer of deniability in an effort to intimidate targets and openly defy international norms and organizations. Russia clearly believes that these online operations will be essential to its domestic and foreign policy for the foreseeable future. As former Chief of the Russian General Staff General Yuri Baluyevsky has observed, “[cyberattacks are] much more important than victory in a classical military conflict, because it is bloodless, yet the impact is overwhelming and can paralyze all of the enemy state’s power structures.”<sup>266</sup>

Russia continues to probe U.S. critical infrastructure. According to former Director of National Intelligence Daniel R. Coats:

Russia has the ability to execute cyber attacks in the United States that generate localized, temporary disruptive effects on critical infrastructure—such as disrupting an electrical distribution network for at least a few hours—similar to those

demonstrated in Ukraine in 2015 and 2016. Moscow is mapping our critical infrastructure with the long-term goal of being able to cause substantial damage.<sup>267</sup>

Russia has continued to conduct cyberattacks on government and private entities in 2019. In January, hackers affiliated with the Russian intelligence services hacked the Center for Strategic and International Studies. Also in 2019, the Democratic National Committee revealed that it had been hacked by Russia following the 2018 midterm elections.<sup>268</sup>

In June 2018, the U.S. Treasury Department sanctioned five Russian entities and three Russian individuals for “malign and destabilizing” cyber activities, including “the destructive NotPetya cyber-attack; cyber intrusions against the U.S. energy grid to potentially enable future offensive operations; and global compromises of network infrastructure devices, including routers and switches, also to potentially enable disruptive cyber-attacks.”<sup>269</sup> These sanctions built on a joint assessment by the Department of Homeland Security and the FBI that Russian hackers were behind a series of attacks against American network infrastructure devices and the U.S. energy and critical infrastructure sectors.<sup>270</sup>

But the United States is not Russia’s only target. In April 2018 alone, Germany’s head of domestic intelligence accused Moscow of attacking his government’s computer networks, and the U.K.’s National Cyber Security Center warned that Russian hackers were targeting Britain’s critical infrastructure supply chains. Russia continues to employ cyber as a key tool in manipulating and undermining democratic elections in Europe and elsewhere.

In addition to official intelligence and military cyber assets, Russia continues to employ allied criminal organizations (so-called patriotic hackers) to help it engage in cyber aggression. Using these hackers gives Russia greater resources and can help to shield their true capabilities. Patriotic hackers also give the Russian government deniability when it is desired. In June 2017, for example, Putin stated

that “[i]f they (hackers) are patriotically-minded, they start to make their own contribution to what they believe is the good fight against those who speak badly about Russia. Is that possible? Theoretically it is possible.”<sup>271</sup>

### Conclusion

Overall, the threat to the U.S. homeland originating from Europe remains low, but the threat to America’s interests and allies in the region remains significant. Behind this threat lies Russia. Although Russia has the military capability to harm and (in the case of its nuclear arsenal) to pose an existential threat to the U.S., it has not conclusively demonstrated the intent to do so.

The situation is different when it comes to America’s allies in the region. Through NATO, the U.S. is obliged by treaty to come to the aid of the alliance’s European members. Russia continues its efforts to undermine the NATO alliance and presents an existential threat to U.S. allies in Eastern Europe. NATO has been the cornerstone of European security and stability ever since its creation in 1949, and it is in America’s interest to ensure that it maintains both the military capability and the political will to fulfill its treaty obligations.

While Russia is not the threat to U.S. global interests that the Soviet Union was during the Cold War, it does pose challenges to a range of America’s interests and those of its allies and friends closest to Russia’s borders. Russia possesses a full range of capabilities from ground

forces to air, naval, space, and cyber. It still maintains the world’s largest nuclear arsenal, and although a strike on the U.S. is highly unlikely, the latent potential for such a strike still gives these weapons enough strategic value vis-à-vis America’s NATO allies and interests in Europe to keep them relevant.

Russian provocations that are much less serious than any scenario involving a nuclear exchange pose the most serious challenge to American interests, particularly in Central and Eastern Europe, the Arctic, the Balkans, and the South Caucasus. As the 2019 Worldwide Threat Assessment states:

Moscow will continue pursuing a range of objectives to expand its reach, including undermining the US-led liberal international order, dividing Western political and security institutions, demonstrating Russia’s ability to shape global issues, and bolstering Putin’s domestic legitimacy. Russia seeks to capitalize on perceptions of US retrenchment and power vacuums, which it views the United States is unwilling or unable to fill, by pursuing relatively low-cost options, including influence campaigns, cyber tools, and limited military interventions.<sup>272</sup>

For these reasons, this *Index* continues to assess the threat from Russia as “aggressive” and “formidable.”

### Threats: Russia

	HOSTILE	AGGRESSIVE	TESTING	ASSERTIVE	BENIGN
Behavior		✓			
	FORMIDABLE	GATHERING	CAPABLE	ASPIRATIONAL	MARGINAL
Capability	✓				

## Endnotes

1. International Institute for Strategic Studies, *The Military Balance 2019: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2019), pp. 195–209.
2. Michael Birnbaum, “Russian Submarines Are Prowling Around Vital Undersea Cables. It’s Making NATO Nervous,” *The Washington Post*, December 22, 2017, [https://www.washingtonpost.com/world/europe/russian-submarines-are-prowling-around-vital-undersea-cables-its-making-nato-nervous/2017/12/22/d4c1f3da-e5d0-11e7-927a-e72eac1e73b6\\_story.html?utm\\_term=.bd78ff119ead](https://www.washingtonpost.com/world/europe/russian-submarines-are-prowling-around-vital-undersea-cables-its-making-nato-nervous/2017/12/22/d4c1f3da-e5d0-11e7-927a-e72eac1e73b6_story.html?utm_term=.bd78ff119ead) (accessed June 19, 2019).
3. Pavel Felgenhauer, “Private Military Companies Forming Vanguard of Russian Foreign Operations,” *Jamestown Foundation Eurasia Daily Monitor*, Vol. 14, Issue 36 (March 16, 2017), <https://jamestown.org/program/private-military-companies-forming-vanguard-russian-foreign-operations/> (accessed June 19, 2019).
4. Kimberly Marten, “The Puzzle of Russian Behavior in Deir Al-Zour,” *War on the Rocks*, July 5, 2018, <https://warontherocks.com/2018/07/the-puzzle-of-russian-behavior-in-deir-al-zour/> (accessed June 19, 2019).
5. Thomas Gibbons-Neff, “How a 4-Hour Battle Between Russian Mercenaries and U.S. Commandos Unfolded in Syria,” *The New York Times*, May 24, 2018, <https://www.nytimes.com/2018/05/24/world/middleeast/american-commandos-russian-mercenaries-syria.html> (accessed June 19, 2019).
6. Maria Tsvetkova, “Russian Toll in Syria Battle Was 300 Killed and Wounded: Sources,” Reuters, February 15, 2018, <https://www.reuters.com/article/us-mideast-crisis-syria-russia-casualtie/russian-toll-in-syria-battle-was-300-killed-and-wounded-sources-idUSKCNIFZ2DZ> (accessed June 19, 2019).
7. Maria Tsvetkova and Anton Zverev, “Exclusive: Kremlin-Linked Contractors Help Guard Venezuela’s Maduro—Sources,” Reuters, January 25, 2019, <https://www.reuters.com/article/us-venezuela-politics-russia-exclusive/exclusive-kremlin-linked-contractors-help-guard-venezuelas-maduro-sources-idUSKCN1PJ22M> (accessed June 19, 2019).
8. Brian Whitmore, “The Latin American Front: Russian Propaganda in Venezuela and Western Responses,” Center for European Policy Analysis, February 2019, p. 3, [https://docs.wixstatic.com/ugd/644196\\_a56b7c0167314e15bed79392ef24495b.pdf](https://docs.wixstatic.com/ugd/644196_a56b7c0167314e15bed79392ef24495b.pdf) (accessed June 19, 2019).
9. Reuters, “Russian Air Force Planes Land in Venezuela Carrying Troops: Reports,” March 24, 2019, <https://www.reuters.com/article/us-venezuela-politics-idUSKCN1R50NB> (accessed June 19, 2019).
10. Andrew Osborn, “Russian Nuclear-Capable Bomber Aircraft Fly to Venezuela, Angering U.S.” Reuters, December 11, 2018, [https://www.reuters.com/article/us-venezuela-russia-airforce/russian-nuclear-capable-bomber-aircraft-fly-to-venezuela-angering-u-s-idUSKBN1OA23L?utm\\_campaign=trueAnthem:+Trending+Content&utm\\_content=5c10105004d301234202a188&utm\\_medium=trueAnthem&utm\\_source=twitter](https://www.reuters.com/article/us-venezuela-russia-airforce/russian-nuclear-capable-bomber-aircraft-fly-to-venezuela-angering-u-s-idUSKBN1OA23L?utm_campaign=trueAnthem:+Trending+Content&utm_content=5c10105004d301234202a188&utm_medium=trueAnthem&utm_source=twitter) (accessed June 19, 2019).
11. Daria Litvinova, “Russia in Venezuela: As Moscow Accuses U.S. of ‘Information War,’ What Is Putin’s Role in the Standoff?” CBS News, updated May 1, 2019, <https://www.cbsnews.com/news/russia-in-venezuela-why-vladimir-putin-backs-nicolas-maduro-in-standoff-with-donald-trump-us/> (accessed June 19, 2019).
12. International Institute for Strategic Studies, *The Military Balance 2017: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2017), p. 186.
13. Radio Free Europe/Radio Liberty, “Putin Creates National Guard Force,” July 4, 2016, <https://www.rferl.org/a/putin-national-guard-dissent-riots/27836301.html> (accessed June 19, 2019), and International Institute for Strategic Studies, *The Military Balance 2017*, p. 169.
14. International Institute for Strategic Studies, *The Military Balance 2017*, p. 186.
15. Reuters, “World Bank Lowers Russia’s 2019 GDP Forecast to 1.4%,” *The Moscow Times*, April 5, 2019, <https://www.themoscowtimes.com/2019/04/05/world-bank-lowers-russias-2019-gdp-forecast-to-14-pct-a65104> (accessed June 19, 2019).
16. Reuters, “Russia’s Economic Growth Slows in Early 2019, Real Incomes in Focus,” April 18, 2019, <https://in.reuters.com/article/russia-economy/russias-economic-growth-slows-in-early-2019-real-incomes-in-focus-id1NKCNIURISW> (accessed June 19, 2019).
17. Table 1, “The 40 Countries with the Highest Military Expenditure in 2018,” in Nan Tian, Aude Fleurant, Alexandra Kuimova, Pieter D. Wezeman, and Siemon T. Wezeman, “Trends in World Military Expenditure, 2018,” Stockholm International Peace Research Institute *Fact Sheet*, April 2019, p. 2, [https://www.sipri.org/sites/default/files/2019-04/fs\\_1904\\_milex\\_2018\\_0.pdf](https://www.sipri.org/sites/default/files/2019-04/fs_1904_milex_2018_0.pdf) (accessed June 19, 2019).
18. Michael Kofman, “Russian Defense Spending Is Much Larger, and More Sustainable than It Seems,” *Defense News*, May 3, 2019, <https://www.defensenews.com/opinion/commentary/2019/05/03/russian-defense-spending-is-much-larger-and-more-sustainable-than-it-seems/> (accessed June 19, 2019).

19. Damien Sharkov, "Russia's Military Expansion Makes It Greatest Threat to Europe and NATO Must Defend It, Says U.S. General," *Newsweek*, January 16, 2018, <http://www.newsweek.com/russias-military-expansion-makes-it-greatest-threat-europe-nato-782114> (accessed June 19, 2019).
20. Stratfor, "Russia: Procurement Plans Reflect the Military's Modernization Struggles," January 15, 2019, <https://worldview.stratfor.com/article/russia-procurement-plans-reflect-militarys-modernization-struggles-putin> (accessed June 19, 2019).
21. International Institute for Strategic Studies, *The Military Balance 2019*, p. 175.
22. Richard Connolly and Mathieu Boulègue, "Russia's New State Armament Programme: Implications for the Russian Armed Forces and Military Capabilities to 2027," Chatham House: The Royal Institute of International Affairs, *Research Paper*, May 2018, p. 2, <https://www.chathamhouse.org/sites/default/files/publications/research/2018-05-10-russia-state-armament-programme-connolly-boulegue-final.pdf> (accessed June 19, 2019).
23. Stratfor, "Russia: Procurement Plans Reflect the Military's Modernization Struggles."
24. Franz-Stefan Gady, "Russia's Most Powerful Intercontinental Ballistic Missile to Enter Service in 2021," *The Diplomat*, March 30, 2018, <https://thediplomat.com/2018/03/russias-most-powerful-intercontinental-ballistic-missile-to-enter-service-in-2021/> (accessed June 19, 2019).
25. "Russia's Hypersonic Ballistic Missile and Laser System in Final Tests, Putin Says," *The Moscow Times*, April 11, 2019, <https://www.themoscowtimes.com/2019/04/11/russias-hypersonic-ballistic-missile-laser-system-final-tests-putin-says-a65204> (accessed June 19, 2019).
26. International Institute for Strategic Studies, *The Military Balance 2017*, p. 159.
27. Tom Bowman, "U.S. Military Advantage over Russia and China 'Eroding,' Pentagon Says," NPR, January 19, 2018, <https://www.npr.org/2018/01/19/579088536/u-s-military-advantage-over-russia-and-china-eroding-says-pentagon> (accessed June 19, 2019).
28. Franz-Stefan Gady, "Russia's T-14 'Armata' Battle Tank to Begin State Trials in 2019," *The Diplomat*, January 3, 2019, <https://thediplomat.com/2019/01/russias-t-14-armata-battle-tank-to-begin-state-trials-in-2019/> (accessed June 19, 2019).
29. International Institute for Strategic Studies, *The Military Balance 2019*, p. 177.
30. Alex Lockie, "Russia Admits Defeat on Its 'Stealth' F-35 Killer by Canceling Mass Production of the Su-57 Fighter Jet," *Business Insider*, July 12, 2018, <https://www.businessinsider.com/russia-admits-defeat-su-57-not-going-into-mass-production-2018-7> (accessed June 19, 2019).
31. Ryan Pickrell, "Russia Is Talking About Scrapping Its Only Aircraft Carrier, Putting the Troubled Ship out of Its Misery," *Business Insider*, April 8, 2019, <https://www.businessinsider.com/russia-is-talking-about-scrapping-kuznetsov-its-only-aircraft-carrier-2019-4> (accessed June 19, 2019).
32. Ryan Pickrell, "Russia Is Planning to Build Its First Nuclear-Powered Aircraft Carrier After Breaking Its Only Flattop," *Business Insider*, May 8, 2019, <https://www.businessinsider.com/russia-wants-to-build-its-first-nuclear-powered-aircraft-carrier-2019-5> (accessed June 19, 2019).
33. Thomas Nilsen, "Russian Navy Upgrades Multi-Purpose Submarines," *The Barents Observer*, March 20, 2017, <https://thebarentsobserver.com/en/security/2017/03/russian-navy-upgrades-multi-purpose-submarines> (accessed June 19, 2019).
34. Bill Gertz, "Russia to Deploy Precision Strike Missiles in Western Atlantic," *The Washington Free Beacon*, January 4, 2019, <https://freebeacon.com/national-security/russia-to-deploy-precision-strike-missiles-in-western-atlantic/> (accessed June 19, 2019).
35. Franz-Stefan Gady, "Russia Lays Down 2 Project 22350 *Admiral Gorshkov*-Class Stealth Frigates," *The Diplomat*, April 24, 2019, <https://thediplomat.com/2019/04/russia-lays-down-2-project-22350-admiral-gorshkov-class-stealth-frigates/> (accessed May 15, 2019).
36. Ibid.
37. Thomas Nilsen, "Russian Navy Gets Go-ahead for Design of New Nuclear Powered Destroyers," *The Barents Observer*, August 28, 2017, <https://thebarentsobserver.com/en/security/2017/08/russian-navy-gets-go-ahead-design-new-nuclear-powered-destroyers> (accessed June 19, 2019).
38. Andrew Osborn, "Despite Putin's Swagger, Russia Struggles to Modernize Its Navy," Reuters, February 21, 2019, <https://www.reuters.com/article/us-russia-military-insight/despite-putins-swagger-russia-struggles-to-modernize-its-navy-idUSKCN1QA0U7> (accessed June 19, 2019).
39. International Institute for Strategic Studies, *The Military Balance 2019*, p. 178.



40. Charlie Gao, "Russia's Husky Class Submarine: Armed with Nuclear Torpedoes and Hypersonic Missiles?" *The National Interest*, May 10, 2018, <https://nationalinterest.org/blog/the-buzz/russias-husky-class-submarine-armed-nuclear-torpedoes-25784> (accessed June 19, 2019), and Michael Peck, "Russia Wants to Arm Its New Husky-Class Submarines with Hypersonic Missiles," *The National Interest*, May 31, 2018, <http://nationalinterest.org/blog/the-buzz/russia-wants-arm-its-new-husky-class-submarines-hypersonic-26063> (accessed June 19, 2019).
41. Gao, "Russia's Husky Class Submarine: Armed with Nuclear Torpedoes and Hypersonic Missiles?"
42. International Institute for Strategic Studies, *The Military Balance 2017*, p. 174.
43. Franz-Stefan Gady, "Shipbuilder Launches New Attack Sub for Russia's Pacific Fleet," *The Diplomat*, March 28, 2019, <https://thediplomat.com/2019/03/shipbuilder-launches-new-attack-sub-for-russias-pacific-fleet/> (accessed May 17, 2019).
44. *Ibid.*
45. Michael Peck, "Russia's Military Has a Problem: Too Many Paratroopers, Not Enough Transport Planes," *The National Interest*, October 1, 2018, <https://nationalinterest.org/blog/buzz/russias-military-has-problem-too-many-paratroopers-not-enough-transport-planes-32337> (accessed June 19, 2019).
46. Reuters, "Russia Expands Military Transport Fleet to Move Troops Long Distances," March 7, 2017, <http://www.reuters.com/article/russia-navy-expansion-idUSL5N1GK470> (accessed June 19, 2019).
47. International Institute for Strategic Studies, *The Military Balance 2017*, pp. 173 and 192.
48. Amanda Macias, "Russia Quietly Conducted the World's Longest Surface-to-Air Missile Test," CNBC, May 24, 2018, [https://www.cnn.com/2018/05/24/russia-quietly-conducted-the-worlds-longest-surface-to-air-missile-test.html?\\_source=twitter%7Cmain](https://www.cnn.com/2018/05/24/russia-quietly-conducted-the-worlds-longest-surface-to-air-missile-test.html?_source=twitter%7Cmain) (accessed June 19, 2019).
49. Defense Intelligence Agency, *Challenges to Security in Space*, released February 11, 2019, p. 23, [https://www.dia.mil/Portals/27/Documents/News/Military%20Power%20Publications/Space\\_Threat\\_V14\\_020119\\_sm.pdf](https://www.dia.mil/Portals/27/Documents/News/Military%20Power%20Publications/Space_Threat_V14_020119_sm.pdf) (accessed June 19, 2019). For release date, see press release, "Defense Intelligence Agency Releases Report on Challenges to U.S. Security in Space," Defense Intelligence Agency, February 11, 2019, <https://www.dia.mil/news/articles/article-view/article/1754150/defense-intelligence-agency-releases-report-on-challenges-to-us-security-in-spa/> (accessed June 19, 2019).
50. Amanda Macias, "A Never-Before-Seen Russian Missile Is Identified as an Anti-Satellite Weapon and Will Be Ready for Warfare by 2022," CNBC, October 25, 2018, <https://www.cnn.com/2018/10/25/russian-missile-identified-as-anti-satellite-weapon-ready-by-2022.html> (accessed May 15, 2019).
51. International Institute for Strategic Studies, *The Military Balance 2019*, p. 177.
52. General Curtis M. Scaparrotti, United States Army, Commander, United States European Command, statement on EUCOM posture before the Committee on Armed Services, U.S. Senate, March 5, 2019, p. 5, [https://www.armed-services.senate.gov/imo/media/doc/Scaparrotti\\_03-05-19.pdf](https://www.armed-services.senate.gov/imo/media/doc/Scaparrotti_03-05-19.pdf) (accessed June 19, 2019). Cited hereafter as Scaparrotti, 2019 EUCOM Posture Statement.
53. Olevs Nikers, "Russia's Offshore 'Missile Tests': Psychologically Undermining the Economic Security of the Baltics," Jamestown Foundation *Eurasia Daily Monitor*, Vol. 15, Issue 74 (May 15, 2018), <https://jamestown.org/program/russias-offshore-missile-tests-psychologically-undermining-the-economic-security-of-the-baltics/> (accessed June 19, 2019), and Michael Birnbaum, "Russia Tests Missiles in the Baltic Sea, a Day After Baltic Leaders Met with Trump," *The Washington Post*, April 4, 2018, [https://www.washingtonpost.com/world/europe/russia-tests-missiles-in-the-baltic-sea-a-day-after-baltic-leaders-met-with-trump/2018/04/04/0a35e222-380d-11e8-af3c-2123715f78df\\_story.html?utm\\_term=.8f8c10f97f62](https://www.washingtonpost.com/world/europe/russia-tests-missiles-in-the-baltic-sea-a-day-after-baltic-leaders-met-with-trump/2018/04/04/0a35e222-380d-11e8-af3c-2123715f78df_story.html?utm_term=.8f8c10f97f62) (accessed June 19, 2019).
54. Samuel Osborne, "Russian Live Missile Tests Force Latvia to Close Airspace over Baltic Sea: 'It's Hard to Comprehend,'" *The Independent*, April 5, 2018, <https://www.independent.co.uk/news/world/europe/russia-latvia-missile-tests-baltic-sea-airspace-donald-trump-baltic-leaders-white-house-a8289451.html> (accessed June 19, 2019).
55. Nikers, "Russia's Offshore 'Missile Tests': Psychologically Undermining the Economic Security of the Baltics," and Birnbaum, "Russia Tests Missiles in the Baltic Sea, a Day After Baltic Leaders Met with Trump."
56. Osborne, "Russian Live Missile Tests Force Latvia to Close Airspace over Baltic Sea."
57. Colonel Tomasz K. Kowalik and Dominik P. Jankowski, "The Dangerous Tool of Russian Military Exercises," Center for European Policy Analysis, StratCom Program, May 9, 2017, reprinted in Dominik P. Jankowski, "The Dangerous Tool of Russian Military Exercises," Foreign Policy Association, Foreign Policy Blogs, June 7, 2017, <https://foreignpolicyblogs.com/2017/06/07/dangerous-tool-russian-military-exercises/> (accessed June 19, 2019).
58. Damien Sharkov, "Putin Calls 45,000 Troops to Snap Air Drill," *Newsweek*, February 8, 2017, <http://www.newsweek.com/putin-called-45000-troops-snap-air-drill-554312> (accessed June 19, 2019).

59. Dave Johnson, "VOSTOK 2018: Ten Years of Russian Strategic Exercises and Warfare Preparation," *NATO Review*, December 20, 2018, <https://www.nato.int/docu/review/2018/Also-in-2018/vostok-2018-ten-years-of-russian-strategic-exercises-and-warfare-preparation-military-exercises/EN/index.htm> (accessed June 19, 2019).
60. U.S. Strategic Command, "Remarks by Gen. Curtis M. Scaparrotti at the 2016 Deterrence Symposium," La Vista, Nebraska, July 27, 2016, <http://www.stratcom.mil/Media/Speeches/Article/986470/2016-deterrence-symposium/> (accessed June 19, 2019).
61. International Institute for Strategic Studies, *The Military Balance 2017*, p. 187.
62. Andrew Higgins, "300,000 Troops and 900 Tanks: Russia's Biggest Military Drills Since Cold War," *The New York Times*, August 28, 2018, <https://www.nytimes.com/2018/08/28/world/europe/russia-military-drills.html> (accessed June 19, 2019).
63. Ibid. and Johnson, "VOSTOK 2018: Ten Years of Russian Strategic Exercises and Warfare Preparation."
64. Mathieu Boulègue, "Russia's Vostok Exercises Were Both Serious Planning and a Show," Chatham House: The Royal Institute of International Affairs, September 17, 2018, <https://www.chathamhouse.org/expert/comment/russia-s-vostok-exercises-were-both-serious-planning-and-show> (accessed June 19, 2019).
65. Ibid. and Johnson, "VOSTOK 2018: Ten Years of Russian Strategic Exercises and Warfare Preparation."
66. Higgins, "300,000 Troops and 900 Tanks: Russia's Biggest Military Drills Since Cold War," and Sam LaGrone, "China Sent Uninvited Spy Ship to Russian Vostok 2018 Exercise Alongside Troops, Tanks," U.S. Naval Institute News, September 17, 2018, <https://news.usni.org/2018/09/17/china-sent-uninvited-spy-ship-russian-vostok-2018-exercise-alongside-troops-tanks> (accessed June 19, 2019).
67. Vladimir Putin, "On the Russian Federation's National Security Strategy," Presidential Edict 683, December 31, 2015, <http://www.ieee.es/Galerias/fichero/OtrasPublicaciones/Internacional/2016/Russian-National-Security-Strategy-31Dec2015.pdf> (accessed June 19, 2019).
68. Ibid.
69. Pavel Podvig, "New Version of the Military Doctrine," Russian Strategic Nuclear Forces Blog, December 26, 2014, [http://russianforces.org/blog/2014/12/new\\_version\\_of\\_the\\_military\\_do.shtml](http://russianforces.org/blog/2014/12/new_version_of_the_military_do.shtml) (accessed June 19, 2019).
70. Connolly and Boulègue, "Russia's New State Armament Programme: Implications for the Russian Armed Forces and Military Capabilities to 2027."
71. International Institute for Strategic Studies, *The Military Balance 2017*, p. 15.
72. Ibid.
73. Tom O'Connor, "Russia Conflict with NATO and U.S. Would Immediately Result in Nuclear War, Russian Lawmaker Warns," *Newsweek*, May 30, 2017, <http://www.newsweek.com/russia-politician-nuclear-weapons-us-nato-crimea-617613> (accessed June 19, 2019).
74. Scaparrotti, 2019 EUCOM Posture Statement, p. 5.
75. Barry D. Watts, *Nuclear-Conventional Firebreaks and the Nuclear Taboo*, Center for Strategic and Budgetary Assessments, 2013, p. 43, <https://csbaonline.org/uploads/documents/Nuclear-Conventional-Firebreaks-Report1.pdf> (accessed June 19, 2019).
76. Shaun Waterman, "Russia Threatens to Strike NATO Missile Defense Sites," *The Washington Times*, May 3, 2012, <http://www.washingtontimes.com/news/2012/may/3/russia-threatens-strike-nato-missile-defense-sites/?page=all> (accessed June 19, 2019).
77. Michael R. Gordon, "U.S. Says Russia Tested Missile, Despite Treaty," *The New York Times*, January 29, 2014, <http://www.nytimes.com/2014/01/30/world/europe/us-says-russia-tested-missile-despite-treaty.html> (accessed June 19, 2019).
78. Radio Free Europe/Radio Liberty, "Report: Russia Has Deployed More Medium-Range Cruise Missiles Than Previously Thought," February 10, 2019, <https://www.rferl.org/a/report-russia-has-deployed-more-medium-range-cruise-missiles-than-previously-thought/29761868.html> (accessed June 19, 2019).
79. Michael R. Gordon, "Russia Deploys Missile, Violating Treaty and Challenging Trump," *The New York Times*, February 14, 2017, <https://www.nytimes.com/2017/02/14/world/europe/russia-cruise-missile-arms-control-treaty.html> (accessed June 19, 2019).
80. Jim Garamone, "NATO Agrees: Russia in Material Breach of INF Treaty," U.S. Department of Defense, December 5, 2018, <https://dod.defense.gov/News/Article/Article/1705843/nato-agrees-russia-in-material-breach-of-inf-treaty/> (accessed June 19, 2019).
81. Fact Sheet, "President Donald J. Trump to Withdraw the United States from the Intermediate-Range Nuclear Forces (INF) Treaty," The White House, February 1, 2019, <https://www.whitehouse.gov/briefings-statements/president-donald-j-trump-withdraw-united-states-intermediate-range-nuclear-forces-inf-treaty/> (accessed June 19, 2019).
82. News release, "Russian Banker Sentenced in Connection with Conspiracy to Work for Russian Intelligence," U.S. Department of Justice, May 25, 2016, <https://www.justice.gov/opa/pr/russian-banker-sentenced-connection-conspiracy-work-russian-intelligence> (accessed June 19, 2019).

83. Deutsche Welle, "Hundreds of Russian and Chinese Spies in Brussels—Report," February 9, 2019, <https://www.dw.com/en/hundreds-of-russian-and-chinese-spies-in-brussels-report/a-47437958> (accessed June 19, 2019).
84. BBC News, "Sergei Kripal: Who Is the Former Russian Intelligence Officer?" March 29, 2018, <http://www.bbc.com/news/world-europe-43291394> (accessed June 19, 2019); Martin Evans and Victoria Ward, "Salisbury Nerve Agent Backlash: Residents Outraged as 500 Told They May Be at Risk a Week After Spy Attack," *The Telegraph*, March 12, 2018, <https://www.telegraph.co.uk/news/2018/03/11/salisbury-public-warned-wash-clothes-nerve-agent-attack/> (accessed June 19, 2019); and Ella Wills, "Police Officer Discharged from Hospital After Salisbury Spy Poisoning Speaks Out: 'Life Will Probably Never Be the Same,'" *Evening Standard*, March 22, 2018, <https://www.standard.co.uk/news/uk/police-officer-discharged-from-hospital-after-salisbury-spy-poisoning-speaks-out-for-first-time-life-a3797041.html> (accessed June 19, 2019).
85. Lauren Said-Moorhouse and Samuel Quashie-Idun, "Salisbury Declared Novichok-Free Nearly a Year After Nerve Agent Attack," CNN, updated March 1, 2019, <https://www.cnn.com/2019/03/01/uk/salisbury-novichok-cleanup-gbr-intl/index.html> (accessed June 19, 2019).
86. News release, "Statement from the United States, France, Germany, and the United Kingdom on the Attack in Salisbury," The White House, March 15, 2018, <https://www.whitehouse.gov/briefings-statements/statement-united-states-france-germany-united-kingdom-attack-salisbury/> (accessed June 19, 2019).
87. Heidi Blake, Tom Warren, Richard Holmes, Jason Leopold, Jane Bradley, and Alex Campbell, "From Russia with Blood," BuzzFeed News, June 15, 2017 (including June 16, 2017, update), [https://www.buzzfeed.com/heidiblake/from-russia-with-blood-14-suspected-hits-on-british-soil?utm\\_term=.dtzm1n1mZB#.po1WlrlWp0](https://www.buzzfeed.com/heidiblake/from-russia-with-blood-14-suspected-hits-on-british-soil?utm_term=.dtzm1n1mZB#.po1WlrlWp0) (accessed June 19, 2019).
88. Ali Watkins, "Russia Escalates Spy Games After Years of U.S. Neglect," *Politico*, updated June 1, 2017, <http://www.politico.com/story/2017/06/01/russia-spies-espionage-trump-239003> (accessed June 19, 2019).
89. BBC News, "US Charges Russian Spies over Yahoo Breach," March 15, 2017, <http://www.bbc.com/news/technology-39281063> (accessed June 19, 2019).
90. Katie Bo Williams, "US Sanctions Russia over Hacking, Expels 35 Officials," *The Hill*, December 29, 2016, <http://thehill.com/policy/national-security/312119-us-announces-sanctions-on-russia> (accessed June 19, 2019).
91. Cristina Silva, "New Cold War: Is Russia Spying on the U.S. from a Nicaragua Military Compound?" *Newsweek*, May 22, 2017, <http://www.newsweek.com/new-cold-war-russia-spying-us-nicaragua-military-compound-613427> (accessed June 19, 2019).
92. Evan Ellis, "Russian Engagement in Latin America: An Update," Center for Strategic and International Studies, December 19, 2017, <https://www.csis.org/analysis/russian-engagement-latin-america-update> (accessed June 19, 2019).
93. Brett Forrest, "In Cold War Echo, Russia Returns to U.S.'s Backyard," *The Wall Street Journal*, January 31, 2018, <https://www.wsj.com/articles/russia-returns-to-u-s-s-backyard-1517403600> (accessed June 19, 2019).
94. Estonian Foreign Intelligence Service, *International Security and Estonia 2019*, p. 4, <https://www.valisluureamet.ee/pdf/raport-2019-ENG-web.pdf> (accessed June 19, 2019).
95. State Security Department of the Republic of Lithuania, Second Investigation Department Under the Ministry of National Defence, *National Threat Assessment 2019*, p. 6, [https://kam.lt/en/news\\_1098/current\\_issues/latest\\_national\\_threat\\_assessment\\_presented.html](https://kam.lt/en/news_1098/current_issues/latest_national_threat_assessment_presented.html) (accessed June 19, 2019).
96. Latvian State Security Service, *Annual Report for 2018*, April 2019, pp. 18–24, <https://vdd.gov.lv/en/useful/publications/annual-report-on-the-activities-of-latvian-state-security-service-in-2018.art139> (accessed June 19, 2019).
97. Per Olaf Salming, "Kremlin Intimidation: Putin Renames Air Force Regiment 'Tallinn Regiment,'" *UpNorth*, January 30, 2018, <https://upnorth.eu/kremlin-intimidation-putin-renames-air-force-regiment-tallinn-regiment/> (accessed June 19, 2019).
98. Bill Gertz, "Russia Waging Information Warfare, General Says," *The Washington Free Beacon*, March 24, 2017, <http://freebeacon.com/national-security/russia-waging-information-warfare-general-says/> (accessed June 19, 2019).
99. BNS/TBT Staff, "Fake News About US Troops Posted on BNS Website and Cyber Attack Suspected," *The Baltic Times*, April 13, 2017, [http://www.baltictimes.com/fake\\_news\\_about\\_us\\_troops\\_posted\\_on\\_bns\\_website\\_and\\_cyber\\_attack\\_suspected/](http://www.baltictimes.com/fake_news_about_us_troops_posted_on_bns_website_and_cyber_attack_suspected/) (accessed June 19, 2019).
100. Deutsche Welle, "NATO: Russia Targeted German Army with Fake News Campaign," February 16, 2017, <http://www.dw.com/en/nato-russia-targeted-german-army-with-fake-news-campaign/a-37591978> (accessed June 19, 2019).
101. Todd C. Helmus, Elizabeth Bodine-Baron, Andrew Radin, Madeline Magnuson, Joshua Mendelsohn, William Marcellino, Andriy Bega, and Zev Winkelman, *Russian Social Media Influence: Understanding Russian Propaganda in Eastern Europe* (Santa Monica: RAND Corporation, 2018), p. 89, [https://www.rand.org/content/dam/rand/pubs/research\\_reports/RR2200/RR2237/RAND\\_RR2237.pdf](https://www.rand.org/content/dam/rand/pubs/research_reports/RR2200/RR2237/RAND_RR2237.pdf) (accessed June 19, 2019).

102. Bill Gertz, "Russia Steps Up Anti-U.S. Military Propaganda," *The Washington Free Beacon*, April 27, 2017, <http://freebeacon.com/national-security/russia-steps-anti-u-s-military-propaganda/> (accessed June 19, 2019).
103. Andrius Sytas, "Lithuania Sees Fake News Attempt to Discredit NATO Exercises," Reuters, June 13, 2018, <https://uk.reuters.com/article/uk-nato-russia/lithuania-sees-fake-news-attempt-to-discredit-nato-exercises-idUKKBNIJ92GS> (accessed June 19, 2019).
104. Kalev Stoicescu and Pauli Järvenpää, *Contemporary Deterrence: Insights and Lessons from Enhanced Forward Presence*, International Centre for Defense and Security, January 2019, p. 13, [https://icds.ee/wp-content/uploads/2019/01/ICDS\\_Report\\_Contemporary\\_Deterrence\\_Stoicescu\\_J%C3%A4rvenp%C3%A4%C3%A4\\_January\\_2019.pdf](https://icds.ee/wp-content/uploads/2019/01/ICDS_Report_Contemporary_Deterrence_Stoicescu_J%C3%A4rvenp%C3%A4%C3%A4_January_2019.pdf) (accessed June 19, 2019).
105. "#BalticBrief: The Kremlin's Loudspeaker in Latvia," Medium, November 18, 2018, <https://medium.com/dfrlab/balticbrief-the-kremlins-loudspeaker-in-latvia-14c6398b2473> (accessed June 19, 2019).
106. Kathrin Hille, Neil Buckley, Courtney Weaver, and Guy Chazan, "Vladimir Putin Signs Treaty to Annex Crimea," *Financial Times*, March 18, 2014, <http://www.ft.com/cms/s/0/d93e4c7c-ae6d-11e3-8e41-00144feab7de.html> (accessed June 19, 2019).
107. Janusz Bugajski and Peter B. Doran, "Black Sea Rising: Russia's Strategy in Southeast Europe," Center for European Policy Analysis *Black Sea Strategic Report* No. 1, February 2016, p. 8, [https://docs.wixstatic.com/ugd/644196\\_29f8496cc1934185865b81480c4561b5.pdf](https://docs.wixstatic.com/ugd/644196_29f8496cc1934185865b81480c4561b5.pdf) (accessed June 19, 2019).
108. Neil MacFarquhar, "Putin Opens Bridge to Crimea, Cementing Russia's Hold on Neighbor," *The New York Times*, May 15, 2018, <https://www.nytimes.com/2018/05/15/world/europe/putin-russia-crimea-bridge.html> (accessed June 19, 2019).
109. UNIAN Information Agency, "Shipping Volumes at Mariupol Port Fall 10% Against 2017—Media," January 9, 2019, <https://www.unian.info/economics/10402497-shipping-volumes-at-mariupol-port-fall-10-against-2017-media.html> (accessed June 19, 2019).
110. International Institute for Strategic Studies, *The Military Balance 2019*, p. 209. Ukraine has put the number of Russian troops in occupied Crimea at 60,000. UNIAN Information Agency, "Some 60,000 Russian Troops Deployed in Crimea Today—Experts," June 3, 2017, <https://www.unian.info/politics/1957384-some-60000-russian-troops-deployed-in-crimea-today-experts.html> (accessed June 19, 2019).
111. Michael Petersen, "The Naval Power Shift in the Black Sea," War on the Rocks, January 9, 2019, <https://warontherocks.com/2019/01/the-naval-power-shift-in-the-black-sea/> (accessed June 19, 2019).
112. Dmitry Gorenburg, "Is a New Russian Black Sea Fleet Coming? Or Is It Here?" War on the Rocks, July 31, 2018, <https://warontherocks.com/2018/07/is-a-new-russian-black-sea-fleet-coming-or-is-it-here/> (accessed June 19, 2019).
113. Reuters, "Russia Decides to Deploy Nuclear-Capable Strategic Bombers to Crimea: RIA," March 18, 2019, <https://www.reuters.com/article/us-ukraine-crisis-crimea-bombers-idUSKCN1QZ1WV> (accessed June 19, 2019).
114. Bugajski and Doran, "Black Sea Rising: Russia's Strategy in Southeast Europe," p. 3.
115. Gorenburg, "Is a New Russian Black Sea Fleet Coming? Or Is It Here?"
116. "Russia: SSGN Severodvinsk to Get Caliber Cruise Missiles," *Naval Today*, August 16, 2012, <http://navaltoday.com/2012/08/16/russia-ssgn-severodvinsk-to-get-caliber-cruise-missiles/> (accessed June 19, 2019), and Sam Jones and Kathrin Hille, "Russia's Military Ambitions Make Waves in the Black Sea," *Financial Times*, May 13, 2016, <https://next.ft.com/content/1b9c24d8-1819-11e6-b197-a4af20d5575e> (accessed June 19, 2019).
117. Petersen, "The Naval Power Shift in the Black Sea."
118. Sergey Sukhankin, "Russia Pours More Military Hardware into 'Fortress Crimea,'" Jamestown Foundation *Eurasia Daily Monitor*, Vol. 14, Issue 147 (November 14, 2017), <https://jamestown.org/program/russia-pours-military-hardware-fortress-crimea/> (accessed June 19, 2019).
119. Petersen, "The Naval Power Shift in the Black Sea."
120. Nolan Peterson, "NATO Braces for Putin's Next Military Move in Eastern Europe," The Daily Signal, March 26, 2018, <https://www.dailysignal.com/2018/03/26/nato-braces-putins-next-military-move-eastern-europe/>.
121. Meetings Coverage and Press Releases, "Situation in Eastern Ukraine Remains 'Tense and Volatile' Despite Post-Ceasefire Reduction in Fighting, Security Council Told During Briefing," U.N. Security Council, December 11, 2015, <https://www.un.org/press/en/2015/sc12154.doc.htm> (accessed June 19, 2019).
122. Radio Free Europe/Radio Liberty, "Death Toll up to 13,000 in Ukraine Conflict, Says UN Rights Office," February 26, 2019, <https://www.rferl.org/a/death-toll-up-to-13-000-in-ukraine-conflict-says-un-rights-office/29791647.html> (accessed June 19, 2019).
123. Radio Free Europe/Radio Liberty, "Russian Court Leaves Jailed Ukrainian Sailors in Pretrial Detention," January 15, 2019, <https://www.rferl.org/a/russian-court-leaves-jailed-ukrainian-sailors-in-pretrial-detention/29711363.html> (accessed June 19, 2019).

124. Press statement, "Russia's Harassment of International Shipping Transiting the Kerch Strait and Sea of Azov," U.S. Department of State, August 30, 2018, <https://www.state.gov/russias-harassment-of-international-shipping-transiting-the-kerch-strait-and-sea-of-azov/> (accessed June 21, 2019).
125. Zhanna Bezpiatchuk, "Russia-Ukraine Sea Clash Leaves Mariupol Port Deserted," BBC News, December 16, 2018, <https://www.bbc.com/news/world-europe-46551464> (accessed June 20, 2019), and UNIAN Information Agency, "Shipping Volumes at Mariupol Port Fall 10% Against 2017—Media."
126. General Curtis M. Scaparrotti, Commander, United States European Command, statement on EUCOM posture before the Committee on Armed Services, U.S. Senate, March 23, 2017, pp. 5–6, [https://www.armed-services.senate.gov/imo/media/doc/Scaparrotti\\_03-23-17.pdf](https://www.armed-services.senate.gov/imo/media/doc/Scaparrotti_03-23-17.pdf) (accessed June 19, 2019).
127. Radio Free Europe/Radio Liberty, "OSCE Expresses Concern over Russian Forces Actions in Transdnier," August 16, 2018, <https://www.rferl.org/a/osce-expresses-concerns-russian-forces-transdnier/29437831.html> (accessed June 20, 2019), and press release, "OSCE Mission to Moldova Concerned About Unsanctioned Military Exercises in the Security Zone," Organization for Security and Co-operation in Europe, August 15, 2018, <https://www.osce.org/mission-to-moldova/390644> (accessed June 20, 2019).
128. Dumitru Minzarari, "Russia Perfecting Its Elections Interference Toolkit in Moldova," Jamestown Foundation Eurasia Daily Monitor, Vol. 16, Issue 12 (January 31, 2019), <https://jamestown.org/program/russia-perfecting-its-elections-interference-toolkit-in-moldova/> (accessed June 20, 2019).
129. Sergey Sukhankin, "Kaliningrad: From Boomtown to Battle-Station," European Council on Foreign Relations, March 27, 2017, [https://www.ecfr.eu/article/commentary\\_kaliningrad\\_from\\_boomtown\\_to\\_battle\\_station\\_7256](https://www.ecfr.eu/article/commentary_kaliningrad_from_boomtown_to_battle_station_7256) (accessed June 20, 2019).
130. Michael Krepon and Joe Kendall, "Beef Up Conventional Forces; Don't Worry About a Tactical Nuke Gap," *Breaking Defense*, March 28, 2016, <http://breakingdefense.com/2016/03/beef-up-conventional-forces-dont-worry-about-a-tactical-uke-gap/> (accessed June 20, 2019), and Sukhankin, "Kaliningrad: From Boomtown to Battle-Station."
131. State Security Department of the Republic of Lithuania, Second Investigation Department Under the Ministry of National Defence, *National Threat Assessment 2019*, p. 22.
132. Kalev Stoicescu and Henrik Praks, "Strengthening the Strategic Balance in the Baltic Sea Area," International Centre for Defence and Security *Report*, March 2016, p. 14, [https://icds.ee/wp-content/uploads/2016/Kalev\\_Stoicescu\\_\\_Henrik\\_Praks\\_-\\_Strengthening\\_the\\_Strategic\\_Balance\\_in\\_the\\_Baltic\\_Sea\\_Area.pdf](https://icds.ee/wp-content/uploads/2016/Kalev_Stoicescu__Henrik_Praks_-_Strengthening_the_Strategic_Balance_in_the_Baltic_Sea_Area.pdf) (accessed June 20, 2019).
133. International Institute for Strategic Studies, *The Military Balance 2017*, p. 216, and Damien Sharkov, "Russian Military Asks Weapons Makers to Extend Range and Precision of Nuclear-Capable Iskander Missiles," *Newsweek*, May 19, 2017, <http://www.newsweek.com/russia-military-weapons-maker-nato-arms-missiles-iskander-nuclear-capable-612409> (accessed June 20, 2019).
134. Radio Free Europe/Radio Liberty, "Russia Deploys Coastal Missile Systems on Disputed Kurile Islands," November 22, 2016, <https://www.rferl.org/a/russia-deploys-coastal-missile-systems-on-disputed-kurile-islands/28133041.html> (accessed June 20, 2019).
135. Andrew Osborn, "Russia Approves Warplane Deployment on Disputed Island Near Japan," Reuters, February 2, 2018, <https://uk.reuters.com/article/uk-japan-russia-islands-military/russia-approves-warplane-deployment-on-disputed-island-near-japan-idUKKBN1FM179> (accessed June 20, 2019).
136. Franz-Stefan Gady, "Russia Is Building Military Barracks on Disputed Kuril Islands," *The Diplomat*, December 19, 2018, <https://thediplomat.com/2018/12/russia-is-building-military-barracks-on-disputed-kuril-islands/> (accessed June 20, 2019).
137. Roland Oliphant, "British Troops Arrive in Estonia as German Spy Chief Warns of Russian Troop Build Up," *The Telegraph*, March 18, 2017, <http://www.telegraph.co.uk/news/2017/03/18/british-troops-arrive-estonia-german-spy-chief-warns-russian/> (accessed June 20, 2019).
138. TASS, "Russia's Western Military District to Get Four S-400 Missile Systems This Year," January 13, 2017, <http://tass.com/defense/924840> (accessed June 20, 2019).
139. Radio Free Europe/Radio Liberty, "Russia to Create New Military Divisions in Response to NATO," January 22, 2016, <http://www.rferl.org/content/russia-new-military-divisions-nato/27503176.html> (accessed June 20, 2019).
140. Keir Giles, "Assessing Russia's Reorganized and Rearmed Military," Carnegie Endowment for International Peace, Task Force on U.S. Policy Toward Russia, Ukraine, and Eurasia *White Paper*, 2017, p. 9, [https://carnegieendowment.org/files/5.4.2017\\_Keir\\_Giles\\_RussiaMilitary.pdf](https://carnegieendowment.org/files/5.4.2017_Keir_Giles_RussiaMilitary.pdf) (accessed June 20, 2019).
141. Thomas Nilsen, "FSB Gets Right to Confiscate Land from People," *The Barents Observer*, May 16, 2017, <https://thebarentsobserver.com/en/security/2017/05/fsb-gets-right-confiscate-land-people#.WR3YvGBXtZy.twitter> (accessed June 20, 2019).

142. Atle Staalesen, "New FSB Base Opens Way for More Operations in Arctic," *The Barents Observer*, January 3, 2019, <https://thebarentsobserver.com/en/security/2019/01/new-fsb-base-opens-way-more-operations-arctic> (accessed June 19, 2019).
143. BBC News, "Putin Creates New National Guard in Russia 'to Fight Terrorism,'" April 6, 2016, <https://www.bbc.com/news/world-europe-35975840> (accessed June 19, 2019).
144. Atle Staalesen, "National Guard Becomes Arctic Protector," *The Barents Observer*, January 28, 2019, <https://thebarentsobserver.com/en/security/2019/01/national-guard-becomes-arctic-protector> (accessed June 19, 2019).
145. Oksana Kobzeva and Natalia Chumakova, "Russia's Novatek Starts Yamal's Second LNG Train, Sends Condensate to Middle East," Reuters, August 9, 2018, <https://www.reuters.com/article/us-russia-novatek-yamal/russias-novatek-starts-yamals-second-lng-train-sends-condensate-to-middle-east-idUSKBN1KUIKM> (accessed June 20, 2019).
146. Staalesen, "National Guard Becomes Arctic Protector," and Atle Staalesen, "World's First Floating Nuclear Power Plant Is Making Pevek an Arctic Boom Town," *The Barents Observer*, November 30, 2018, <https://thebarentsobserver.com/en/arctic-industry-and-energy/2018/11/worlds-first-floating-nuclear-power-plant-making-pevek-arctic> (accessed June 20, 2019).
147. Atle Staalesen, "It's an Order from the Kremlin: Shipping on Northern Sea Route to Reach 80 Million Tons by 2024," *The Barents Observer*, May 15, 2018, <https://thebarentsobserver.com/en/arctic/2018/05/its-order-kremlin-shipping-northern-sea-route-increase-80-million-tons-2024> (accessed June 20, 2019).
148. Staalesen, "New FSB Base Opens Way for More Operations in Arctic."
149. Nastassia Astrasheuskaya, "Russia Gives Nuclear Group Control of Arctic Sea Route," *Financial Times*, December 13, 2018, <https://www.ft.com/content/b5dc9c38-fd56-11e8-aebf-99e208d3e521> (accessed June 20, 2019).
150. Pavel Felgenhauer, "Russia Claims Total Military Superiority in the Arctic," Jamestown Foundation *Eurasia Daily Monitor*, Vol. 16, Issue 36 (March 14, 2019), <https://jamestown.org/program/russia-claims-total-military-superiority-in-the-arctic/> (accessed June 20, 2019).
151. Dave Majumdar, "Russia to Standup New Arctic Command," U.S. Naval Institute News, updated February 18, 2014, <http://news.usni.org/2014/02/18/russia-standup-new-arctic-command> (accessed June 20, 2019).
152. Reuters, "Putin Instigating Biggest Russian Arctic Military Buildup Since Soviet Fall," *The Japan Times*, January 31, 2017, <http://www.japantimes.co.jp/news/2017/01/31/world/putin-instigating-biggest-russian-arctic-military-buildup-since-soviet-fall/#.WSM0IoWcHcs> (accessed June 20, 2019), and "New Forces to Guard Northern Sea Route," *The Maritime Executive*, January 20, 2017, <http://www.maritime-executive.com/article/new-forces-to-guard-northern-sea-route> (accessed June 20, 2019).
153. TASS, "Russian Northern Fleet Creates Submarine Division for Deep-Water Operations," Navy Recognition, April 27, 2018, <http://www.navyrecognition.com/index.php/news/defence-news/2018/april-2018-navy-naval-defense-news/6169-russian-northern-fleet-creates-submarine-division-for-deep-water-operations.html> (accessed June 20, 2019).
154. Elizabeth McLaughlin, "The Race for the Arctic: As New Frontier Opens, Russia Leaves US in Its Wake," ABC News, May 10, 2017, <http://abcnews.go.com/International/race-arctic-frontier-opens-russia-leaves-us-wake/story?id=47304875> (accessed June 20, 2019), and Andrew Osborn, "Putin's Russia in Biggest Arctic Military Push Since Soviet Fall," Reuters, January 30, 2017, <http://mobile.reuters.com/article/idUSKBN15E0W0> (accessed June 20, 2019).
155. Jacek Siminski, "Russia Reactivates Military Airfield in the Arctic Region After 20 Years," *The Aviationist*, December 8, 2013, <https://theaviationist.com/2013/12/08/russia-arctic-base/> (accessed June 20, 2019), and Osborn, "Putin's Russia in Biggest Arctic Military Push Since Soviet Fall."
156. Atle Staalesen, "New Arctic Naval Base Built in 6 Months," *The Barents Observer*, January 30, 2019, <https://thebarentsobserver.com/en/civil-society-and-media/2019/01/new-arctic-naval-base-built-6-months> (accessed June 20, 2019).
157. Atle Staalesen, "Russian Navy Announces It Will Significantly Expand Arctic Air Patrols," *The Barents Observer*, January 2, 2018, <https://thebarentsobserver.com/en/security/2018/01/russian-navy-announces-it-will-significantly-increase-arctic-air-patrols> (accessed June 20, 2019), and Atle Staalesen, "Navy Pilots Take Off to New Arctic Bases," *The Barents Observer*, March 13, 2019, <https://thebarentsobserver.com/en/2019/03/navy-pilots-take-new-arctic-bases> (accessed June 20, 2019).
158. Robbie Gramer, "Here's What Russia's Military Build-Up in the Arctic Looks Like," *Foreign Policy*, January 25, 2017, [http://foreignpolicy.com/2017/01/25/heres-what-russias-military-build-up-in-the-arctic-looks-like-trump-oil-military-high-north-infographic-map/?utm\\_content=buffer12641&utm\\_medium=social&utm\\_source=twitter.com&utm\\_campaign=buffer](http://foreignpolicy.com/2017/01/25/heres-what-russias-military-build-up-in-the-arctic-looks-like-trump-oil-military-high-north-infographic-map/?utm_content=buffer12641&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer) (accessed June 20, 2019).
159. Atle Staalesen, "Navy Pilots Take Off to New Arctic Bases," *The Barents Observer*, March 13, 2019, <https://thebarentsobserver.com/en/2019/03/navy-pilots-take-new-arctic-bases> (accessed June 20, 2019).

160. Joseph Trevithick, "Russia Projects Heavy Airpower in the Arctic from Constellation of New and Improved Bases," *The War Zone*, January 2, 2019, <http://www.thedrive.com/the-war-zone/25763/russia-projects-heavy-airpower-in-the-arctic-from-constellation-of-new-and-improved-bases> (accessed June 20, 2019).
161. Thomas Nilsen, "Russia Resumes North Pole Patrols with Fighter Jets," *The Barents Observer*, February 2, 2019, <https://thebarentsobserver.com/en/security/2019/02/russia-resumes-north-pole-patrols-fighter-jets> (accessed June 20, 2019).
162. Thomas Nilsen, "In Polar Night, Russia Exercises Strategic Bombers and Newest Frigate," *The Barents Observer*, January 27, 2019, <https://thebarentsobserver.com/en/security/2019/01/polar-night-russia-exercises-strategic-bombers-and-newest-frigate> (accessed June 20, 2019).
163. Thomas Nilsen, "Video: Russian Bombers Outside Norway for Second Time in a Week," *The Barents Observer*, April 4, 2019, <https://thebarentsobserver.com/en/security/2019/04/video-russian-bombers-outside-norway-second-time-week> (accessed June 20, 2019).
164. Thomas Nilsen, "Russian Bombers Simulated an Attack Against This Radar on Norway's Barents Sea Coast," *The Barents Observer*, March 5, 2018, <https://thebarentsobserver.com/en/security/2018/03/russian-bombers-simulated-attack-against-radar-norways-barents-sea-coast> (accessed June 20, 2019).
165. Thomas Nilsen, "Arctic Challenge 2017 Set for Take Off," *The Barents Observer*, May 16, 2017, <https://thebarentsobserver.com/en/security/2017/05/arctic-challenge-2017-set-take> (accessed June 20, 2019), and Nilsen, "Russian Bombers Simulated an Attack Against This Radar on Norway's Barents Sea Coast."
166. TASS, "Russian Pacific Fleet Il-38N MPA Practice ASW in Arctic," *Navy Recognition*, April 2, 2018, <https://www.navyrecognition.com/index.php/news/defence-news/2018/april-2018-navy-naval-defense-news/6109-russian-pacific-fleet-il-38n-mpa-practice-asw-in-arctic.html> (accessed June 20, 2019).
167. Trude Pettersen, "Northern Fleet Gets Own Air Force, Air Defense Forces," *The Barents Observer*, February 1, 2016, <https://thebarentsobserver.com/en/security/2016/02/northern-fleet-gets-own-air-force-air-defense-forces> (accessed June 20, 2019).
168. Damien Sharkov, "Russia Deploys Air Radar on Arctic Wrangel Island," *Newsweek*, January 4, 2017, <http://www.newsweek.com/russia-deploys-air-radar-arctic-wrangel-island-538527> (accessed June 20, 2019).
169. Thomas Nilsen, "Russia Plans to Lay Trans-Arctic Fiber Cable Linking Military Installations," *The Barents Observer*, April 24, 2018, <https://thebarentsobserver.com/en/security/2018/04/russia-slated-lay-military-trans-arctic-fibre-cable#Wt-EVDOjIWI.twitter> (accessed June 20, 2018).
170. Thomas Nilsen, "Russia to Test-Launch Rockets Near Norway's Arctic Coast in Last Days of Trident Juncture," *Radio Canada International, Eye on the Arctic*, October 31, 2018, <http://www.rcinet.ca/eye-on-the-arctic/2018/10/31/russia-missile-launch-norway-finnmark-arctic-flight-nato-trident-juncture/> (accessed June 21, 2019).
171. RIA Novosti, "Russian Commandos Train for Arctic Combat," *Sputnik*, October 14, 2013, <https://sputniknews.com/military/20131014/184143129/Russian-Commandos-Train-for-Arctic-Combat.html> (accessed June 21, 2019).
172. Stephen Blank, "Russia's New Arctic Base Continue[s] the Militarization of the High North," *Jamestown Foundation Eurasia Daily Monitor*, Vol. 12, Issue 202 (November 6, 2015), [http://www.jamestown.org/single/?tx\\_ttnews%5Btt\\_news%5D=44572&no\\_cache=#.VxqCwfrKjph](http://www.jamestown.org/single/?tx_ttnews%5Btt_news%5D=44572&no_cache=#.VxqCwfrKjph) (accessed June 21, 2019), and Osborn, "Putin's Russia in Biggest Arctic Military Push Since Soviet Fall."
173. Yasmin Tadjdeh, "Zukunft: Coast Guard Could Arm Future Icebreaker," *National Defense*, May 3, 2017, <http://www.nationaldefensemagazine.org/articles/2017/5/3/zukunft-coast-guard-could-arm-future-icebreaker> (accessed June 21, 2019).
174. Dmitry Gorenburg, "Russia's New and Unrealistic Naval Doctrine," *War on the Rocks*, July 26, 2017, <https://warontherocks.com/2017/07/russias-new-and-unrealistic-naval-doctrine/> (accessed June 20, 2019).
175. Daniel Brown, "Russia's NATO Northern Fleet Beefs Up Its Nuclear Capabilities to Phase 'NATO Out of Arctic,'" *Business Insider*, June 1, 2017, <http://www.businessinsider.com/russias-northern-fleet-beefs-up-its-nuclear-capabilities-phase-nato-out-arctic-2017-6> (accessed June 20, 2019).
176. Thomas Nilsen, "Russia's Most Secret Sub Soon to Be Launched with This Terrifying Weapon," *The Barents Observer*, March 14, 2019, <https://thebarentsobserver.com/en/security/2019/03/russias-most-secret-sub-soon-be-launched-terrifying-weapon> (accessed June 21, 2019).
177. Alex Lockie, "Russia Says It's Going to Arm a Submarine with 6 Nuclear 'Doomsday' Devices," *Business Insider*, March 12, 2019, <https://www.businessinsider.com/russia-to-arm-a-secretive-submarine-with-6-nuclear-doomsday-devices-2019-3> (accessed June 21, 2019). See also TASS, "Russian Northern Fleet Creates Submarine Division for Deep-Water Operations," and Sputnik, "Russia to Convert Belgorod Submarine for Special Missions," February 9, 2012, <https://sputniknews.com/military/20120209171227695/> (accessed June 20, 2019).
178. Lockie, "Russia Says It's Going to Arm a Submarine with 6 Nuclear 'Doomsday' Devices."

179. Sputnik, "Russian Navy to Receive Biggest and Most Unique Nuclear Submarine in the World," updated April 23, 2017, <https://sputniknews.com/military/201704231052905471-russia-navy-biggest-sub/> (accessed June 21, 2019).
180. Nilsen, "Russia's Most Secret Sub Soon to Be Launched with This Terrifying Weapon."
181. Civil Georgia, "Moscow, Sokhumi Endorse Final Text of New Treaty," November 22, 2014, <http://www.civil.ge/eng/article.php?id=27841> (accessed June 21, 2019).
182. Civil Georgia, "Tbilisi Condemns Russia's Move to Sign New Treaty with Sokhumi," November 22, 2014, <http://www.civil.ge/eng/article.php?id=27842> (accessed June 21, 2019).
183. Radio Free Europe/Radio Liberty, "U.S. Condemns Russian Military Deal with Georgian Breakaway Region," January 26, 2018, <https://www.rferl.org/a/u-s-condemns-russian-ossetia-military-deal-georgia/29000754.html> (accessed June 21, 2019), and press statement, "Russia's Violations of Georgian Sovereignty," U.S. Department of State, January 26, 2018, <https://www.state.gov/russias-violations-of-georgian-sovereignty/> (accessed June 21, 2019).
184. News release, "Georgia—Javelin Missiles and Command Launch Units," U.S. Department of Defense, Defense Security Cooperation Agency, November 20, 2017, <http://www.dsca.mil/major-arms-sales/georgia-javelin-missiles-and-command-launch-units> (accessed June 21, 2019).
185. Adrian Croft, "Georgia Says Russia Bent on 'Creeping Annexation' of Breakaway Regions," Reuters, February 26, 2015, <http://www.reuters.com/article/us-georgia-russia-idUSKBNOLU2M020150226> (accessed June 21, 2019).
186. Luke Coffey, "NATO Membership for Georgia: In U.S. and European Interest," Heritage Foundation *Special Report* No. 199, January 29, 2018, pp. 10–11, <https://www.heritage.org/defense/report/nato-membership-georgia-us-and-european-interest>. See also Margarita Antidze, "Georgia Says Russia Violating Sovereignty with Border Markers," Reuters, July 13, 2015, <https://af.reuters.com/article/worldNews/idAFKCNOPN1VK20150713> (accessed June 21, 2019).
187. Andrew Osborn, "Russia to Beef Up Military Presence in Former Soviet Space," *The Telegraph*, August 18, 2010, <http://www.telegraph.co.uk/news/worldnews/europe/russia/7952433/Russia-to-beef-up-military-presence-in-former-Soviet-space.html> (accessed June 21, 2019).
188. International Institute for Strategic Studies, *The Military Balance 2018*, p. 182.
189. Joshua Kucera and Bradley Jardine, "Armenia Elects Protest Leader as Prime Minister," Eurasianet, May 8, 2018, <https://eurasianet.org/s/armenia-elects-protest-leader-as-prime-minister> (accessed June 21, 2019).
190. Radio Free Europe/Radio Liberty, "U.S. Frowns on Armenia's Involvement in Russia-Backed Syria Mission," February 13, 2019, <https://www.rferl.org/a/us-frowns-on-armenia-s-involvement-in-russia-backed-syria-mission/29768111.html> (accessed June 21, 2019).
191. In 1991, the Azerbaijan SSR Parliament dissolved the Nagorno–Karabakh Autonomous Oblast and divided the area among five rayons (administrative regions) in Azerbaijan.
192. Margarita Antidze, "Armenia, Azerbaijan Closer to War over Nagorno–Karabakh Than at Any Time Since 1994—ICG," Reuters, June 1, 2017, <http://www.reuters.com/article/armenia-azerbaijan-conflict-idUSL8N1IY402> (accessed June 21, 2019).
193. Joshua Kucera, "Azerbaijan's Military Operation in Nakhchivan: Less Than Meets the Eye?" Eurasianet, June 26, 2018, <https://eurasianet.org/azerbajians-military-operation-in-nakhchivan-less-than-meets-the-eye> (accessed June 21, 2019).
194. Deutsche Welle, "Ceasefire Holds in Contested Armenia–Azerbaijan Border Region," April 6, 2016, <http://www.dw.com/en/ceasefire-holds-in-contested-armenia-azerbaijan-border-region/a-19170371> (accessed June 21, 2019).
195. Jack Farhy, "Russia Senses Opportunity in Nagorno–Karabakh Conflict," *Financial Times*, April 19, 2016, <https://next.ft.com/content/3d485610-0572-11e6-9b51-0fb5e65703ce> (accessed June 21, 2019), and Nurlan Aliyev, "Russia's Arms Sales: A Foreign Policy Tool in Relations with Azerbaijan and Armenia," Jamestown Foundation *Eurasia Daily Monitor*, Vol. 15, Issue 47 (March 28, 2018), <https://jamestown.org/program/russias-arms-sales-foreign-policy-tool-relations-azerbaijan-armenia/> (accessed June 21, 2019).
196. Alexandros Petersen, "Russia Shows Its Hand on Karabakh," *EUobserver*, November 8, 2013, <https://euobserver.com/opinion/122032> (accessed June 21, 2019).
197. Rod Nordland, "Russia Signs Deal for Syria Bases; Turkey Appears to Accept Assad," *The New York Times*, January 20, 2017, [https://mobile.nytimes.com/2017/01/20/world/middleeast/russia-turkey-syria-deal.html?\\_r=1&referrer=https://t.co/T1Cwr3UdJi](https://mobile.nytimes.com/2017/01/20/world/middleeast/russia-turkey-syria-deal.html?_r=1&referrer=https://t.co/T1Cwr3UdJi) (accessed June 21, 2019).
198. Julian E. Barnes, "A Russian Ghost Submarine, Its U.S. Pursuers and a Deadly New Cold War," *The Wall Street Journal*, October 20, 2017, <https://www.wsj.com/articles/a-russian-ghost-submarine-its-u-s-pursuers-and-a-deadly-new-cold-war-1508509841> (accessed June 21, 2019).



199. Reuters, "Russia to Upgrade Its Naval, Air Bases in Syria: Interfax," January 15, 2017, <http://www.reuters.com/article/us-mideast-crisis-syria-russia-base-idUSKBN14Z0FQ> (accessed June 21, 2019).
200. Jonathan Marcus, "Russia S-400 Syria Missile Deployment Sends Robust Signal," BBC News, December 1, 2015, <http://www.bbc.com/news/world-europe-34976537> (accessed June 21, 2019).
201. Ben Brimelow, "Russia's Newest Anti-Air Defenses Are in Syria—and the US Should Be Worried," *Business Insider*, April 11, 2018, <http://www.businessinsider.com/pantsir-s1-makes-russian-air-defenses-stronger-2018-2> (accessed June 21, 2019).
202. "#PutinAtWar: Russia Fortifies Air Base in Khmeimim," Medium, November 11, 2018, <https://medium.com/dfriab/putinatwar-russia-fortifies-air-base-in-khmeimim-803f4cc07946> (accessed June 21, 2019).
203. BBC News, "Russia Used Syria as Live-Fire Training—US General," December 22, 2016, <http://www.bbc.com/news/world-europe-38402506> (accessed June 21, 2019).
204. International Institute for Strategic Studies, *The Military Balance 2019*, p. 168.
205. Tom O'Connor, "Russia Is 'Forcing' U.S. Military out of Syria and Testing New Weapons to Help, Reports Say," *Newsweek*, December 17, 2018, <https://www.newsweek.com/russia-forcing-us-out-syria-new-weapons-1262207> (accessed June 21, 2019).
206. Tobin Harshaw, "Putin's Arms Bazaar Is in a Serious Sales Slump," Bloomberg, April 25, 2017, <https://www.bloomberg.com/view/articles/2017-04-25/putin-s-arms-bazaar-is-in-a-serious-sales-slump> (accessed June 21, 2019).
207. Stockholm International Peace Research Institute, "Global Arms Trade: USA Increases Dominance; Arms Flows to the Middle East Surge, Says SIPRI," March 11, 2019, <https://www.sipri.org/media/press-release/2019/global-arms-trade-usa-increases-dominance-arms-flows-middle-east-surge-says-sipri> (accessed June 21, 2019). See also "Russia Remains Second-Largest Arms Exporter Despite Sales Drop—Think Tank," *The Moscow Times*, March 11, 2019, <https://www.themoscowtimes.com/2019/03/11/russia-remains-second-largest-arms-exporter-despite-sales-drop-think-tank-a64763> (accessed June 21, 2019).
208. Ryan Browne, "US Official: Russia Apologized After Russian Jet Performed Barrel Roll over US Plane," CNN, updated May 25, 2017, <http://www.cnn.com/2017/05/25/politics/russia-us-aircraft-barrel-roll/> (accessed June 21, 2019).
209. Anne Barnard, "Russia Says Deal Bars American Jets from Much of Syria's Skies. U.S. Says No," *The New York Times*, May 5, 2017, <https://www.nytimes.com/2017/05/05/world/middleeast/syria-deescalation-zones-russia-iran-turkey.html> (accessed June 21, 2019).
210. Chad Garland, "US and Russian Forces Have Clashed Repeatedly in Syria, US Envoy Says," *Stars and Stripes*, November 23, 2018, <https://www.stripes.com/news/us-and-russian-forces-have-clashed-repeatedly-in-syria-us-envoy-says-1.557790> (accessed June 21, 2019).
211. Radio Free Europe/Radio Liberty, "Putin, Egyptian Leader Sign 'Strategic' Partnership Treaty," October 17, 2018, <https://www.rferl.org/a/putin-egyptian-leader-el-sissi-discuss-increasing-arms-sales-direct-air-links-moscow-visit-sochi/29547819.html> (accessed June 21, 2019).
212. Vladimir Isachenkov, "Russia Negotiates Deal for Its Warplanes to Use Egypt Bases," Associated Press, November 30, 2017, <https://apnews.com/bdfae4502ca74c1eacdbf6d3225e8f4> (accessed June 21, 2019).
213. "Russia Secures \$2Bn Fighter Jet Contract with Egypt—Reports," *The Moscow Times*, March 18, 2019, <https://www.themoscowtimes.com/2019/03/18/russia-secures-2bln-fighter-jet-contract-with-egypt-reports-a64842> (accessed June 21, 2019).
214. James Marson, "After Military Push in Syria, Russia Plays Both Sides in Libya," *The Wall Street Journal*, updated June 7, 2018, <https://www.wsj.com/articles/after-military-push-in-syria-russia-plays-both-sides-in-libya-1528372802> (accessed June 21, 2019); Alec Luhn and Reuters, "Russian Special Forces Sent to Back Renegade Libyan General—Reports," *The Guardian*, March 14, 2017, <https://www.theguardian.com/world/2017/mar/14/russian-special-forces-deployed-in-egypt-near-libyan-border-report> (accessed June 21, 2019); and Alec Luhn and Dominic Nicholls, "Russian Mercenaries Back Libyan Rebel Leader as Moscow Seeks Influence in Africa," *The Telegraph*, March 3, 2019, <https://www.telegraph.co.uk/news/2019/03/03/russian-mercenaries-back-libyan-rebel-leader-moscow-seeks-influence/> (accessed June 21, 2019).
215. Marson, "After Military Push in Syria, Russia Plays Both Sides in Libya."
216. UNIAN Information Agency, "Russian Jet Makes Aggressive Move over French Frigate in Eastern Mediterranean," April 10, 2018, <https://www.unian.info/world/10075277-russian-jet-makes-aggressive-move-over-french-frigate-in-eastern-mediterranean.html> (accessed June 20, 2019).
217. Christopher Woody, "A British Sub Was Reportedly Tracked by Russian Subs in a 'Cat-and-Mouse' Pursuit Before the Latest Strikes in Syria," *Business Insider*, April 16, 2018, <http://www.businessinsider.com/uk-submarine-russia-tracked-before-syria-strikes-2018-4> (accessed June 21, 2019).

218. Barnes, "A Russian Ghost Submarine, Its U.S. Pursuers and a Deadly New Cold War."
219. Scaparrotti, 2019 EUCOM Posture Statement, p. 5.
220. Daniel Kochis, "A Roadmap for Strengthened Transatlantic Pathways in the Western Balkans," Heritage Foundation *Backgrounder* No. 3286, March 16, 2018, p. 4, <https://www.heritage.org/global-politics/report/roadmap-strengthened-transatlantic-pathways-the-western-balkans>.
221. Leonid Bershidsky, "Russia Re-Enacts the Great Game in the Balkans," Bloomberg, January 19, 2017, corrected January 20, 2017, <https://www.bloomberg.com/view/articles/2017-01-19/russia-re-enacts-the-great-game-in-the-balkans> (accessed July 14, 2017).
222. Andrew E. Cramer and Joseph Orovic, "Two Suspected Russian Agents Among 14 Convicted in Montenegro Coup Plot," *The New York Times*, May 9, 2019, <https://www.nytimes.com/2019/05/09/world/europe/montenegro-coup-plot-gru.html> (accessed June 20, 2019).
223. Kochis, "A Roadmap for Strengthened Transatlantic Pathways in the Western Balkans," p. 11.
224. Andrew Rettman, "Nato to add Macedonia despite Putin warning," *EU Observer*, February 7, 2019, <https://euobserver.com/foreign/144109> (accessed June 20, 2019).
225. Helene Cooper and Eric Schmitt, "U.S. Spycraft and Stealthy Diplomacy Expose Russian Subversion in a Key Balkans Vote," *The New York Times*, October 9, 2018, <https://www.nytimes.com/2018/10/09/us/politics/russia-macedonia-greece.html> (accessed June 20, 2019).
226. *Ibid.*
227. Kochis, "A Roadmap for Strengthened Transatlantic Pathways in the Western Balkans," p. 9.
228. *Ibid.*, p. 4.
229. Marc Santora and Neil MacFarquhar, "Putin Gets Red Carpet Treatment in Serbia, a Fulcrum Once More," *The New York Times*, January 17, 2019, <https://www.nytimes.com/2019/01/17/world/europe/serbia-putin-russia-belgrade-vucic.html> (accessed June 20, 2019).
230. Snezana Bjelotomic, "Serbia and Russia Sign 26 Intergovernmental Agreements During Putin's Visit," *Serbian Monitor*, January 18, 2019, <https://www.serbianmonitor.com/en/serbia-and-russia-sign-26-intergovernmental-agreements-during-putins-visit/> (accessed June 20, 2019).
231. Radio Free Europe/Radio Liberty, "On Visit to Serbia, Putin Accuses Kosovo of 'Illegally' Setting Up an Army," updated January 17, 2019, <https://www.rferl.org/a/ahead-of-high-level-visit-to-serbia-putin-blasts-west-s-role-in-balkans/29714843.html> (accessed June 20, 2019).
232. Vincent L. Morelli and Sarah E. Garding, "Serbia: Background and U.S. Relations" Congressional Research Service, updated November 16, 2018, p. 13, <https://fas.org/sgp/crs/row/R44955.pdf> (accessed June 20, 2019).
233. Reuters, "Russia Backs Bosnia's Integrity Amid Serb Calls for Secession," September 21, 2018, <https://www.reuters.com/article/us-bosnia-russia/russia-backs-bosnias-integrity-amid-serb-calls-for-secession-idUSKCN1M11Q4> (accessed June 20, 2019).
234. Radio Free Europe/Radio Liberty, "Tensions Rise as Bosnian Serbs Vote in Banned Referendum," updated September 25, 2016, <https://www.rferl.org/a/balkan-tensions-rise-as-bosnian-serbs-push-ahead-with-banned-referendum/28010813.html> (accessed June 20, 2019), and Gordana Knezevic, "Russia's Fingers in Bosnia's Pie," Radio Free Europe/Radio Liberty, September 28, 2016, <https://www.rferl.org/a/russia-putin-republika-srpska-bosnia-dodik-referendum-statehood-day/28018362.html> (accessed June 20, 2019).
235. Zorica Ilic, "Russia's Balkan Power Games on Show Ahead of Elections," Deutsche Welle, October 6, 2018, <https://www.dw.com/en/russias-balkan-power-games-on-show-ahead-of-elections/a-45781149> (accessed June 20, 2019).
236. Andrew Byrne, "Bosnian Serb Forces Take Part in Illegal 'Statehood Day' Parade," *Financial Times*, January 9, 2017, <https://www.ft.com/content/5ffff694-d66f-11e6-944b-e7eb37a6aa8e> (accessed June 20, 2019).
237. Radio Free Europe/Radio Liberty, "U.S. Imposes Sanctions on Republika Srpska's President Dodik," January 17, 2017, <https://www.rferl.org/a/dodik-republika-srpska-united-states-sanctions/28239895.html> (accessed June 20, 2019).
238. Radio Free Europe/Radio Liberty, "Bosnian Serbs Celebrate Controversial 'Republika Srpska Day,'" January 9, 2019, <https://www.rferl.org/a/bosnian-serbs-celebrate-controversial-srpska-day/29699730.html> (accessed June 20, 2019).
239. Thea Morrison, "Georgia's Breakaway S.Ossetia Signs Agreements with Republika Srpska," *Georgia Today*, January 11, 2018, <http://georgiatoday.ge/news/8733/Georgia%E2%80%99s-Breakaway-S.Ossetia-Signs-Agreements-with-Republika-Srpska> (accessed June 20, 2019).

240. Gordana Knezevic, "Talk of Paramilitaries, Real or Imagined, Could Fuel Division," Radio Free Europe/Radio Liberty, February 21, 2018, <https://www.rferl.org/a/balkans-talk-of-paramilitaries-fuel-division/29055292.html> (accessed July 12, 2019).
241. Vera Mironova and Bogdan Zawadewicz, "Putin Is Building a Bosnian Paramilitary Force," *Foreign Policy*, August 8, 2018, <https://foreignpolicy.com/2018/08/08/putin-is-building-a-bosnian-paramilitary-force/> (accessed June 20, 2019).
242. Ibid.
243. Radio Free Europe/Radio Liberty, "Serbia Stops 'Promo Train' to Kosovo's North," updated January 14, 2017, <https://www.rferl.org/a/28233304.html> (accessed June 20, 2019).
244. Christopher Woody, "'Good Luck, Guys': 17 Russian Jets Buzzed a British Destroyer and Left a Threatening Message Earlier This Year," *Business Insider*, November 27, 2018, <https://www.businessinsider.com/17-russian-jets-buzzed-a-british-destroyer-in-the-black-sea-2018-11> (accessed June 20, 2019).
245. Reuters, "As Syria Tensions Surge, Russian Fighter Jet Buzzes French Warship in Breach of International Law," *The Japan Times*, April 11, 2018, [https://www.japantimes.co.jp/news/2018/04/11/world/syria-tensions-surge-russian-fighter-jet-buzzes-french-warship-breach-international-law/#.Wx\\_gGlpKjcs](https://www.japantimes.co.jp/news/2018/04/11/world/syria-tensions-surge-russian-fighter-jet-buzzes-french-warship-breach-international-law/#.Wx_gGlpKjcs) (accessed June 20, 2019).
246. Birnbaum, "Russian Submarines Are Prowling Around Vital Undersea Cables."
247. Rishi Sunak, *Undersea Cables: Indispensable, Insecure*, Policy Exchange, 2017, p. 5, <https://policyexchange.org.uk/wp-content/uploads/2017/11/Undersea-Cables.pdf> (accessed June 20, 2019).
248. Kyle Mizokami, "What Is a Russian Spy Ship Doing in the Eastern Mediterranean?" *Popular Mechanics*, September 19, 2017, <https://www.popularmechanics.com/military/navy-ships/a28276/yantar-spy-ship-eastern-mediterranean/> (accessed June 20, 2019), and Deb Reichmann, "Russia May Be Targeting Undersea Internet Cables. Here's Why That's Bad," *Time*, March 30, 2018, <https://www.yahoo.com/news/russia-may-targeting-undersea-internet-213130980.html> (accessed June 20, 2019).
249. Ryan Browne and Zachary Cohen, "Russian Spy Ship Spotted 100 Miles off North Carolina Coast," CNN, updated January 22, 2018, <https://www.cnn.com/2018/01/22/politics/russia-spy-ship-us-coast/index.html?sr=twCNNp012218russia-spy-ship-us-coast0253PMStory&CNNPolitics=Tw> (accessed June 20, 2019).
250. Ben Werner, "Russian Su-27 Fighter Buzzes U.S. Navy EP-3 Ariels over Black Sea," U.S. Naval Institute News, January 29, 2018, <https://news.usni.org/2018/01/29/30987> (accessed June 20, 2019).
251. Ryan Browne, "Russian Jet Makes 'Unsafe' Intercept of US Navy Aircraft," CNN, updated November 27, 2017, <https://www.cnn.com/2017/11/27/politics/russia-us-unsafe-intercept/index.html> (accessed June 20, 2019).
252. BBC News, "RAF Lossiemouth Jets Scrambled to Russian Planes Twice in Five Days," April 3, 2019, <https://www.bbc.com/news/uk-scotland-highlands-islands-47799660> (accessed June 20, 2019).
253. Jelena Čirić, "Russian Bombers Enter NATO Airspace Near Iceland," *Iceland Review*, March 19, 2019, <https://www.icelandreview.com/news/russian-bombers-enter-nato-airspace-near-iceland/> (accessed June 20, 2019), and Larissa Kyzer, "Russian Bombers Re-enter NATO Airspace Near Iceland," *Iceland Review*, March 29, 2019, <https://www.icelandreview.com/news/russian-bombers-reenter-nato-airspace-near-iceland/> (accessed June 20, 2019).
254. Associated Press, "Sweden: Russian Military Planes Briefly Violated Airspace," January 24, 2019, <https://www.apnews.com/097a3fd978f14fe9a7f4e5cb4d1d600> (accessed June 20, 2019).
255. Radio Free Europe/Radio Liberty, "U.S., Canadian Jets Scrambled to Escort Russian Bombers Away from North American Coastline," updated January 27, 2019, <https://www.rferl.org/a/us-canadian-jets-scramble-escort-russian-blackjack-bombers-away/29733515.html> (accessed June 20, 2019).
256. Franz-Stefan Gady, "Japan Scrambles Fighter Jets to Intercept Russian Military Reconnaissance Plane," *The Diplomat*, March 29, 2019, <https://thediplomat.com/2019/03/japan-scrambles-fighter-jets-to-intercept-russian-military-reconnaissance-plane/> (accessed June 20, 2019), and Franz-Stefan Gady, "Japan Scrambles Fighter Jets to Intercept 2 Russian Military Aircraft," *The Diplomat*, May 6, 2019, <https://thediplomat.com/2019/05/japan-scrambles-fighter-jets-to-intercept-2-russian-military-aircraft/> (accessed June 20, 2019).
257. Franz-Stefan Gady, "Japan Intercepts 2 Russian Nuclear-Capable Fighter-Bombers," *The Diplomat*, January 17, 2019, <https://thediplomat.com/2019/01/japan-intercepts-2-russian-nuclear-capable-fighter-bombers/> (accessed June 20, 2019).
258. Gady, "Japan Scrambles Fighter Jets to Intercept 2 Russian Military Aircraft."
259. Jon Lake, "Russian Activity Remains High on NATO's Eastern Border," *A/Nonline*, November 29, 2018, <https://www.ainonline.com/aviation-news/defense/2018-11-29/russian-activity-remains-high-natos-eastern-border> (accessed June 20, 2019).
260. Baltic News Service, "NATO Jets Scrambled Six Times Last Week in Baltic Air Policing Duties," ERR News, March 25, 2019, <https://news.err.ee/923424/nato-jets-scrambled-six-times-last-week-in-baltic-air-policing-duties> (accessed June 20, 2019).

261. Andrew E. Kramer, "Putin Jet Trespassed in NATO Airspace on Way to Summit, Estonia Says," *The New York Times*, July 17, 2018, <https://www.nytimes.com/2018/07/17/world/europe/putin-summit-plane-estonia.html> (accessed June 20, 2019).
262. Royal Air Force, "Royal Air Force Typhoons in Double Black Sea Russian Response," August 25, 2018, <https://www.raf.mod.uk/news/articles/royal-air-force-typhoons-in-double-black-sea-russian-response/> (accessed June 20, 2019).
263. Sean O'Riordan, "Passenger Planes Dodged Russian Bombers," *Irish Examiner*, March 3, 2015, <http://www.irishexaminer.com/ireland/passenger-planes-dodged-russian-bombers-315623.html> (accessed June 20, 2019).
264. "SAS Flight in Russian Spy Plane Near Miss," *The Local*, May 8, 2014, <http://www.thelocal.se/20140508/sas-plane-in-russian-spy-plane-near-miss> (accessed June 20, 2019).
265. David Cenciotti, "Russian Spyplane Nearly Collided with Airliner off Sweden. Again," *The Aviationist*, December 14, 2014, <http://theaviationist.com/2014/12/14/near-collision-off-sweden/> (accessed June 20, 2019).
266. BBC News, "Russian Military Admits Significant Cyber-War Efforts," February 23, 2017, <http://www.bbc.com/news/world-europe-39062663> (accessed June 20, 2019).
267. Daniel R. Coats, Director of National Intelligence, "Worldwide Threat Assessment of the US Intelligence Community," statement before the Select Committee on Intelligence, U.S. Senate, January 29, 2019, p. 6, <https://www.dni.gov/files/ODNI/documents/2019-ATA-SFR---SSCI.pdf> (accessed June 20, 2019).
268. Center for Strategic and International Studies, "Significant Cyber Incidents Since 2006," [https://csis-prod.s3.amazonaws.com/s3fs-public/190211\\_Significant\\_Cyber\\_Events\\_List.pdf](https://csis-prod.s3.amazonaws.com/s3fs-public/190211_Significant_Cyber_Events_List.pdf) (accessed June 20, 2019).
269. Press release, "Treasury Sanctions Russian Federal Security Service Enablers," U.S. Department of the Treasury, June 11, 2018, <https://home.treasury.gov/news/press-releases/sm0410> (accessed June 20, 2019).
270. U.S. Department of Homeland Security, Cybersecurity and Infrastructure Security Agency, "Grizzly Steppe—Russian Malicious Cyber Activity," <https://www.us-cert.gov/GRIZZLY-STEPPE-Russian-Malicious-Cyber-Activity> (accessed June 20, 2019).
271. Denis Pinchuk, "Patriotic Russians May Have Staged Cyber Attacks on Own Initiative: Putin," Reuters, June 1, 2017, <http://www.reuters.com/article/us-russia-economic-forum-putin-cyber-idUSKBN18S56Y> (accessed June 20, 2019).
272. Coats, "Worldwide Threat Assessment of the US Intelligence Community," p. 37.

# China

Asia (also referred to as the Indo-Pacific) hosts a variety of threats to the U.S. homeland and the global commons, as well as a general threat of regional war that stems from a handful of inter-state rivalries. Included in this range of threats is a growing and increasingly multifaceted set of threats from a rising China. America's forward-deployed military at bases throughout the Western Pacific, five treaty allies, security partners in Taiwan and Singapore, and growing security partnership with India are keys to the U.S. strategic footprint in Asia. However:

- Taiwan is under a long-standing, well-equipped, purposely positioned, and increasingly active military threat from China;
- Japan, Vietnam, and the Philippines, by virtue of maritime territorial disputes, are under paramilitary, military, and political pressure from China; and
- India is geographically positioned between two major security threats: Pakistan to its west and China to its northeast.

## Threats to the Homeland

In the 2017 National Security Strategy, the Trump Administration made clear that it was shifting the focus of American security planning away from counterterrorism and back toward great-power competition. In particular, it noted that:

China and Russia challenge American power, influence, and interests, attempting to erode American security and prosperity. They are determined to make economies less free and less fair, to grow their militaries, and to control information and data to repress their societies and expand their influence.<sup>1</sup>

Both China and Russia are seen as revisionist powers, but they pose very different challenges to the United States. The People's Republic of China (PRC) has a far larger economy, as well as the world's second-largest gross domestic product (GDP), and is intertwined in the global supply chain for crucial technologies, especially those relating to information and communications technology (ICT). As a result, it has the resources to support its ongoing comprehensive military modernization program, which has been underway for over two decades and spans the conventional, space, and cyber realms as well as WMD capabilities, including a multipronged nuclear modernization effort.

At the same time, however, the PRC has been acting more assertively, even aggressively, against more of its neighbors. Unresolved border and territorial claims have led Beijing to adopt an increasingly confrontational attitude with regard to the South China Sea and India, and cross-Straits tensions have reemerged as a result of Beijing's reaction to the Democratic Progressive Party's victory in Taiwan's 2016 elections.

**Growing Conventional Capabilities.** The Chinese People's Liberation Army (PLA) remains one of the world's largest militaries,

but its days of largely obsolescent equipment are in the past. Nearly two decades of officially acknowledged double-digit growth in the Chinese defense budget have resulted in a comprehensive modernization program that has benefited every part of the PLA. This has been complemented by improvements in Chinese military training and, at the end of 2015, the largest reorganization in the PLA's history.<sup>2</sup> The PLA's overall size has shrunk, including a 300,000-person cut in the past two years, but its overall capabilities have increased as older platforms have been replaced with newer systems that are much more sophisticated.

A major part of the 2015 reorganization was the establishment of a separate ground forces headquarters and bureaucracy; previously, the ground forces had been the default service providing staffs and commanders. Now the PLA Army (PLAA), responsible for the PLA's ground forces, is no longer automatically in charge of war zones or higher headquarters functions. At the same time, the PLAA has steadily modernized its capabilities, incorporating both new equipment and a new organization. It has shifted from a division-based structure toward a brigade-based structure and has been improving its mobility, including heliborne infantry and fire support.<sup>3</sup> These forces are increasingly equipped with modern armored fighting vehicles, air defenses, both tube and rocket artillery, and electronic support equipment.

The PLA Navy (PLAN) is Asia's largest navy. While the total number of ships has dropped, the PLAN has fielded increasingly sophisticated and capable multi-role ships. Multiple classes of surface combatants are now in series production, including the Type 055 cruiser and the Type 052C and Type 052D guided missile destroyers, each of which fields long-range SAM and anti-ship cruise missile systems, as well as the Type 054 frigate and Type 056 corvette.

The PLAN has similarly been modernizing its submarine force. Since 2000, the PLAN has consistently fielded between 50 and 60 diesel-electric submarines, but the age and capability of the force has been improving as older

boats, especially 1950s-vintage *Romeo*-class boats, are replaced with newer designs. These include a dozen *Kilo*-class submarines purchased from Russia and domestically designed and manufactured *Song* and *Yuan* classes. All of these are believed to be capable of firing both torpedoes and anti-ship cruise missiles.<sup>4</sup> The Chinese have also developed variants of the *Yuan*, with an air-independent propulsion (AIP) system that reduces the boats' vulnerability by removing the need to use noisy diesel engines to recharge batteries.<sup>5</sup>

The PLAN has also been expanding its amphibious assault capabilities. The Chinese have announced a plan to triple the size of the PLA naval infantry force (their counterpart to the U.S. Marine Corps) from two brigades totaling 10,000 troops to seven brigades with 30,000 personnel.<sup>6</sup> To move this force, the Chinese have begun to build more amphibious assault ships, including the Type 071 amphibious transport docks.<sup>7</sup> Each can carry about 800 naval infantrymen and move them to shore by means of four air-cushion landing craft and four helicopters.

Supporting these expanded naval combat forces is a growing fleet of support and logistics vessels. The 2010 PRC defense white paper noted the accelerated construction of "large support vessels." It also specifically noted that the navy is exploring "new methods of logistics support for sustaining long-time maritime missions."<sup>8</sup> These include tankers and fast combat support ships that extend the range of Chinese surface groups and allow them to operate for more prolonged periods away from main ports. Chinese naval task forces dispatched to the Gulf of Aden have typically included such vessels.

The PLAN has also been expanding its naval aviation capabilities, the most publicized element of which has been the growing Chinese carrier fleet. This currently includes not only the *Liaoning*, purchased from Ukraine over a decade ago, but a domestically produced copy that is in workups. While both of these ships have ski jumps for their air wing, the Chinese are also building several conventional takeoff/barrier

landing (CATOBAR) carriers (like American or French aircraft carriers) that will employ catapults and therefore allow their air complement to carry more ordnance and/or fuel.<sup>9</sup>

The land-based element of the PLAN is modernizing as well, with a variety of long-range strike aircraft, anti-ship cruise missiles, and unmanned aerial vehicles (UAVs) entering the inventory. In addition to more modern versions of the H-6 twin-engine bombers (a version of the Soviet/Russian Tu-16 Badger), the PLAN's Naval Aviation force has added a range of other strike aircraft to its inventory. These include the JH-7/FBC-1 Flying Leopard, which can carry between two and four YJ-82 anti-ship cruise missiles, and the Su-30 strike fighter.

The PLA Air Force (PLAAF), with over 1,700 combat aircraft, is Asia's largest air force. It has shifted steadily from a force focused on homeland air defense to one capable of power projection, including long-range precision strikes against both land and maritime targets. The PLAAF currently has over 600 fourth-generation fighters (comparable to the U.S. F-15/F-16/F-18). They include the domestically designed and produced J-10 as well as the Su-27/Su-30/J-11 system (comparable to the F-15 or F-18) that dominates both the fighter and strike missions.<sup>10</sup> China is also believed to be preparing to field two stealthy fifth-generation fighter designs. The J-20 is the larger aircraft and resembles the American F-22 fighter. The J-31 appears to resemble the F-35 but with two engines rather than one. The production of advanced combat aircraft engines remains one of the greatest challenges to Chinese fighter design.

The PLAAF is also deploying increasing numbers of H-6 bombers, which can undertake longer-range strike operations, including operations employing land-attack cruise missiles. Although, like the American B-52 and Russian Tu-95, the H-6 is a 1950s-era design (copied from the Soviet-era Tu-16 Badger bomber), the latest versions (H-6K) are equipped with updated electronics and engines and are made of carbon composites.

Equally important, the PLAAF has been introducing a variety of support aircraft, including airborne early warning (AEW), command and control (C2), and electronic warfare (EW) aircraft. These systems field state-of-the-art radars and electronic surveillance systems, allowing Chinese air commanders to detect potential targets, including low-flying aircraft and cruise missiles, more quickly and gather additional intelligence on adversary radars and electronic emissions. More and more of China's combat aircraft are also capable of undertaking mid-air refueling, allowing them to conduct extended, sustained operations, and the Chinese aerial tanker fleet (based on the H-6 aircraft) has been also expanding.

At the biennial Zhuhai Air Show, Chinese companies have displayed a variety of unmanned aerial vehicles that reflect substantial investments and research and development efforts. The surveillance and armed UAV systems include the Xianglong (Soaring Dragon) and Sky Saber systems. The 2014 DOD report on Chinese capabilities also reported that China had tested a stealthy flying-wing UAV, the Lijian.<sup>11</sup> Chinese UAVs have been included in various military parades over the past several years, suggesting that they are being incorporated into Chinese forces, and the 2018 DOD report on Chinese capabilities states that "China's development, production and deployment of domestically-developed reconnaissance and combat UAVs continues to expand."<sup>12</sup>

The PLAAF is also responsible for the Chinese homeland's strategic air defenses. Its array of surface-to-air (SAM) missile batteries is one of the largest in the world and includes the S-300 (SA-10B/SA-20) and its Chinese counterpart, the Hongqi-9 long-range SAM. In 2018, the Russians began to deliver the S-400 series of long-range SAMs to China. These will mark a substantial improvement in PLAAF air defense capabilities, as the S-400 has both anti-aircraft and anti-missile capabilities.<sup>13</sup> China has deployed these SAM systems in a dense, overlapping belt along its coast, protecting the nation's economic center of gravity. Key

industrial and military centers such as Beijing are also heavily defended by SAM systems.

Unlike the U.S. military, China's airborne forces are part of the PLAAF. The 15th Airborne Corps has been reorganized from three airborne divisions to six airborne brigades in addition to a special operations brigade, an aviation brigade, and a support brigade. The force has been incorporating indigenously developed airborne mechanized combat vehicles for the past decade, giving them more mobility and a better ability to engage armored forces.

**Nuclear Capability.** Chinese nuclear forces are the responsibility of the PLA Rocket Forces (PLARF), one of the three new services created on December 31, 2015. China's nuclear ballistic missile forces include land-based missiles with a range of 13,000 kilometers that can reach the U.S. (CSS-4) and submarine-based missiles that can reach the U.S. when the submarine is deployed within missile range.

The PRC became a nuclear power in 1964 when it exploded its first atomic bomb as part of its "two bombs, one satellite" effort. In quick succession, China then exploded its first thermonuclear bomb in 1967 and orbited its first satellite in 1970, demonstrating the capability to build a delivery system that can reach the ends of the Earth. China chose to rely primarily on a land-based nuclear deterrent instead of developing two or three different basing systems as the United States did.

Furthermore, unlike the United States or the Soviet Union, China chose to pursue only a minimal nuclear deterrent. The PRC fielded only a small number of nuclear weapons, with estimates of about 100–150 weapons on medium-range ballistic missiles and about 60 ICBMs.<sup>14</sup> Its only ballistic missile submarine (SSBN) conducted relatively few deterrence patrols (perhaps none),<sup>15</sup> and its first-generation SLBM, the JL-1, if it ever attained full operational capability had limited reach. The JL-1's 1,700-kilometer range makes it comparable to the first-generation Polaris A1 missile fielded by the U.S. in the 1960s.

While China's nuclear force remained stable for several decades, it has been part of the

modernization effort of the past 20 years. The result has been modernization and some expansion of the Chinese nuclear deterrent. The core of China's ICBM force is the DF-31 series, a solid-fueled, road-mobile system, along with a growing number of longer-range, road-mobile DF-41 missiles that may already be in the PLA operational inventory. The DF-41 may be deployed with multiple independently targetable reentry vehicles (MIRVs).<sup>16</sup> China's medium-range nuclear forces have similarly shifted to mobile, solid-rocket systems so that they are both more survivable and more easily maintained.

Notably, the Chinese are expanding their ballistic missile submarine fleet. Replacing the one Type 092 *Xia*-class SSBN are several Type 094 *Jin*-class SSBNs, four of which are already operational. They will likely be equipped with the new, longer-range JL-2 SLBM.<sup>17</sup> Such a system would give the PRC a "secure second-strike" capability, substantially enhancing its nuclear deterrent.

There is also some possibility that the Chinese nuclear arsenal now contains land-attack cruise missiles. The CJ-20, a long-range, air-launched cruise missile carried on China's H-6 bomber, may be nuclear tipped, although there is not much evidence at this time that China has pursued such a capability. China is also believed to be working on a cruise missile submarine that, if equipped with nuclear cruise missiles, would further expand the range of its nuclear attack options.<sup>18</sup>

As a result of its modernization efforts, China's nuclear forces appear to be shifting from a minimal deterrent posture (one suited only to responding to an attack and even then with only limited numbers) to a more robust but still limited deterrent posture. While the PRC will still likely field fewer nuclear weapons than either the United States or Russia, it will field a more modern and diverse set of capabilities than India, Pakistan, or North Korea, its nuclear-armed neighbors. If there are corresponding changes in doctrine, modernization will enable China to engage in limited nuclear options in the event of a conflict.



In addition to strategic nuclear forces, the PLARF has responsibility for medium-range and intermediate-range ballistic missile (MRBM and IRBM) forces. These include the DF-21 and DF-26 missiles, which can reach as far as Guam and southern India.<sup>19</sup> It is believed that Chinese missile brigades equipped with these systems may have both nuclear and conventional responsibilities, making any deployment from garrison much more ambiguous from a stability perspective. The expansion of these forces also raises questions about the total number of Chinese nuclear warheads.

**Cyber and Space Capabilities.** The major 2015 reorganization of the PLA included the creation of the PLA Strategic Support Force (PLASSF), which brings the Chinese military's electronic warfare, network warfare (including cyber), and space warfare forces under a single service umbrella. Previously, these capabilities had been embedded in different departments across the PLA's General Staff Department and General Armaments Department. By consolidating them into a single service, the PLA has created a Chinese "information warfare" force that is responsible for offensive and defensive operations in the electromagnetic and space domains.

Chinese network warfare forces have been identified as conducting a variety of cyber and network reconnaissance operations as well as cyber economic espionage. In 2014, the U.S. Department of Justice charged PLA officers from Unit 61398, then of the General Staff Department's 3rd Department, with theft of intellectual property (IP) and implanting of malware in various commercial firms.<sup>20</sup> Members of that unit are thought also to be part of "Advanced Persistent Threat-1," a group of computer hackers believed to be operating on behalf of a nation-state rather than a criminal group.

Chinese space capabilities gained public prominence in 2007 when the PLA conducted an anti-satellite (ASAT) test in low-Earth orbit against a defunct Chinese weather satellite. The test became one of the worst debris-generating incidents of the Space Age, with several

thousand pieces of debris generated, many of which will remain in orbit for over a century. However, the PRC has been conducting space operations since 1970 when it first orbited a satellite. Equally important, Chinese counter-space efforts have been expanding steadily. The PLA has not only tested ASATs against low-Earth orbit systems, but is also believed to have tested a system designed to attack targets at geosynchronous orbit (GEO), approximately 22,000 miles above the Earth. As many vital satellites are at GEO, including communications and missile early-warning systems, China's ability to target such systems constitutes a major threat.

The creation of the PLASSF, incorporating counter-space forces, reflects the movement of counter-space systems, including direct-ascent ASATs, out of the testing phase to fielding them with units. A recent report from the U.S. National Air and Space Intelligence Center (NASIC) notes that Chinese units are now training with anti-satellite missiles.<sup>21</sup>

### **Threat of Regional War**

Three issues, all involving China, threaten American interests and embody the "general threat of regional war" noted at the outset of this section: the status of Taiwan, the escalation of maritime and territorial disputes, and border conflict with India.

**Taiwan.** China's long-standing threat to end the de facto independence of Taiwan and ultimately to bring it under the authority of Beijing—if necessary, by force—is both a threat to a major American security partner and a threat to the American interest in peace and stability in the Western Pacific.

After easing for eight years, tensions across the Taiwan Strait have resumed as a result of Beijing's reaction to the outcome of Taiwan's 2016 presidential election. Beijing has suspended most direct government-to-government discussions with Taipei and is using a variety of aid and investment efforts to draw away Taiwan's remaining diplomatic partners.

Beijing has also undertaken significantly escalated military activities directed at Taiwan.

In March 2019, two Chinese J-11 fighters (a domestic version of the Su-27) crossed the median or center line of the Taiwan Strait, which has been informally considered a boundary for the two sides. This marked the first PLAAF incursion in over a decade and followed a series of PLAN circumnavigations of the island that were intended to demonstrate the PLA's ability to isolate Taiwan. These actions have raised tensions between Taipei and Beijing.<sup>22</sup>

Regardless of the state of the relationship at any given time, Chinese leaders from Deng Xiaoping and Mao Zedong to Xi Jinping have consistently emphasized the importance of ultimately reclaiming Taiwan. The island—along with Tibet—is the clearest example of a geographical “core interest” in Chinese policy. China has never renounced the use of force, and it continues to employ political warfare against Taiwan's political and military leadership.

For the Chinese leadership, the failure to effect unification, whether peacefully or through the use of force, would reflect fundamental political weakness in the PRC. For this reason, China's leaders cannot back away from the stance of having to unify the island with the mainland, and the island remains an essential part of the People's Liberation Army's “new historic missions,” shaping PLA acquisitions and military planning.

It is widely posited that China's anti-access/area-denial (A2/AD) strategy—the deployment of an array of overlapping capabilities, including anti-ship ballistic missiles (ASBMs), submarines, and long-range cruise missiles, satellites, and cyber weapons—is aimed largely at forestalling American intervention in support of friends and allies in the Western Pacific, including Taiwan. By holding at risk key American platforms and systems (e.g., aircraft carriers), the Chinese seek to delay or even deter American intervention in support of key friends and allies, allowing the PRC to achieve a *fait accompli*. The growth of China's military capabilities is specifically oriented toward countering America's ability to assist in the defense of Taiwan.

Chinese efforts to reclaim Taiwan are not limited to overt military means. The “three warfares” highlight Chinese political warfare methods, including legal warfare/lawfare, public opinion warfare, and psychological warfare. The PRC employs such approaches to undermine both Taiwan's will to resist and America's willingness to support Taiwan. The Chinese goal would be to “win without fighting”—to take Taiwan without firing a shot or with only minimal resistance before the United States could organize an effective response.

**Escalation of Maritime and Territorial Disputes.** Because the PRC and other countries in the region see active disputes over the East and South China Seas not as differences regarding the administration of international common spaces, but rather as matters of territorial sovereignty, there exists the threat of armed conflict between China and American allies who are also claimants, particularly Japan and the Philippines.

Moreover, because its economic center of gravity is now in the coastal region, China has had to emphasize maritime power to defend key assets and areas. This is exacerbated by China's status as the world's foremost trading state. China increasingly depends on the seas for its economic well-being. Its factories are powered increasingly by imported oil, and its diets contain a growing percentage of imported food. Chinese products rely on the seas to be moved to markets. Consequently, China not only has steadily expanded its maritime power, including its merchant marine and maritime law enforcement capabilities, but also has acted to secure the “near seas” (*jin hai*; 近海) as a Chinese preserve.

Beijing prefers to accomplish its objectives quietly and through nonmilitary means. In both the East and South China Seas, China has sought to exploit “gray zones,” gaining control incrementally and deterring others without resorting to the lethal use of force. It uses military and economic threats, bombastic language, and enforcement through legal warfare (including the employment of Chinese maritime law enforcement vessels) as well as

military bullying. Chinese paramilitary-implemented, military-backed encroachment in support of expansive extralegal claims could lead to an unplanned armed clash.

Especially risky are the growing tensions between China and Japan and among a number of claimants in the South China Sea. In the former case, the most proximate cause is the dispute over the Senkakus. China has intensified its efforts to assert claims of sovereignty over the Senkaku Islands of Japan in the East China Sea. Beijing asserts both exclusive economic rights within the disputed waters and recognition of “historic” rights to dominate and control those areas as part of its territory.<sup>23</sup> Chinese fishing boats (often believed to be elements of the Chinese maritime militia) and Chinese Coast Guard (CCG) vessels have been encroaching steadily on the territorial waters within 12 nautical miles of the uninhabited islands. In the summer of 2016, China began to deploy naval units into the area.<sup>24</sup>

In November 2013, China declared an air defense identification zone (ADIZ) in the East China Sea that largely aligned with its claimed maritime Exclusive Economic Zone (EEZ). The People’s Liberation Army declared that it would “adopt defense emergency measures to respond to aircraft that do not cooperate in identification or refuse to follow the instructions.”<sup>25</sup> The announcement was a provocative act and another Chinese attempt to change the status quo unilaterally.

The ADIZ declaration is part of a broader Chinese pattern of using intimidation and coercion to assert expansive extralegal claims of sovereignty and/or control incrementally. In June 2016, a Chinese fighter made an “unsafe” pass near a U.S. RC-135 reconnaissance aircraft in the East China Sea area. In March 2017, Chinese authorities warned the crew of an American B-1B bomber operating in the area of the ADIZ that they were flying illegally in PRC airspace. In response to the incident, the Chinese Foreign Ministry called for the U.S. to respect the ADIZ.<sup>26</sup> In May, the Chinese intercepted an American WC-135, also over the East China Sea.<sup>27</sup>

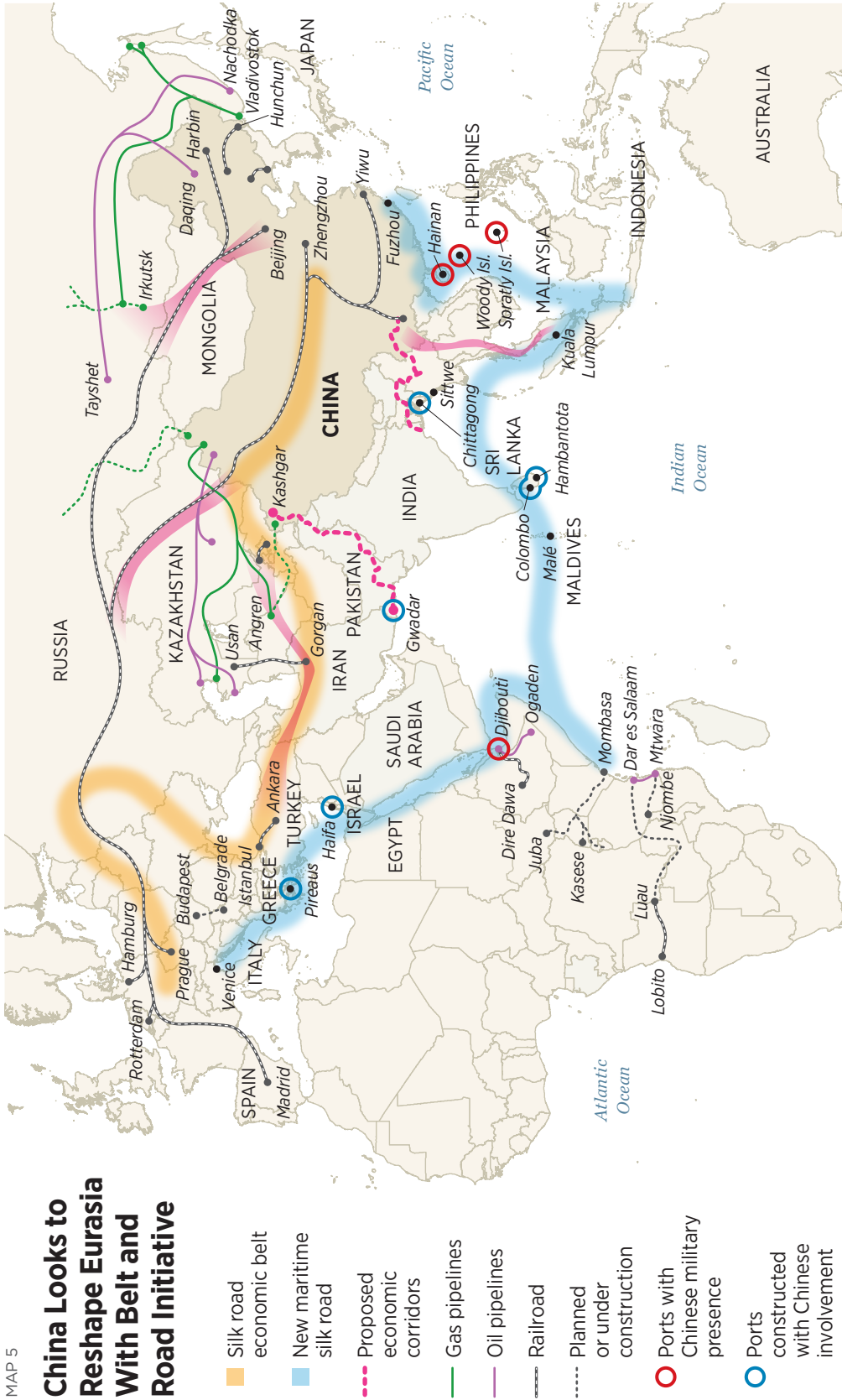
In the South China Sea, the most salient issue is the Spratlys, where overlapping Chinese, Philippine, Malaysian, Vietnamese, and Taiwanese claims raise the prospect of confrontation. This volatile situation has led to a variety of confrontations between China and other claimants.

China–Vietnam tensions in the region, for example, were on starkest display in 2014 when state-owned China National Offshore Oil Corporation (CNOOC) deployed an oil rig inside Vietnam’s EEZ. The Chinese platform was accompanied by dozens of ships including naval vessels. The resulting escalation saw Chinese ships ramming Vietnamese law enforcement ships and using water cannon against the crews of Vietnamese ships. It also resulted in massive and sometimes violent demonstrations in Vietnam. The oil rig was ultimately withdrawn, and relations were restored, but the occasional reappearance of the same rig has served to underscore the continuing volatility of this issue, which involves the same area over which China and Vietnam engaged in armed battle in 1974.

Because of the relationship between the Philippines and the United States, tensions between Beijing and Manila are the most likely to lead to American participation. There have been a number of incidents. In 2012, for example, a Philippine naval ship operating on behalf of the country’s coast guard challenged private Chinese poachers in waters around Scarborough Shoal. The resulting escalation left Chinese government ships in control of the shoal. In 2016, there were reports that the Chinese intended to consolidate their gains in the area by reclaiming the sea around the shoal, but there is no indication that this has happened. Furthermore, with the election of Philippine President Rodrigo Duterte in 2016, there has been a general warming in China–Philippines relations. Duterte has sought to set aside the dispute over the South China Sea, and the Chinese, while not accepting the authority of a 2016 ruling by the Permanent Court of Arbitration (PCA) that favored a range of the Philippines’ positions, have allowed Filipino

MAP 5

# China Looks to Reshape Eurasia With Belt and Road Initiative



**SOURCES:** Reuters, "Reviving the Silk Road," May 10, 2017, map, <https://pictures.reuters.com/archive/CHINA-SILKROAD--C-ETIED5A1MD43P.html> (accessed July 3, 2018), and Heritage Foundation research.

fishermen access to Scarborough Shoal in accordance with it.

In all of these cases, the situation is exacerbated by rising nationalism. In the face of persistent economic challenges, nationalist themes are becoming an increasingly strong undercurrent and affecting policymaking. Although the nationalist phenomenon is not new, it is gaining force and complicating efforts to maintain regional stability.

Governments may choose to exploit nationalism for domestic political purposes, but they also run the risk of being unable to control the genie that they have released. Nationalist rhetoric is mutually reinforcing, which makes countries less likely to back down than in the past. The increasing power that the Internet and social media provide to the populace, largely outside of government control, adds elements of unpredictability to future clashes. China's refusal to accept the 2016 Permanent Court of Arbitration findings (which were overwhelmingly in favor of the Philippines) despite both Chinese and Philippine accession to the U.N. Convention on the Law of the Sea (UNCLOS) is a partial reflection of such trends.

In case of armed conflict between China and the Philippines or between China and Japan, either by intention or as a result of an accidental incident at sea, the U.S. could be required to exercise its treaty commitments.<sup>28</sup> Escalation of a direct U.S.–China incident is also not unthinkable. Keeping an inadvertent incident from escalating into a broader military confrontation would be difficult. This is particularly true in the East and South China Seas, where naval as well as civilian law enforcement vessels from both China and the U.S. operate in what the U.S. considers to be international waters.

The most significant development in the South China Sea during the past three years has been Chinese reclamation and militarization of seven artificial islands or outposts. In 2015, President Xi promised President Barack Obama that China had no intention of militarizing the islands. In fact, however, as described by Admiral Harry Harris, Commander,

U.S. Pacific Command, in his April 2017 posture statement to the Senate Committee on Armed Services:

China's military-specific construction in the Spratly islands includes the construction of 72 fighter aircraft hangars—which could support three fighter regiments—and about ten larger hangars that could support larger airframes, such as bombers or special mission aircraft. All of these hangars should be completed this year. During the initial phases of construction China emplaced tank farms, presumably for fuel and water, at Fiery Cross, Mischief and Subi reefs. These could support substantial numbers of personnel as well as deployed aircraft and/or ships. All seven outposts are armed with a large number of artillery and gun systems, ostensibly for defensive missions. The recent identification of buildings that appear to have been built specifically to house long-range surface-to-air missiles is the latest indication China intends to deploy military systems to the Spratlys.<sup>29</sup>

There is the possibility that China will ultimately declare an ADIZ above the South China Sea in an effort to assert its authority over the entire area. There are also concerns that in the event of a downturn in its relationship with the Philippines, China will take action against vulnerable targets like Philippines-occupied Second Thomas Shoal or Reed Bank, which the PCA determined are part of the Philippines' EEZ and continental shelf, or proceed with the reclamation at Scarborough. The latter development in particular would facilitate the physical assertion of Beijing's claims and enforcement of an ADIZ, regardless of the UNCLOS award.

**Border Conflict with India.** The possibility of armed conflict between India and China, while currently remote, poses an indirect threat to U.S. interests because it could disrupt the territorial status quo and raise nuclear tensions in the region. A border conflict between

India and China could also prompt Pakistan to try to take advantage of the situation, further contributing to regional instability.

Long-standing border disputes that led to a Sino-Indian War in 1962 have again become a flashpoint in recent years. In April 2013, the most serious border incident between India and China in over two decades occurred when Chinese troops settled for three weeks several miles inside northern Indian territory on the Depsang Plains in Ladakh. A visit to India by Chinese President Xi Jinping in September 2014 was overshadowed by another flare-up in border tensions when hundreds of Chinese PLA forces reportedly set up camps in the mountainous regions of Ladakh, prompting Indian forces to deploy to forward positions in the region. This border standoff lasted three weeks and was defused when both sides agreed to pull their troops back to previous positions.

In 2017, Chinese military engineers were building a road to the Doklam plateau, an area claimed by both Bhutan and China, and this led to a confrontation between Chinese and Indian forces, the latter requested by Bhutanese authorities to provide assistance. The crisis lasted 73 days; both sides pledged to pull back, and Chinese construction efforts in the area have continued.<sup>30</sup> Improved Chinese infrastructure not only would give Beijing the diplomatic advantage over Bhutan, but also could make the Siliguri corridor that links the eastern Indian states with the rest of the country more vulnerable.

India claims that China occupies more than 14,000 square miles of Indian territory in the Aksai Chin along its northern border in Kashmir, and China lays claim to more than 34,000 square miles of India's northeastern state of Arunachal Pradesh. The issue is also closely related to China's concern for its control of Tibet and the presence in India of the Tibetan government in exile and Tibet's spiritual leader, the Dalai Lama.

The Chinese are building up military infrastructure and expanding a network of road, rail, and air links in its southwestern border areas. To meet these challenges, the Indian

government has also committed to expanding infrastructure development along the disputed border, although China currently holds a decisive military edge.

## Threats to the Commons

The U.S. has critical sea, air, space, and cyber interests at stake in the East Asia and South Asia international common spaces. These interests include an economic interest in the free flow of commerce and the military use of the commons to safeguard America's own security and contribute to the security of its allies and partners.

Washington has long provided the security backbone in these areas, and this in turn has supported the region's remarkable economic development. However, China is taking increasingly assertive steps to secure its own interests in these areas independent of U.S. efforts to maintain freedom of the commons for all in the region. Given this behavior, which includes the construction of islands atop previously submerged features, it cannot be assumed that China shares a common conception of international space with the United States or an interest in perpetuating American predominance in securing international common spaces.

In addition, as China expands its naval capabilities, it will be present farther and farther away from its home shores. China has now established its first formal overseas military base, having initialed an agreement with the government of Djibouti in January 2017. Chinese officials appear also to be in discussions with Pakistan about allowing military access to the port of Gwadar.

**Dangerous Behavior in the Maritime and Airspace Common Spaces.** The aggressiveness of the Chinese navy, maritime law enforcement forces, and air forces in and over the waters of the East China Sea and South China Sea, coupled with ambiguous, extralegal territorial claims and assertion of control there, poses an incipient threat to American and overlapping allied interests. Chinese military writings emphasize the importance of

establishing dominance of the air and maritime domains in any future conflict.

Although the Chinese do not necessarily have sufficient capacity to deny the U.S. the ability to operate in local waters and airspace, they equal or overmatch all of their neighbors. China is not yet in a position to enforce an ADIZ consistently in either area, but the steady two-decade improvement of the PLAAF and PLAN naval aviation will eventually provide the necessary capabilities. Chinese observations of recent conflicts, including wars in the Persian Gulf, the Balkans, and Afghanistan, have emphasized the growing role of airpower and missiles in conducting “non-contact, non-linear, non-symmetrical” warfare.<sup>31</sup> This growing parity, if not superiority, constitutes a radical shift from the Cold War era, when the U.S., with its allies, clearly would have dominated air and naval operations in the Pacific.

To underscore its growing capabilities, China also seems to have made a point of publicizing its air force modernization, unveiling new aircraft prototypes, including two new stealthy fighters, on the eve of visits by American Secretaries of Defense. Secretary Chuck Hagel’s visit in 2014, for example, was preceded by the unveiling of the J-15 naval fighter. Moreover, these aircraft have often been used very aggressively. In April 2018, for example, China conducted “live fire exercises” in the East China Sea with its *Liaoning* aircraft carrier and J-15 fighters. According to China’s Xinhua news agency, “the drill...included multiple take-offs from the deck of the Liaoning by J15 fighter jets and...‘anti-air missiles were fired from ships surrounding the carrier’.”<sup>32</sup>

**Increasing Chinese Military Space Activities.** One of the key force multipliers for the United States is its extensive array of space-based assets. Through its various satellite constellations, the U.S. military can track opponents, coordinate friendly forces, engage in precision strikes against enemy forces, and conduct battle-damage assessments so that its munitions are expended efficiently.

The American military is more reliant than many others on space-based systems because

it is also an expeditionary military (i.e., its wars are conducted far from the homeland). Consequently, it requires global rather than regional reconnaissance, communications and data transmission, and meteorological information and support. At this point, only space-based systems can provide this sort of information on a real-time basis. No other country is capable of leveraging space as the U.S. does, and this is a major advantage, but this heavy reliance on space systems is also a key American vulnerability.

China fields an array of space capabilities, including its own navigation and timing satellites, the Beidou/Compass system, and has claimed a capacity to refuel satellites.<sup>33</sup> It has three satellite launch centers and is constructing a fourth. China’s interest in space dominance includes not only accessing space, but also denying opponents the ability to do the same. As one Chinese assessment notes, space capabilities provided 70 percent of battlefield communications, over 80 percent of battlefield reconnaissance and surveillance, and 100 percent of meteorological information for American operations in Kosovo. Moreover, 98 percent of precision munitions relied on space for guidance information. In fact, “[i]t may be said that America’s victory in the Kosovo War could not [have been] achieved without fully exploiting space.”<sup>34</sup>

To this end, the PLA has been developing a range of anti-satellite capabilities that include both hard-kill and soft-kill systems. The former include direct-ascent kinetic-kill vehicles (DA-KKV) such as the system tested in 2007, but they also include more advanced systems that are believed to be capable of reaching targets in mid-Earth orbit and even geosynchronous orbit.<sup>35</sup> The latter include anti-satellite lasers for either dazzling or blinding purposes.<sup>36</sup> This is consistent with PLA doctrinal writings, which emphasize the need to control space in future conflicts. “Securing space dominance has already become the prerequisite for establishing information, air, and maritime dominance,” says one Chinese teaching manual, “and will directly affect the course and outcome of wars.”<sup>37</sup>

Soft-kill attacks need not come only from dedicated weapons, however. The case of Galaxy-15, a communications satellite owned by Intelsat Corporation, showed how a satellite could effectively disrupt communications simply by always being in “switched on” mode.<sup>38</sup> Before it was finally brought under control, it had drifted through a portion of the geosynchronous belt, forcing other satellite owners to move their assets and juggle frequencies. A deliberate such attempt by China (or any other country) could prove far harder to handle, especially if conducted in conjunction with attacks by kinetic systems or directed-energy weapons.

Most recently, China has landed an unmanned probe at the lunar south pole, on the far side of the Moon. This is a major accomplishment because the probe is the first spacecraft ever to land at either of the Moon’s poles. To support this mission, the Chinese deployed a data relay satellite to Lagrange Point-2, one of five points where the gravity wells of the Earth and Sun “cancel out” each other, allowing a satellite to remain in a relatively fixed location with minimal fuel consumption. While the satellite itself may or may not have military roles, the deployment highlights that China will now be using the enormous volume of cis-lunar space (the region between the Earth and Moon) for various deployments. This will greatly complicate American space situational awareness efforts, as it forces the U.S. to monitor a vastly greater area of space for possible Chinese spacecraft.

**Cyber Activities and the Electromagnetic Domain.** In 2013, the Verizon Risk Center found that China was responsible for the largest percentage (30 percent) of external breaches in which “the threat actor’s country of origin was discoverable” and that “96% of espionage cases were attributed to threat actors in China and the remaining 4% were unknown.”<sup>39</sup> In addition, efforts by “[s]tate-affiliated actors tied to China...to steal IP comprise[d] about one-fifth of all breaches in [Verizon’s] dataset.”<sup>40</sup> Given the difficulties of attribution, country of origin should not necessarily be conflated with the perpetrator, but forensic efforts have

associated at least one Chinese military unit with cyber intrusions.<sup>41</sup>

Since the 2015 Xi–Obama summit where the two sides reached an understanding to reduce cyber economic espionage, Chinese cyber actions have shifted. Although the overall level of activity appears to be unabated, the Chinese seem to have moved toward more focused attacks mounted from new sites.

China’s cyber-espionage efforts are often aimed at economic targets, reflecting the much more holistic Chinese view of both security and information. Rather than creating an artificial dividing line between military security and civilian security, much less information, the PLA plays a role in supporting both aspects and seeks to obtain economic IP as well as military electronic information.

This is not to suggest that the PLA has not emphasized the military importance of cyber warfare. Chinese military writings since the 1990s have emphasized a fundamental transformation in global military affairs (*shijie junshi gaige*). Future wars will be conducted through joint operations involving multiple services rather than through combined operations focused on multiple branches within a single service. These future wars will span not only the traditional land, sea, and air domains, but also outer space and cyberspace. The latter two arenas will be of special importance because warfare has shifted from an effort to establish material dominance (characteristic of Industrial Age warfare) to establishing information dominance (*zhi xinxi quan*). This is due to the rise of the information age and the resulting introduction of information technology into all areas of military operations.

Consequently, according to PLA analysis, future wars will most likely be “local wars under informationized conditions.” That is, they will be wars in which information and information technology will be both widely applied and a key basis of victory. The ability to gather, transmit, analyze, manage, and exploit information will be central to winning such wars: The side that is able to do these things more accurately and more quickly will be the side that



wins. This means that future conflicts will no longer be determined by platform-versus-platform performance and not even by system against system (*xitong*). Rather, conflicts are now clashes between rival arrays of systems of systems (*tixi*).<sup>42</sup>

Chinese military writings suggest that a great deal of attention has been focused on developing an integrated computer network and electronic warfare (INEW) capability. This would allow the PLA to reconnoiter a potential adversary's computer systems in peacetime, influence opponent decision-makers by threatening those same systems in times of crisis, and disrupt or destroy information networks and systems by cyber and electronic warfare means in the event of conflict. INEW capabilities would complement psychological warfare and physical attack efforts to secure "information dominance," which Chinese military writings emphasize as essential for fighting and winning future wars.

It is essential to recognize, however, that the PLA views computer network operations as part of information operations (*xinxi zuozhan*), or information combat. With obvious implications for the U.S., the PLA emphasizes the need to suppress and destroy an enemy's information systems while preserving one's own, as well as the importance of computer and electronic warfare in both the offensive and defensive roles. Methods to secure information dominance would include establishing an information blockade; deception, including through electronic means; information contamination; and information paralysis.<sup>43</sup> China sees cyber as part of an integrated capability for achieving strategic dominance in the Western Pacific region.

Information operations are specific operational activities that are associated with striving to establish information dominance. They are conducted in both peacetime and wartime, with the peacetime focus on collecting information, improving its flow and application, influencing opposing decision-making, and effecting information deterrence. These operations involve four mission areas:

- **Command and Control Missions.** An essential part of information operations is the ability of commanders to control joint operations by disparate forces. Thus, command, control, communications, computers, intelligence, surveillance, and reconnaissance structures constitute a key part of information operations, providing the means for collecting, transmitting, and managing information.
- **Offensive Information Missions.** These are intended to disrupt the enemy's battlefield command and control systems and communications networks, as well as to strike the enemy's psychological defenses.
- **Defensive Information Missions.** Such missions are aimed at ensuring the survival and continued operation of information systems. They include deterring an opponent from attacking one's own information systems, concealing information, and combating attacks when they do occur.
- **Information Support and Information-Safeguarding Missions.** The ability to provide the myriad types of information necessary to support extensive joint operations and to do so on a continuous basis is essential to their success.<sup>44</sup>

Computer network operations are integral to all four of these overall mission areas. They can include both strategic and battlefield network operations and can incorporate both offensive and defensive measures. They also include protection not only of data, but also of information hardware and operating software.

Computer network operations will not stand alone, however, but will be integrated with electronic warfare operations, as reflected in the phrase "network and electronics unified" (*wangdian yiti*). Electronic warfare operations are aimed at weakening or destroying enemy electronic facilities and systems while defending one's own.<sup>45</sup> The combination of electronic and computer network attacks will produce

synergies that affect everything from finding and assessing the adversary to locating one's own forces to weapons guidance to logistical support and command and control. The creation of the PLASSF is intended to integrate these forces and make them more complementary and effective in future "local wars under informationized conditions."

### Conclusion

China presents the United States with the most comprehensive security challenge in the region. It poses various threat contingencies across all three areas of vital American national interests: homeland; regional war (including potential attacks on overseas U.S. bases as well as against allies and friends); and international common spaces. China's provocative behavior is well documented: It is challenging the U.S. and its allies such as Japan at sea, in the air, and in cyberspace; it has raised concerns on its border with India; and it is a standing

threat to Taiwan. Despite a lack of official transparency, publicly available sources shed considerable light on China's rapidly growing military capabilities.

The Chinese launched their first home-grown aircraft carrier during the past year and are fielding large numbers of new platforms for their land, sea, air, and outer space forces, as well as in the electromagnetic domain. The PLA has been staging larger and more comprehensive exercises, including major exercises in the East China Sea near Taiwan, that are improving the ability of the Chinese to operate their plethora of new systems. It has also continued to conduct probes of both the South Korean and Japanese air defense identification zones, drawing rebukes from both Seoul and Tokyo.

This *Index* assesses the overall threat from China, considering the range of contingencies, as "aggressive" for level of provocation of behavior and "formidable" for level of capability.

### Threats: China

	HOSTILE	AGGRESSIVE	TESTING	ASSERTIVE	BENIGN
Behavior		✓			
	FORMIDABLE	GATHERING	CAPABLE	ASPIRATIONAL	MARGINAL
Capability	✓				

## Endnotes

1. *National Security Strategy of the United States of America*, The White House, December 2017, p. 2, <https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf> (accessed June 25, 2019).
2. Joel Wuthnow and Phillip C. Saunders, *Chinese Military Reform in the Age of Xi Jinping: Drivers, Challenges, and Implications*, Institute for National Strategic Studies, Center for the Study of Chinese Military Affairs, *China Strategic Perspectives* No. 10, March 2017, *passim*, <https://ndupress.ndu.edu/Portals/68/Documents/stratperspective/china/ChinaPerspectives-10.pdf> (accessed June 25, 2019).
3. U.S. Defense Intelligence Agency, *China Military Power: Modernizing a Force to Fight and Win*, 2019, pp. 58–60, [https://www.dia.mil/Portals/27/Documents/News/Military%20Power%20Publications/China\\_Military\\_Power\\_FINAL\\_5MB\\_20190103.pdf](https://www.dia.mil/Portals/27/Documents/News/Military%20Power%20Publications/China_Military_Power_FINAL_5MB_20190103.pdf) (accessed June 25, 2019).
4. Dennis Gormley, Andrew S. Erickson, and Jingdong Yuan, “A Potent Vector: Assessing Chinese Cruise Missile Developments,” *Joint Force Quarterly* No. 75 (4th Quarter 2014), pp. 98–105, <https://ndupress.ndu.edu/Publications/Article/577568/a-potent-vector-assessing-chinese-cruise-missile-developments/> (accessed June 25, 2019).
5. U.S. Department of Defense, Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People’s Republic of China 2017*, p. 24, [https://dod.defense.gov/Portals/1/Documents/pubs/2017\\_China\\_Military\\_Power\\_Report.PDF](https://dod.defense.gov/Portals/1/Documents/pubs/2017_China_Military_Power_Report.PDF) (accessed June 25, 2019).
6. Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People’s Republic of China 2018*, p. 28, <https://media.defense.gov/2018/Aug/16/2001955282/-1/-1/2018-CHINA-MILITARY-POWER-REPORT.PDF> (accessed June 25, 2019).
7. U.S. Defense Intelligence Agency, *China Military Power: Modernizing a Force to Fight and Win*, p. 70.
8. Section II, “National Defense Policy,” in People’s Republic of China, Ministry of National Defense, *White Paper 2010*, [http://eng.mod.gov.cn/publications/2017-04/11/content\\_4778206\\_2.htm](http://eng.mod.gov.cn/publications/2017-04/11/content_4778206_2.htm) (accessed June 26, 2019).
9. Franz-Stefan Gady, “China’s New Aircraft Carrier to Use Advanced Jet Launch System,” *The Diplomat*, November 6, 2017, <https://thediplomat.com/2017/11/chinas-new-aircraft-carrier-to-use-advanced-jet-launch-system/> (accessed June 26, 2019).
10. International Institute for Strategic Studies, *The Military Balance 2019: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2019), pp. 260–261.
11. U.S. Department of Defense, Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People’s Republic of China 2014*, p. 66, [https://archive.defense.gov/pubs/2014\\_DoD\\_China\\_Report.pdf](https://archive.defense.gov/pubs/2014_DoD_China_Report.pdf) (accessed June 26, 2019).
12. U.S. Department of Defense, Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People’s Republic of China 2018*, p. 34.
13. Franz-Stefan Gady, “Russia Delivers 1st S-400 Missile Defense Regiment to China,” *The Diplomat*, April 3, 2018, <https://thediplomat.com/2018/04/russia-delivers-1st-s-400-missile-defense-regiment-to-china/> (accessed June 26, 2019).
14. U.S. Department of Defense, Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People’s Republic of China 2019*, p. 66, [https://media.defense.gov/2019/May/02/2002127082/-1/-1/2019\\_CHINA\\_MILITARY\\_POWER\\_REPORT.pdf](https://media.defense.gov/2019/May/02/2002127082/-1/-1/2019_CHINA_MILITARY_POWER_REPORT.pdf) (accessed June 26, 2019).
15. Andrew S. Erickson and Michael S. Chase, “China’s SSBN Forces: Transitioning to the Next Generation,” *Jamestown Foundation China Brief*, Vol. 9, Issue 12 (June 12, 2009), [http://www.jamestown.org/single/?no\\_cache=1&tx\\_ttnews\[tt\\_news\]=35120#.U5G00Sjb5NQ](http://www.jamestown.org/single/?no_cache=1&tx_ttnews[tt_news]=35120#.U5G00Sjb5NQ) (accessed June 26, 2019).
16. U.S. Department of Defense, Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People’s Republic of China 2019*, p. 45.
17. *Ibid.*, p. 66.
18. For more information on China’s cruise missile program, see Dennis M. Gormley, Andrew S. Erickson, and Jingdong Yuan, *A Low-Visibility Force Multiplier: Assessing China’s Cruise Missile Ambitions* (Washington: National Defense University Press, 2014), <http://ndupress.ndu.edu/Portals/68/Documents/Books/force-multiplier.pdf> (accessed June 22, 2017). Published by the NDU Press for the Center for the Study of Chinese Military Affairs, of the NDU’s Institute for National Strategic Studies.
19. U.S. Department of Defense, Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People’s Republic of China 2019*, p. 45.
20. Press release, “U.S. Charges Five Chinese Military Hackers for Cyber Espionage Against U.S. Corporations and a Labor Organization for Commercial Advantage,” U.S. Department of Justice, May 19, 2014, <https://www.justice.gov/opa/pr/us-charges-five-chinese-military-hackers-cyber-espionage-against-us-corporations-and-labor> (accessed June 26, 2019).

21. National Air and Space Intelligence Center, "Competing in Space," December 2018, p. 21, <https://media.defense.gov/2019/Jan/16/2002080386/-1/-1/1/190115-F-NV711-0002.PDF> (accessed June 26, 2019).
22. Ankit Panda, "Taipei Slams 'Provocative' Chinese Air Force Fighters Cross Taiwan Strait Median Line," *The Diplomat*, April 1, 2019, <https://thediplomat.com/2019/04/taipei-slams-provocative-chinese-air-force-fighters-cross-taiwan-strait-median-line/> (accessed June 26, 2019).
23. See Chapter 10, "The South China Sea Tribunal," in Tufts University, The Fletcher School, *Law of the Sea: A Policy Primer*, <https://sites.tufts.edu/lawofthesea/chapter-ten/> (accessed June 26, 2019).
24. Ankit Panda, "Japan Identifies Chinese Submarine in East China Sea: A Type 093 SSN," *The Diplomat*, January 16, 2018, <https://thediplomat.com/2018/01/japan-identifies-chinese-submarine-in-east-china-sea-a-type-093-ssn/> (accessed June 26, 2019).
25. Madison Park, "Why China's New Air Zone Incensed Japan, U.S.," CNN, updated November 27, 2013, <http://www.cnn.com/2013/11/25/world/asia/china-japan-island-explainer/> (accessed June 26, 2019).
26. Jason Le Miere, "China Claims U.S. Military Plane 'Illegally' Entered Chinese Air Defense Zone," *Newsweek*, March 24, 2017, <http://www.newsweek.com/china-claims-us-military-plane-illegally-entered-chinese-air-defense-zone-573711> (accessed June 26, 2019).
27. Hans Nichols and Courtney Kube, "Two Chinese Fighter Jets Intercept U.S. Plane Over East China Sea, Officials Say," NBC News, updated May 18, 2017, <http://www.nbcnews.com/news/us-news/two-chinese-fighter-jets-intercept-u-s-plane-officials-say-n761931> (accessed June 26, 2019).
28. Although it has long been a matter of U.S. policy that Philippine territorial claims in the South China Sea lie outside the scope of American treaty commitments, the treaty does apply in the event of an attack on Philippine "armed forces, public vessels or aircraft in the Pacific." Mutual Defense Treaty Between the United States and the Republic of the Philippines, August 30, 1951, Article V, [http://avalon.law.yale.edu/20th\\_century/phil001.asp](http://avalon.law.yale.edu/20th_century/phil001.asp) (accessed June 26, 2019). In any event, Article IV of the treaty obligates the U.S. in case of such an attack to "meet the common dangers in accordance with its constitutional processes." Regardless of formal treaty obligations, however, enduring U.S. interests in the region and perceptions of U.S. effectiveness and reliability as a check on growing Chinese ambitions would likely spur the U.S. to become involved.
29. Admiral Harry B. Harris Jr., U.S. Navy, Commander, U.S. Pacific Command, statement "On U.S. Pacific Command Posture" before the Committee on Armed Services, U.S. Senate, April 27, 2017, p. 8, [https://www.armed-services.senate.gov/imo/media/doc/Harris\\_04-27-17.pdf](https://www.armed-services.senate.gov/imo/media/doc/Harris_04-27-17.pdf) (accessed June 26, 2019).
30. Joel Wuthnow, Satu Limaye, and Nilanthi Samaranyake, "Doklam, One Year Later: China's Long Game in the Himalayas," *War on the Rocks*, June 7, 2018, <https://warontherocks.com/2018/06/doklam-one-year-later-chinas-long-game-in-the-himalayas/> (accessed June 26, 2019).
31. "Building an Active, Layered Defense: Chinese Naval and Air Force Advancement," interview with Andrew S. Erickson, National Bureau of Asian Research, September 10, 2012, <https://www.nbr.org/publication/building-an-active-layered-defense-chinese-naval-and-air-force-advancement/> (accessed June 26, 2019).
32. Agence France-Presse, "Chinese Aircraft Carrier Leads Live Combat Drill in East China Sea," *The Straits Times*, April 24, 2018, <https://www.straitstimes.com/asia/east-asia/chinese-aircraft-carrier-leads-live-combat-drill-in-east-china-sea> (accessed August 19, 2019).
33. Xinhua, "China Announces Success in Technology to Refuel Satellites in Orbit," June 30, 2016, [http://www.china.org.cn/china/Off\\_the\\_Wire/2016-06/30/content\\_38784419.htm](http://www.china.org.cn/china/Off_the_Wire/2016-06/30/content_38784419.htm) (accessed June 26, 2019).
34. Mei Lianju, *Space Operations Teaching Materials* (Beijing, PRC: Academy of Military Sciences Publishing House, 2013), p. 65.
35. See, for example, Brian Weeden, "Through a Glass, Darkly: Chinese, American, and Russian Anti-Satellite Testing in Space," Secure World Foundation, March 17, 2014, [https://swfound.org/media/167224/through\\_a\\_glass\\_darkly\\_march2014.pdf](https://swfound.org/media/167224/through_a_glass_darkly_march2014.pdf) (accessed June 26, 2019).
36. Ian Easton, "The Great Game in Space: China's Evolving ASAT Weapons Programs and Their Implications for Future U.S. Strategy," Project 2049 Institute, 2009, pp. 4–5, [https://project2049.net/wp-content/uploads/2018/05/china\\_asat\\_weapons\\_the\\_great\\_game\\_in\\_space.pdf](https://project2049.net/wp-content/uploads/2018/05/china_asat_weapons_the_great_game_in_space.pdf) (accessed June 26, 2019).
37. Mei Lianju, *Space Operations Teaching Materials*, p. 69.
38. Peter B. de Selding, "Runaway Zombie Satellite Galaxy 15 Continues to Pose Interference Threat," *Space.com*, October 15, 2010, <http://www.space.com/9340-runaway-zombie-satellite-galaxy-15-continues-pose-interference-threat.html> (accessed June 26, 2019).

39. Verizon, *2013 Data Breach Investigations Report*, pp. 21–22, <https://enterprise.verizon.com/resources/reports/data-breach-investigations-report-2013.pdf> (accessed August 19, 2018). See also Elise Ackerman, “New Verizon Security Report Finds a Growing Number of Attacks by China’s Hacker Army,” *Forbes*, April 23, 2013, <https://www.forbes.com/sites/eliseackerman/2013/04/23/new-verizon-security-report-finds-a-growing-number-of-attacks-by-chinas-hacker-army/#11429f622c49> (accessed June 26, 2019), and Lucian Constantin, “Verizon: One in Five Data Breaches Are the Result of Cyberespionage,” *PC World*, April 23, 2013, <http://www.pcworld.com/article/2036177/one-in-five-data-breaches-are-the-result-of-cyberespionage-verizon-says.html> (accessed June 26, 2019).
40. Verizon, *2013 Data Breach Investigations Report*, p. 5.
41. Dan McWhorter, “Mandiant Exposes APT1—One of China’s Cyber Espionage Units & Releases 3,000 Indicators,” Mandiant, February 18, 2013, <https://www.mandiant.com/blog/mandiant-exposes-apt1-chinas-cyber-espionage-units-releases-3000-indicators/> (accessed June 26, 2019).
42. Bai Bangxi and Jiang Lijun, “‘Systems Combat’ Is Not the Same as ‘System Combat,’” *China National Defense Newspaper*, January 10, 2008, cited in Dean Cheng, “U.S.–China Competition in Space,” testimony before the Subcommittee on Space, Committee on Science, Space, and Technology, U.S. House of Representatives, September 27, 2016, p. 2, <https://docs.house.gov/meetings/SY/SY16/20160927/105387/HHRG-114-SY16-Wstate-ChengD-20160927.pdf> (accessed June 26, 2019).
43. Yuan Wenxian, *Joint Campaign Information Operations Teaching Materials* (Beijing, PRC: National Defense University Press, 2009), pp. 109–112.
44. Guo Ruobing, *Theory of Military Information Security* (Beijing, PRC: National Defense University Publishing House, 2013), pp. 12–21.
45. Tan Rukan, *Building Operational Strength Course Materials* (Beijing, PRC: Academy of Military Sciences Publishing House, 2012), p. 204.



# Iran

Radical Islamist terrorism in its many forms remains the most immediate global threat to the safety and security of U.S. citizens at home and abroad, and Iran-supported terrorists pose some of the greatest potential threats. The Lebanon-based Hezbollah has a long history of executing terrorist attacks against American targets in the Middle East at Iran's direction and could be activated to launch attacks inside the United States in the event of a conflict with Iran. Such state-sponsored terrorist attacks pose the greatest potential Iranian threats to the U.S. homeland, at least until Iran develops a long-range ballistic missile capable of targeting the United States.

## Threats to the Homeland

**Hezbollah Terrorism.** Hezbollah (Party of God), the radical Lebanon-based Shia revolutionary movement, poses a clear terrorist threat to international security. Hezbollah terrorists have murdered Americans, Israelis, Lebanese, Europeans, and citizens of many other nations. Originally founded with support from Iran in 1982, this Lebanese group has evolved from a local menace into a global terrorist network that is strongly backed by regimes in Iran and Syria. Its political wing has dominated Lebanese politics and is funded by Iran and a web of charitable organizations, criminal activities, and front companies.

Hezbollah regards terrorism not only as a useful tool for advancing its revolutionary agenda, but also as a religious duty as part of a "global jihad." It helped to introduce and popularize the tactic of suicide bombings

in Lebanon in the 1980s, developed a strong guerrilla force and a political apparatus in the 1990s, provoked a war with Israel in 2006, intervened in the Syrian civil war after 2011 at Iran's direction, and has become a major destabilizing influence in the ongoing Arab-Israeli conflict.

Before September 11, 2001, Hezbollah had murdered more Americans than any other terrorist group. Despite al-Qaeda's increased visibility since then, Hezbollah remains a bigger, better equipped, better organized, and potentially more dangerous terrorist organization, partly because it enjoys the support of the world's two chief state sponsors of terrorism: Iran and Syria. Hezbollah's demonstrated capabilities led former Deputy Secretary of State Richard Armitage to dub it "the A-Team of Terrorists."<sup>1</sup>

Hezbollah has expanded its operations from Lebanon to targets in the Middle East and far beyond the region. It now is a global terrorist threat that draws financial and logistical support from its Iranian patrons as well as from the Lebanese Shiite diaspora in the Middle East, Europe, Africa, Southeast Asia, North America, and South America. Hezbollah fundraising and equipment procurement cells have been detected and broken up in the United States and Canada, and Europe is believed to contain many more of these cells.

Hezbollah has been involved in numerous terrorist attacks against Americans, including:

- The April 18, 1983, bombing of the U.S. embassy in Beirut, which killed 63 people including 17 Americans;

- The October 23, 1983, suicide truck bombing of the Marine barracks at Beirut Airport, which killed 241 Marines and other personnel deployed as part of the multinational peacekeeping force in Lebanon;
- The September 20, 1984, suicide truck bombing of the U.S. embassy annex in Lebanon, which killed 23 people including two Americans; and
- The June 25, 1996, Khobar Towers bombing, which killed 19 American servicemen stationed in Saudi Arabia.

Hezbollah also was involved in the kidnapping of several dozen Westerners, including 14 Americans, who were held as hostages in Lebanon in the 1980s. The American hostages eventually became pawns that Iran used as leverage in the secret negotiations that led to the Iran–Contra affair in the mid-1980s.

Hezbollah has launched numerous attacks outside of the Middle East. It perpetrated the two deadliest terrorist attacks in the history of South America: the March 1992 bombing of the Israeli embassy in Buenos Aires, Argentina, which killed 29 people, and the July 1994 bombing of a Jewish community center in Buenos Aires that killed 96 people. The trial of those who were implicated in the 1994 bombing revealed an extensive Hezbollah presence in Argentina and other countries in South America.

Hezbollah has escalated its terrorist attacks against Israeli targets in recent years as part of Iran’s intensifying shadow war against Israel. In 2012, Hezbollah killed five Israeli tourists and a Bulgarian bus driver in a suicide bombing near Burgas, Bulgaria. Hezbollah terrorist plots against Israelis were foiled in Thailand and Cyprus during that same year.

In 2013, Hezbollah admitted that it had deployed several thousand militia members to fight in Syria on behalf of the Assad regime. By 2015, Hezbollah forces had become crucial in propping up the Assad regime after the Syrian army was hamstrung by casualties, defections,

and low morale. Hezbollah also deployed personnel to Iraq after the 2003 U.S. intervention to assist pro-Iranian Iraqi Shia militias that were battling the U.S.-led coalition. In addition, Hezbollah has deployed personnel in Yemen to train and assist the Iran-backed Houthi rebels.

Although Hezbollah operates mostly in the Middle East, it has a global reach and has established a presence inside the United States. Cells in the United States generally are focused on fundraising, including criminal activities such as those perpetrated by over 70 used-car dealerships identified as part of a scheme to launder hundreds of millions of dollars of cocaine-generated revenue that flowed back to Hezbollah.<sup>2</sup>

Covert Hezbollah cells could morph into other forms and launch terrorist operations inside the United States. Given Hezbollah’s close ties to Iran and past record of executing terrorist attacks on Tehran’s behalf, there is a real danger that Hezbollah terrorist cells could be activated inside the United States in the event of a conflict between Iran and the U.S. or between Iran and Israel. On June 1, 2017, two naturalized U.S. citizens were arrested and charged with providing material support to Hezbollah and conducting preoperational surveillance of military and law enforcement sites in New York City and at Kennedy Airport, the Panama Canal, and the American and Israeli embassies in Panama.<sup>3</sup> Nicholas Rasmussen, Director of the National Counterterrorism Center, noted that the June arrests were a “stark reminder” of Hezbollah’s global reach and warned that Hezbollah “is determined to give itself a potential homeland option as a critical component of its terrorism playbook,” which “is something that those of us in the counterterrorism community take very, very seriously.”<sup>4</sup>

**Iran’s Ballistic Missile Threat.** Iran has an extensive missile development program that has received key assistance from North Korea, as well as more limited support from Russia and China until the imposition of sanctions by the U.N. Security Council. Although the U.S. intelligence community assesses that



Iran does not have an ICBM capability (an intercontinental ballistic missile with a range of 5,500 kilometers or about 2,900 miles), Tehran could develop one in the future. Iran has launched several satellites with space launch vehicles that use similar technology, which could also be adapted to develop an ICBM capability.<sup>5</sup> Tehran's missile arsenal primarily threatens U.S. bases and allies in the Middle East, but Iran eventually could expand the range of its missiles to include the continental United States.

### **Threat of Regional War**

The Middle East region is one of the most complex and volatile threat environments faced by the United States and its allies. Iran, Hezbollah, and Iran-supported proxy groups pose actual or potential threats both to America's interests and to those of its allies.

**Iranian Threats in the Middle East.** Iran is led by an anti-Western revolutionary regime that seeks to tilt the regional balance of power in its favor by driving out the Western presence, undermining and overthrowing opposing governments, and establishing its hegemony over the oil-rich Persian Gulf region. It also seeks to radicalize Shiite communities and advance their interests against Sunni rivals. Iran has a long record of sponsoring terrorist attacks against American allies and other interests in the region.

Iran's conventional military forces, although relatively weak by Western standards, loom large over Iran's smaller neighbors. Iran's armed forces remain dependent on major weapons systems and equipment that date back to before its 1979 revolution. Iran's ability to replace these aging weapons systems, many of which were depleted in the 1980–1988 Iran–Iraq war, has been limited by Western sanctions. Iran has not been able to acquire large numbers of modern armor, combat aircraft, longer-range surface-to-surface missiles, or major naval warships.

Tehran, however, has managed to import modern Russian and Chinese air-to-air, air-to-ground, air defense, anti-armor, and anti-ship

missiles to upgrade its conventional military and asymmetric forces.<sup>6</sup> It also has developed its capacity to reverse engineer and build its own versions of ballistic missiles, rockets, unmanned aerial vehicles (UAVs), minisubmarines, and other weapon systems. To compensate for its limited capability to project conventional military power, Tehran has focused on building up its asymmetric warfare capabilities, proxy forces, and ballistic missile and cruise missile capabilities. For example, in part because of the limited capabilities of its air force, Iran developed UAVs during the Iran–Iraq war, including at least one armed model that carried up to six RPG-7 rounds in what was perhaps the world's first use of UAVs in combat.<sup>7</sup>

The July 2015 Iran nuclear agreement, which lifted nuclear-related sanctions on Iran in January 2016, gave Tehran access to about \$100 billion in restricted assets and allowed Iran to expand its oil and gas exports, the chief source of its state revenues. Relief from the burden of sanctions helped Iran's economy and enabled Iran to enhance its strategic position, military capabilities, and support for surrogate networks and terrorist groups. In May 2016, Tehran announced that it was increasing its military budget for 2016–2017 to \$19 billion—90 percent more than the previous year's budget.<sup>8</sup> Estimating total defense spending is difficult because of Tehran's opaque budget process and the fact that spending on some categories, including Iran's ballistic missile program and military intervention in Syria, is hidden, but the International Institute for Strategic Studies estimates that Iran's defense spending fell from \$21 billion in 2017 to \$19.6 billion in 2018.<sup>9</sup>

The lifting of sanctions also enabled Tehran to emerge from diplomatic isolation and strengthen strategic ties with Russia. Russian President Vladimir Putin traveled to Iran in November 2015 to meet with Supreme Leader Ayatollah Ali Khamenei and other officials. Both regimes called for enhanced military cooperation. During Iranian President Hassan Rouhani's visit to Russia in March 2017, Putin

proclaimed his intention to raise bilateral relations to the level of a “strategic partnership.”<sup>10</sup> Putin met with Rouhani again on June 9, 2018, on the sidelines of the Shanghai Cooperation Organization (SCO) summit, where he noted that Iran and Russia were “working well together to settle the Syrian crisis” and promised to support Iran’s entry into the SCO.<sup>11</sup>

This growing strategic relationship has strengthened Iran’s military capabilities. Tehran announced in April 2016 that Russia had begun deliveries of up to five S-300 Favorit long-range surface-to-air missile systems, which can track up to 100 aircraft and engage six of them simultaneously at a range of 200 kilometers.<sup>12</sup> The missile system, which was considered a defensive weapon not included in the U.N. arms embargo on Iran, was deployed and became operational in 2017, giving Iran a “generational improvement in capabilities” according to Defense Intelligence Agency Director Lieutenant General Robert Ashley.<sup>13</sup>

Moscow also began negotiations to sell Iran an unspecified number of T-90 tanks and advanced Sukhoi Su-30 Flanker fighter jets.<sup>14</sup> These warplanes would significantly improve Iran’s air defense and long-range strike capabilities, although under the terms of the 2015 Iran nuclear agreement, they cannot be delivered until after the U.N. arms embargo on Iran has expired. The agreement is scheduled to expire in October 2020. If Tehran pulled out of the agreement, however, the embargo would continue, precluding the sales.

After the nuclear agreement, Iran and Russia escalated their strategic cooperation in propping up Syria’s embattled Assad regime. Iran’s growing military intervention in Syria was partly eclipsed by Russia’s military intervention and launching of an air campaign against Assad’s enemies in September 2015, but Iran’s Islamic Revolutionary Guard Corps (IRGC) and surrogate militia groups have played the leading role in spearheading the ground offensives that have retaken territory from Syrian rebel groups and tilted the military balance in favor of the Assad regime. By October 2015, Iran had deployed an estimated

7,000 IRGC troops and paramilitary forces in Syria, along with an estimated 20,000 foreign fighters from Iran-backed Shiite militias from Lebanon, Iraq, Afghanistan, and Pakistan.<sup>15</sup> Tehran escalated to deploy a force of almost 80,000 Shia militia fighters commanded by nearly 2,000 IRGC officers.<sup>16</sup>

Iran, working closely with Russia, then expanded its military efforts and helped to consolidate a costly victory for the Assad regime. At the height of the fighting in August 2016, Russia temporarily deployed Tu-22M3 bombers and Su-34 strike fighters to an air base at Hamedan in western Iran in order to strike rebel targets in Syria.<sup>17</sup> After the fall of Aleppo in December 2016, which inflicted a crushing defeat on the armed opposition, Tehran sought to entrench a permanent Iranian military presence in Syria, establishing an elaborate infrastructure of military bases, intelligence centers, UAV airfields, missile sites, and logistical facilities. The IRGC also sought to secure a logistical corridor to enable the movement of heavy equipment, arms, and matériel through Iraq and Syria to bolster Hezbollah in Lebanon.

Iran’s military presence in Syria and continued efforts to provide advanced weapons to Hezbollah through Syria have fueled tensions with Israel. Israel has launched over two hundred air strikes against Hezbollah and Iranian forces to prevent the transfer of sophisticated arms and prevent Iran-backed militias from deploying near Israel’s border. On February 10, 2018, Iranian forces in Syria launched an armed drone that penetrated Israeli airspace before it was shot down. Israel responded with air strikes on IRGC facilities in Syria. Iranian forces in Syria later launched a salvo of 20 rockets against Israeli military positions in the Golan Heights on May 9, 2018, provoking Israel to launch ground-to-ground missiles, artillery salvos, and air strikes against all known Iranian bases in Syria.<sup>18</sup>

Although Russia has sought to calm the situation, reportedly helping to arrange the withdrawal of Iranian heavy weapons 85 kilometers from Israeli military positions in the Golan Heights, Moscow has turned a blind eye

to Iranian redeployments and the threat that long-range Iranian weapon systems deployed in Syria pose to Israel.<sup>19</sup> On January 13, 2019, Israel launched an air strike against an Iranian arms depot at Damascus International Airport, and the Israeli government revealed that it had launched over 2,000 missiles at various targets in Syria in 2018.<sup>20</sup> Israel remains determined to prevent Iran from establishing forward bases near its borders, and another clash could rapidly escalate into a regional conflict.

**Iran's Proxy Warfare.** Iran has adopted a political warfare strategy that emphasizes irregular warfare, asymmetric tactics, and the extensive use of proxy forces. The Islamic Revolutionary Guard Corps has trained, armed, supported, and collaborated with a wide variety of radical Shia and Sunni militant groups, as well as Arab, Palestinian, Kurdish, and Afghan groups that do not share its radical Islamist ideology. The IRGC's elite Quds (Jerusalem) Force has cultivated, trained, armed, and supported numerous proxies, particularly the Lebanon-based Hezbollah; Iraqi Shia militant groups; Palestinian groups such as Hamas and Palestinian Islamic Jihad; and groups that have fought against the governments of Afghanistan, Bahrain, Egypt, Israel, Iraq, Jordan, Kuwait, Morocco, Saudi Arabia, Turkey, the United Arab Emirates (UAE), and Yemen.

Iran is the world's foremost state sponsor of terrorism and has made extensive efforts to export its radical Shia brand of Islamist revolution. It has established a network of powerful Shia revolutionary groups in Lebanon and Iraq; has cultivated links with Afghan Shia and Taliban militants; and has stirred Shia unrest in Bahrain, Iraq, Lebanon, Saudi Arabia, and Yemen. In recent years, Iranian arms shipments have been intercepted regularly by naval forces off the coasts of Bahrain and Yemen, and Israel has repeatedly intercepted arms shipments, including long-range rockets, bound for Palestinian militants in Gaza.

U.S. troops in the Middle East have been targeted by Iranian proxies in Lebanon in the 1980s, Saudi Arabia in 1996, and Iraq in the 2000s. In April 2019, the Pentagon released

an updated estimate of the number of U.S. personnel killed by Iran-backed militias in Iraq, revising the number upward to at least 603 dead between 2003 and 2011. These casualties, about 17 percent of the American death toll in Iraq, "were the result of explosively formed penetrators (EFP), other improvised explosive devices (IED), improvised rocket-assisted munitions (IRAM), rockets, mortars, rocket-propelled grenades (RPG), small-arms, sniper, and other attacks in Iraq," according to a Pentagon spokesman.<sup>21</sup>

**Terrorist Threats from Hezbollah.** Hezbollah is a close ally of, frequent surrogate for, and terrorist subcontractor for Iran's revolutionary Islamist regime. Iran played a crucial role in creating Hezbollah in 1982 as a vehicle for exporting its revolution, mobilizing Lebanese Shia, and developing a terrorist surrogate for attacks on its enemies.

Tehran provides the bulk of Hezbollah's foreign support: arms, training, logistical support, and money. The Pentagon has estimated that Iran provides up to \$200 million in annual financial support for Hezbollah; other estimates made before the 2015 nuclear deal ran as high as \$350 million annually.<sup>22</sup> After the nuclear deal, which offered Tehran substantial relief from sanctions, Tehran increased its aid to Hezbollah, providing as much as \$800 million per year according to Israeli officials.<sup>23</sup> Tehran has been lavish in stocking Hezbollah's expensive and extensive arsenal of rockets, sophisticated land mines, small arms, ammunition, explosives, anti-ship missiles, anti-aircraft missiles, and even unmanned aerial vehicles that Hezbollah can use for aerial surveillance or remotely piloted terrorist attacks. Iranian Revolutionary Guards have trained Hezbollah terrorists in Lebanon's Bekaa Valley and in Iran.

Iran has used Hezbollah as a club to hit not only Israel and Tehran's Western enemies, but also many Arab countries. Tehran's revolutionary ideology has fueled Iran's hostility to other Middle Eastern states, many of which it seeks to overthrow and replace with radical allies. During the Iran-Iraq war, Iran used Hezbollah to launch terrorist attacks against Iraqi

targets and against Arab states that sided with Iraq. Hezbollah launched numerous terrorist attacks against Saudi Arabia and Kuwait, which extended strong financial support to Iraq's war effort, and participated in several other terrorist operations in Bahrain and the UAE.

Iranian Revolutionary Guards conspired with the branch of Hezbollah in Saudi Arabia to conduct the 1996 Khobar Towers bombing. Hezbollah collaborated with the IRGC's Quds Force to destabilize Iraq after the 2003 U.S. occupation and helped to train and advise the Mahdi Army, the radical anti-Western Shiite militia led by militant Iraqi cleric Moqtada al-Sadr. Hezbollah detachments also have cooperated with IRGC forces in Yemen to train and assist the Houthi rebel movement.

Hezbollah threatens the security and stability of the Middle East and Western interests in the Middle East on a number of fronts. In addition to its murderous actions against Israel, Hezbollah has used violence to impose its radical Islamist agenda and subvert democracy in Lebanon. Some experts believed that Hezbollah's participation in the 1992 Lebanese elections and subsequent inclusion in Lebanon's parliament and coalition governments would moderate its behavior, but political inclusion did not lead it to renounce terrorism.

Hezbollah also poses a potential threat to America's NATO allies in Europe. Hezbollah established a presence inside European countries in the 1980s amid the influx of Lebanese citizens seeking to escape Lebanon's civil war and took root among Lebanese Shiite immigrant communities throughout Europe. German intelligence officials estimate that roughly 900 Hezbollah members live in Germany alone. Hezbollah also has developed an extensive web of fundraising and logistical support cells throughout Europe.<sup>24</sup>

France and Britain have been the principal European targets of Hezbollah terrorism, partly because both countries opposed Hezbollah's agenda in Lebanon and were perceived as enemies of Iran, Hezbollah's chief patron. Hezbollah has been involved in many terrorist attacks against Europeans, including:

- The October 1983 bombing of the French contingent of the multinational peace-keeping force in Lebanon (on the same day the U.S. Marine barracks was bombed), which killed 58 French soldiers;
- The December 1983 bombing of the French embassy in Kuwait;
- The April 1985 bombing of a restaurant near a U.S. base in Madrid, Spain, which killed 18 Spanish citizens;
- A campaign of 13 bombings in France in 1986 that targeted shopping centers and railroad facilities, killing 13 people and wounding more than 250; and
- A March 1989 attempt to assassinate British novelist Salman Rushdie that failed when a bomb exploded prematurely, killing a terrorist in London.

Hezbollah's attacks in Europe trailed off in the 1990s after Hezbollah's Iranian sponsors accepted a truce in their bloody 1980–1988 war with Iraq and no longer needed a surrogate to punish states that Tehran perceived as supporting Iraq. Significantly, European participation in Lebanese peacekeeping operations, which became a lightning rod for Hezbollah terrorist attacks in the 1980s, could become an issue again if Hezbollah attempts to revive its aggressive operations in southern Lebanon. Troops from EU member states could someday find themselves attacked by Hezbollah with weapons financed by Hezbollah supporters in their home countries.

Hezbollah operatives have been deployed in countries throughout Europe, including Belgium, Bulgaria, Cyprus, France, Germany, and Greece.<sup>25</sup>

**Growing Missile Threat.** Iran possesses the largest number of deployed missiles in the Middle East.<sup>26</sup> In June 2017, Iran launched mid-range missiles from its territory that struck opposition targets in Syria. This was the first such operational use of mid-range

missiles by Iran in almost 30 years, but it was not as successful as Tehran might have hoped. It was reported that three of the five missiles launched missed Syria altogether and landed in Iraq and that the remaining two landed in Syria but missed their intended targets by miles.<sup>27</sup>

The backbone of the Iranian ballistic missile force is the Shahab series of road-mobile surface-to-surface missiles, which are based on Soviet-designed Scud missiles. The Shahab missiles are potentially capable of carrying nuclear, chemical, or biological warheads in addition to conventional high-explosive warheads. Their relative inaccuracy (compared to NATO ballistic missiles) limits their effectiveness unless they are employed against large, soft targets like cities.

Tehran's heavy investment in such weapons has fueled speculation that the Iranians intend eventually to replace the conventional warheads on their longer-range missiles with nuclear warheads. As the Nuclear Threat Initiative has observed, "Iran's rapidly improving missile capabilities have prompted concern from international actors such as the United Nations, the United States and Iran's regional neighbors."<sup>28</sup>

Iran is not a member of the Missile Technology Control Regime, and it has sought aggressively to acquire, develop, and deploy a wide spectrum of ballistic missile, cruise missile, and space launch capabilities. During the 1980–1988 Iran–Iraq war, Iran acquired Soviet-made Scud-B missiles from Libya and later acquired North Korean–designed Scud-C and No-dong missiles, which it renamed the Shahab-2 (with an estimated range of 500 kilometers or 310 miles) and Shahab-3 (with an estimated range of 900 kilometers or 560 miles). It now can produce its own variants of these missiles as well as longer-range Ghadr-1 and Qiam missiles.<sup>29</sup>

Iran's Shahab-3 and Ghadr-1, which is a modified version of the Shahab-3 with a smaller warhead but greater range (about 1,600 kilometers or 1,000 miles), are considered more reliable and advanced than the North Korean

No-dong missile from which they are derived. Although early variants of the Shahab-3 missile were relatively inaccurate, Tehran was able to adapt and employ Chinese guidance technology to improve strike accuracy significantly.<sup>30</sup> In 2014, then-Defense Intelligence Agency Director Lieutenant General Michael T. Flynn warned that:

Iran can strike targets throughout the region and into Eastern Europe. In addition to its growing missile and rocket inventories, Iran is seeking to enhance lethality and effectiveness of existing systems with improvements in accuracy and warhead designs. Iran is developing the Khalij Fars, an anti-ship ballistic missile which could threaten maritime activity throughout the Persian Gulf and Strait of Hormuz.<sup>31</sup>

Iran's ballistic missiles pose a growing threat to U.S. bases and allies from Turkey, Israel, and Egypt to the west, to Saudi Arabia and the other Gulf states to the south, to Afghanistan and Pakistan to the east. Iran also has become a center for missile proliferation by exporting a wide variety of ballistic missiles, cruise missiles, and rockets to the Assad regime in Syria and proxy groups such as Hezbollah, Hamas, Palestinian Islamic Jihad, the Houthi rebels in Yemen, and Iraqi militias. The Houthi Ansar Allah group has launched ballistic missiles and armed drones against targets in Saudi Arabia and the UAE, which launched a military campaign against them in 2015 in support of Yemen's government.

However, it is Israel, which has fought a shadow war with Iran and its terrorist proxies, that is most at risk from an Iranian missile attack. In case the Israeli government had any doubt about Iran's implacable hostility, the Revolutionary Guards, which control most of Iran's strategic missile systems, displayed a message written in Hebrew on the side of one of the Iranian missiles tested in March 2016: "Israel must be wiped off the earth."<sup>32</sup> The development of nuclear warheads for Iran's

ballistic missiles would significantly degrade Israel's ability to deter major Iranian attacks, an ability that the existing (but not officially acknowledged) Israeli monopoly on nuclear weapons in the Middle East currently provides.

For Iran's radical regime, hostility to Israel, which Iran sometimes calls the "Little Satan," is second only to hostility to the United States, which the leader of Iran's 1979 revolution, Ayatollah Khomeini, dubbed the "Great Satan." But Iran poses a greater immediate threat to Israel than it does to the United States: Israel is a smaller country with fewer military capabilities, is located much closer to Iran, and already is within range of Iran's Shahab-3 missiles. Moreover, all of Israel can be hit with the thousands of shorter-range rockets that Iran has provided to Hezbollah in Lebanon and to Hamas and Palestinian Islamic Jihad in Gaza.

**Weapons of Mass Destruction.** Tehran has invested tens of billions of dollars since the 1980s in a nuclear weapons program that is concealed within its civilian nuclear power program. It built clandestine but subsequently discovered underground uranium-enrichment facilities near Natanz and Fordow and a heavy-water reactor near Arak that would give it a second potential route to nuclear weapons.<sup>33</sup>

Before the 2015 nuclear deal, Iran had accumulated enough low-enriched uranium to build eight nuclear bombs (assuming the uranium was enriched to weapon-grade levels); "[b]y using the approximately 9,000 first generation centrifuges operating at its Natanz Fuel Enrichment Plant as of October 2015, Iran could theoretically produce enough weapon-grade uranium to fuel a single nuclear warhead in less than 2 months."<sup>34</sup> Clearly, the development of a nuclear bomb would greatly amplify the threat posed by Iran. Even if Iran did not use a nuclear weapon or pass it on to one of its terrorist surrogates to use, the regime could become emboldened to expand its support for terrorism, subversion, and intimidation, assuming that its nuclear arsenal would protect it from retaliation as has been the case with North Korea.

On July 14, 2015, President Barack Obama announced that the United States and Iran, along with China, France, Germany, Russia, the United Kingdom, and the European Union High Representative for Foreign Affairs and Security Policy, had reached a "comprehensive, long-term deal with Iran that will prevent it from obtaining a nuclear weapon."<sup>35</sup> The short-lived agreement, however, did a much better job of dismantling sanctions against Iran than it did of dismantling Iran's nuclear infrastructure, much of which was allowed to remain functional subject to weak restrictions, some of them only temporary. This flaw led President Donald Trump to withdraw the U.S. from the agreement on May 8, 2018, and reimpose sanctions.<sup>36</sup>

In fact, the agreement did not require that any of Iran's covertly built facilities would have to be dismantled. The Natanz and Fordow uranium enrichment facilities were allowed to remain in operation, although the latter facility was to be repurposed at least temporarily as a research site. The heavy-water reactor at Arak was also retained with modifications that will reduce its yield of plutonium. All of these facilities, built covertly and housing operations prohibited by multiple U.N. Security Council resolutions, were legitimized by the agreement.

The Iran nuclear agreement marked a risky departure from more than five decades of U.S. nonproliferation efforts under which Washington opposed the spread of sensitive nuclear technologies, such as uranium enrichment, even for allies. Iran got a better deal on uranium enrichment under the agreement than such U.S. allies as the United Arab Emirates, South Korea, and Taiwan have received from Washington in the past. In fact, the Obama Administration gave Iran better terms on uranium enrichment than President Gerald Ford's Administration gave the Shah of Iran, a close U.S. ally before the 1979 revolution.

President Trump's decision to withdraw from the nuclear agreement marked a return to long-standing U.S. nonproliferation policy. Iran, Britain, France, Germany, the European Union, China, and Russia sought to salvage

the agreement, but this is unlikely, given the strength of the U.S. nuclear sanctions that were fully reimposed by November 4, 2018, after a 180-day wind-down period.

Iran initially adopted a policy of “strategic patience,” seeking to preserve as much of the agreement’s sanctions relief as it could while hoping to outlast the Trump Administration and deal with a presumably more pliable successor Administration after the 2020 elections. The Trump Administration, however, ratcheted up sanctions to unprecedented levels under its “maximum pressure” campaign. On April 8, 2019, it designated Iran’s Revolutionary Guards as a foreign terrorist organization; because the Revolutionary Guards are extensively involved in Iran’s oil, construction, and defense industries, this allowed U.S. sanctions to hit harder at strategic sectors of Iran’s economy.<sup>37</sup> On April 22, 2019, Secretary of State Mike Pompeo announced that the Administration would eliminate waivers for Iran’s remaining oil exports on May 2 and seek to zero them out entirely.<sup>38</sup>

Although President Trump has made it clear that he seeks a new agreement on Iran’s nuclear program, Tehran has refused to return to the negotiating table. Instead, it has sought to pressure European states to protect it from the effects of U.S. sanctions. On May 8, 2019, Iranian President Rouhani announced that Iran would no longer comply with the 2015 nuclear agreement’s restrictions on the size of Iran’s stockpiles of enriched uranium and heavy water.<sup>39</sup> Tehran gave the Europeans 60 days to deliver greater sanctions relief, specifically with respect to oil sales and banking transactions, and warned that if this ultimatum was not met by July 7, 2019, it would both resume construction of its unfinished heavy-water reactor at Arak and resume uranium enrichment at higher levels than permitted by the agreement.

Iran also is a declared chemical weapons power that claims to have destroyed all of its chemical weapon stockpiles, but it has never fully complied with the Chemical Weapons Convention or declared its holdings.<sup>40</sup> U.S.

intelligence agencies have assessed that Iran maintains “the capability to produce chemical warfare (CW) agents and ‘probably’ has the capability to produce some biological warfare agents for offensive purposes, if it made the decision to do so.”<sup>41</sup>

**Iranian Threats to Israel.** In addition to ballistic missile threats from Iran, Israel faces the constant threat of attack from Palestinian, Lebanese, Egyptian, Syrian, and other Arab terrorist groups, including many supported by Iran. The threat posed by Arab states, which lost four wars against Israel in 1948, 1956, 1967, and 1973 (Syria and the PLO lost a fifth war in 1982 in Lebanon), has gradually declined. Egypt and Jordan have signed peace treaties with Israel, and Iraq, Libya, Syria, and Yemen have been distracted by civil wars. Although the conventional military threat to Israel from Arab states has declined, unconventional military and terrorist threats, especially from an expanding number of sub-state actors, have risen substantially.

Iran has systematically bolstered many of these groups even when it did not necessarily share their ideology. Today, Iran’s surrogates, Hezbollah and Palestinian Islamic Jihad, along with more distant ally Hamas, pose the chief immediate security threats to Israel. After Israel’s May 2000 withdrawal from southern Lebanon and the September 2000 outbreak of fighting between Israelis and Palestinians, Hezbollah stepped up its support for such Palestinian extremist groups as Hamas, Palestinian Islamic Jihad, the al-Aqsa Martyrs’ Brigades, and the Popular Front for the Liberation of Palestine. It also expanded its own operations in the West Bank and Gaza and provided funding for specific attacks launched by other groups.

In July 2006, Hezbollah forces crossed the Lebanese border in an effort to kidnap Israeli soldiers inside Israel, igniting a military clash that claimed hundreds of lives and severely damaged the economies on both sides of the border. Hezbollah has since rebuilt its depleted arsenal with help from Iran and Syria. According to official Israeli estimates, Hezbollah has

amassed around 150,000 rockets, including a number of long-range Iranian-made missiles capable of striking cities throughout Israel.<sup>42</sup> In recent years, under cover of the war in Syria, Iran and Hezbollah have established another potential front against Israel in addition to Lebanon and Gaza.

Since Israel's withdrawal from the Gaza Strip in 2005, Hamas, Palestinian Islamic Jihad, and other terrorist groups have fired more than 11,000 rockets into Israel, sparking wars in 2008–2009, 2012, and 2014.<sup>43</sup> Over 5 million Israelis out of a total population of 8.1 million live within range of rocket attacks from Gaza, although the successful operation of the Iron Dome anti-missile system greatly mitigated this threat during the Gaza conflict in 2014. In that war, Hamas also unveiled a sophisticated tunnel network that it used to infiltrate Israel to launch attacks on Israeli civilians and military personnel. In early May 2019, Palestinian Islamic Jihad ignited another round of fighting in Gaza in which about 700 rockets were fired at Israel.<sup>44</sup>

**Threats to Saudi Arabia and Other Members of the Gulf Cooperation Council.** Saudi Arabia and the five other Arab Gulf States—Bahrain, Kuwait, Oman, Qatar, and the United Arab Emirates—formed the Gulf Cooperation Council (GCC) in 1981 to deter and defend against Iranian aggression. Iran remains the primary external threat to their security. Tehran has supported groups that launched terrorist attacks against Bahrain, Kuwait, Saudi Arabia, and Yemen. It sponsored the Islamic Front for the Liberation of Bahrain, a surrogate group that plotted a failed 1981 coup against Bahrain's ruling Al Khalifa family, the Sunni rulers of the predominantly Shia country. Iran also has long backed Bahraini branches of Hezbollah and the Dawa Party.

However, in recent years, some members of the GCC, led mainly by Saudi Arabia, have shown concern over Qatar's support for the Muslim Brotherhood and its perceived coziness with Iran, with which Doha shares a major gas field in the Gulf. This led to the breakdown of diplomatic relations between many Arab

states and Qatar in June 2017 and the imposition of economic sanctions as part of a diplomatic standoff that shows no signs of ending.<sup>45</sup>

When Bahrain was engulfed in a wave of Arab Spring protests in 2011, its government charged that Iran again exploited the protests to back the efforts of Shia radicals to overthrow the royal family. Saudi Arabia, fearing that a Shia revolution in Bahrain would incite its own restive Shia minority, led a March 2011 GCC intervention that backed Bahrain's government with about 1,000 Saudi troops and 500 police from the UAE.

Bahrain has repeatedly intercepted shipments of Iranian arms, including sophisticated bombs employing explosively formed penetrators. The government withdrew its ambassador to Tehran when two Bahrainis with ties to the IRGC were arrested after their arms shipment was intercepted off Bahrain's coast in July 2015. Iranian hardliners have steadily escalated pressure on Bahrain. In March 2016, a former IRGC general who is a close adviser to Ayatollah Khamenei stated that "Bahrain is a province of Iran that should be annexed to the Islamic Republic of Iran."<sup>46</sup> After Bahrain stripped a senior Shiite cleric, Sheikh Isa Qassim, of his citizenship, General Qassim Suleimani, commander of the IRGC's Quds Force, threatened to make Bahrain's royal family "pay the price and disappear."<sup>47</sup>

Saudi Arabia has criticized Iran for supporting radical Saudi Shiites, intervening in Syria, and supporting Shiite Islamists in Lebanon, Iraq, and Yemen. In January 2016, Saudi Arabia executed a Shiite cleric charged with sparking anti-government protests and cut diplomatic ties with Iran after Iranian mobs enraged by the execution attacked and set fire to the Saudi embassy in Tehran.<sup>48</sup>

In addition to terrorist threats and possible rebellions by Shia or other disaffected internal groups, Saudi Arabia and the other GCC states face possible military threats from Iran. Because of their close security ties with the United States, Tehran is unlikely to launch direct military attacks against these countries, but it has backed Shiite terrorist groups like Saudi



Hezbollah within GCC states and has supported the Shiite Houthi rebels in Yemen. In March 2015, Saudi Arabia led a 10-country coalition that launched a military campaign against Houthi forces and provided support for ousted Yemeni President Abdu Rabu Mansour Hadi, who took refuge in Saudi Arabia. The Saudi Navy also established a blockade of Yemeni ports to prevent Iran from aiding the rebels.

The Houthis have retaliated by launching Iranian-supplied missiles at military and civilian targets in Saudi Arabia and the UAE, including ballistic missile attacks on airports, Riyadh, and other cities, as well as cruise missile strikes. In December 2017, the Houthis launched a cruise missile attack on an unfinished nuclear reactor in Abu Dhabi. The Houthis also have made extensive use of UAVs andUCAVs (unmanned combat aerial vehicles, or armed drones). A HouthiUCAV attacked a military parade in Yemen in January 2019, killing at least six people including Yemen's commander of military intelligence, and longer-rangeUCAVs were used in a coordinated attack on Saudi Arabia's East–West pipeline on May 14, 2019.<sup>49</sup>

### Threats to the Commons

The United States has critical interests at stake in the Middle Eastern commons: sea, air, space, and cyber. The U.S. has long provided the security backbone in these areas, and this security in turn has supported the region's economic development and political stability.

**Maritime.** Maintaining the security of the sea lines of communication in the Persian Gulf, Arabian Sea, Red Sea, and Mediterranean Sea is a high priority for strategic, economic, and energy security purposes. The Persian Gulf region contains approximately 50 percent of the world's oil reserves and is a crucial source of oil and gas for energy-importing states, particularly China, India, Japan, South Korea, and many European countries. Interstate conflict or terrorist attacks could easily interrupt the flow of that oil.

Bottlenecks such as the Strait of Hormuz, Suez Canal, and Bab el-Mandeb Strait are

potential choke points for restricting the flow of oil, international trade, and the deployment of U.S. Navy warships. The chief potential threat to the free passage of ships through the Strait of Hormuz, one of the world's most important maritime choke points, is Iran. According to one recent account:

The U.S. Energy Information Administration estimated that 18.5 million barrels per day (bpd) of seaborne oil passed through the waterway in 2016. That was about 30 percent of crude and other oil liquids traded by sea in 2016.

About 17.2 million bpd of crude and condensates were estimated to have been shipped through the Strait in 2017 and about 17.4 million bpd in the first half of 2018, according to oil analytics firm Vortexa.

With global oil consumption standing at about 100 million bpd, that means almost a fifth passes through the Strait.

Most crude exported from Saudi Arabia, Iran, the UAE, Kuwait and Iraq — all members of the Organization of the Petroleum Exporting Countries — is shipped through the waterway.

It is also the route used for nearly all the liquefied natural gas (LNG) produced by the world's biggest LNG exporter, Qatar.<sup>50</sup>

Iran has trumpeted the threat that it could pose to the free flow of oil exports from the Gulf if it is attacked or if a cutoff of its own oil exports is threatened. Iran's leaders have threatened to close the Strait of Hormuz, the jugular vein through which most Gulf oil exports flow to Asia and Europe. Although the United States has greatly reduced its dependence on oil exports from the Gulf, it still would sustain economic damage in the event of a spike in world oil prices, and many of its European and Asian allies and trading partners

import a substantial portion of their oil needs from the region.

Supreme Leader Ayatollah Ali Khamenei has repeatedly played up Iran's threat to international energy security, proclaiming in 2006 that "[i]f the Americans make a wrong move toward Iran, the shipment of energy will definitely face danger, and the Americans would not be able to protect energy supply in the region."<sup>51</sup> Iranian officials often reiterate these threats during periods of heightened tension. For example, the chief of staff of Iran's army, Major General Mohammad Baqeri, warned on April 28, 2019, that "if our oil does not pass, the oil of others shall not pass the Strait of Hormuz either."<sup>52</sup>

Iran has established a precedent for attacking oil shipments in the Gulf. During the Iran-Iraq war, each side targeted the other's oil facilities, ports, and oil exports. Iran escalated attacks to include neutral Kuwaiti oil tankers and terminals and clandestinely laid mines in Persian Gulf shipping lanes while its ally Libya clandestinely laid mines in the Red Sea. The United States defeated Iran's tactics by reflagging Kuwaiti oil tankers, clearing the mines, and escorting ships through the Persian Gulf, but a large number of commercial vessels were damaged during the "Tanker War" from 1984 to 1987.

Iran's demonstrated willingness to disrupt oil traffic through the Persian Gulf in the past to place economic pressure on Iraq is a red flag to U.S. military planners. During the 1980s Tanker War, Iran's ability to strike at Gulf shipping was limited by its aging and outdated weapons systems and the arms embargo imposed by the U.S. after the 1979 revolution, but since the 1990s, Iran has been upgrading its military with new weapons from North Korea, China, and Russia, as well as with weapons manufactured domestically.

Since the Iran-Iraq war, Tehran has invested heavily in developing its naval forces, particularly the IRGC Navy, along unconventional lines. Today, Iran boasts an arsenal of Iranian-built missiles based on Russian and Chinese designs that pose significant threats

to oil tankers as well as warships. Iran has deployed mobile anti-ship missile batteries along its 1,500-mile gulf coast and on many of the 17 Iranian-controlled islands in the gulf, as well as modern anti-ship missiles mounted on fast attack boats, submarines, oil platforms, and vessels disguised as civilian fishing boats. Six of Iran's 17 islands in the gulf are particularly important because they are located close to the shipping channels that all ships must use near the Strait of Hormuz: Forur, Bani Forur and Sirri, and three islands seized from the United Arab Emirates: Abu Musa, Greater Tunb, and Lesser Tunb.

Iran has imported Russian submarines, North Korean minisubmarines, and a wide variety of advanced Chinese anti-ship missiles and has a significant stock of Chinese-designed anti-ship cruise missiles, including the older HY-2 Seersucker and the more modern CSS-N-4 Sardine and CSS-N-8 Saccade models. It also has reverse engineered Chinese missiles to produce its own Ra'ad and Noor anti-ship cruise missiles. More recently, Tehran has produced and deployed more advanced anti-ship cruise missiles, the Nasir and Qadir.<sup>53</sup> Shore-based missiles deployed along Iran's coast would be augmented by aircraft-delivered laser-guided bombs and missiles as well as by television-guided bombs.

Iran has a large supply of anti-ship mines, including modern mines that are far superior to the simple World War I-style contact mines that it used in the 1980s. In addition to expanding the quantity of its mines from an estimated 1,500 during the Iran-Iraq war to at least 6,000 and possibly up to 20,000, Tehran has increased their quality. It has acquired significant stocks of "smart mines" including versions of the Russian MDM-6, Chinese MC-52, and Chinese EM-11, EM-31, and EM-55 mines.<sup>54</sup> One of Iran's most lethal mines is the Chinese-designed EM-52 "rocket" mine, which remains stationary on the sea floor and fires a homing rocket when a ship passes overhead.

Iran can deploy mines or torpedoes from its three *Kilo*-class submarines, purchased from Russia, which are based at Bandar Abbas, Iran's

largest seaport and naval base. These submarines could be difficult to detect for brief periods when running silent and remaining stationary on a shallow bottom just outside the Strait of Hormuz.<sup>55</sup> Iran could also deploy mines by minisubmarines, helicopters, or small boats disguised as fishing vessels. Iran's robust mine warfare capability and the limited capacity for countermine operations by the U.S. Navy and allied navies pose a major challenge to gulf maritime security.<sup>56</sup>

Iran has developed two separate naval forces. The regular navy takes the lead in the Caspian Sea and outside the Strait of Hormuz in the Gulf of Oman, while the Islamic Revolutionary Guard Corps Navy is Iran's dominant force inside the Persian Gulf. The IRGC Navy has developed an effective asymmetric naval warfare strategy that could enable it to counter the superior firepower and technology of the U.S. Navy and its GCC allies, at least for a short period, and has adopted swarming tactics using well-armed fast attack boats to launch surprise attacks against larger and more heavily armed naval adversaries.

The commander of the IRGC Navy bragged in 2008 that it had brought guerilla warfare tactics to naval warfare: "We are everywhere and at the same time nowhere."<sup>57</sup> The IRGC has honed such unconventional tactics as deploying remote-controlled radar decoy boats and boats packed with explosives to confuse defenses and attack adversaries. The IRGC also could deploy naval commandos trained to attack using small boats, minisubmarines, and even jet skis, as well as underwater demolition teams that could attack offshore oil platforms, moored ships, ports, and other facilities.

On April 28, 2015, the Revolutionary Guard naval force seized the *Maersk Tigris*, a container ship registered in the Marshall Islands, near the Strait of Hormuz. Tehran claimed that it seized the ship because of a previous court ruling ordering the Maersk Line, which charters the ship, to make a payment to settle a dispute with a private Iranian company. The ship was later released after being held for more than a week.<sup>58</sup> On May 14, 2015, the *Alpine Eternity*,

an oil tanker flagged in Singapore, was surrounded and attacked by Revolutionary Guard gunboats in the strait when it refused to be boarded. Iranian authorities alleged that it had damaged an Iranian oil platform in March, but the ship's owners maintained that it had hit an uncharted submerged structure.<sup>59</sup>

The Revolutionary Guard's aggressive tactics in using commercial disputes as pretexts for illegal seizures of transiting vessels prompted the U.S. Navy to escort American and British-flagged ships through the Strait of Hormuz for several weeks in May before tensions eased.

The July 2015 nuclear agreement did not alter the confrontational tactics of the Revolutionary Guards in the Gulf.<sup>60</sup> IRGC naval forces frequently challenged U.S. naval forces in a series of incidents. IRGC missile boats launched rockets within 1,500 yards of the carrier *Harry S. Truman* near the Strait of Hormuz in late December 2015, flew drones over U.S. warships, and detained and humiliated 10 American sailors in a provocative January 12, 2016, incident.<sup>61</sup> Despite the fact that the two U.S. Navy boats carrying the sailors had drifted inadvertently into Iranian territorial waters, the vessels had the right of innocent passage, and their crews should not have been disarmed, forced onto their knees, filmed, and exploited in propaganda videos.

Iran halted the harassment of U.S. Navy ships in 2017 for unknown reasons. According to U.S. Navy reports, Iran instigated 23 "unsafe and/or unprofessional" interactions with U.S. Navy ships in 2015, 35 in 2016, and 14 in the first eight months of 2017, with the last incident occurring on August 14, 2017.<sup>62</sup> Although this was a welcome development, the provocations could resume suddenly if U.S.–Iran relations deteriorate.

Iran apparently already has escalated its intimidation tactics against international shipping near the gulf. On May 12, 2019, four oil tankers were damaged by mysterious explosions off the coast of the UAE in the Gulf of Oman. Then-U.S. National Security Adviser John Bolton stated that "naval mines almost

## Iranian Aggression in the Strait of Hormuz



**NOTE:** Locations of incidents are approximate.

**SOURCES:** Weiyi Cai, Denise Lu, and Anjali Singhvi, "Three Attacks in the World's Oil Choke Point," *The New York Times*, June 21, 2019, <https://www.nytimes.com/interactive/2019/06/21/world/middleeast/map-us-iran-drone-attack.html> (accessed July 8, 2019), and other media reports.

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certainly from Iran” were the cause of the damage.<sup>63</sup> On June 13, two more tankers were attacked in the Gulf of Oman. Even though Iranian Revolutionary Guards were filmed removing an unexploded limpet mine from one of the damaged ships, Tehran continued to deny its involvement in all of the attacks.<sup>64</sup> An IRGC surface-to-air missile shot down a U.S. surveillance drone in international air space on June 19. The U.S. initially planned to launch retaliatory strikes, but President Trump called off the operation.<sup>65</sup>

If Tehran were to attack ships transiting the Strait of Hormuz, the United States and its

allies have the capacity to counter Iran’s maritime threats and restore the flow of oil exports, but “the effort would likely take some time—days, weeks, or perhaps months—particularly if a large number of Iranian mines need to be cleared from the Gulf.”<sup>66</sup> Naval warfare experts estimated in May 2019 that Iran could close the strait for up to four weeks with its combined forces, using coastal missile batteries, mines, submarines, and naval forces.<sup>67</sup> Such an aggressive move would be very costly and risky for Tehran. Closing the strait would also block Iran’s oil exports and many of its imports, including food and medicine. Moreover, most

of Iran's naval forces, naval bases, and other military assets could be destroyed in the resulting conflict.

In addition to using its own forces, Tehran could use its extensive network of clients in the region to sabotage oil pipelines and other infrastructure or to strike oil tankers in port or at sea. Iranian Revolutionary Guards deployed in Yemen reportedly played a role in the unsuccessful October 9 and 12, 2016, missile attacks launched by Houthi rebels against the USS *Mason*, a U.S. Navy warship, near the Bab el-Mandeb Strait in the Red Sea.<sup>68</sup> The Houthis denied that they launched the missiles, but they did claim responsibility for an October 1, 2016, attack on a UAE naval vessel and the suicide bombing of a Saudi warship in February 2017.

Houthi irregular forces have deployed mines along Yemen's coast, used a remote-controlled boat packed with explosives in an unsuccessful attack on the Yemeni port of Mokha in July 2017, and have launched several unsuccessful naval attacks against ships in the Red Sea. Houthi gunboats also attacked and damaged a Saudi oil tanker near the port of Hodeidah on April 3, 2018.

U.N. investigators have concluded that the Houthis also operate UAVs with a range of up to 1,500 kilometers (930 miles), several of which were used to attack Saudi Arabia's East-West pipeline on May 14, 2019.<sup>69</sup> This attack, along with attacks on oil tankers in the Gulf of Oman two days earlier, likely was a signal from Tehran that it can also disrupt oil shipments outside the Persian Gulf in a crisis.

**Airspace.** The Middle East is particularly vulnerable to attacks on civilian aircraft. Large quantities of arms, including man-portable air defense systems, were looted from arms depots in Libya, Iraq, Syria, and Yemen during civil wars and could find their way into the hands of Iranian-supported groups. Iran has provided anti-aircraft missiles to Hezbollah, Iraqi militias, and the Houthi rebels in Yemen. The Houthis also have attacked Saudi airports with ballistic missiles and armed drones, although they may have been targeting military facilities located nearby.<sup>70</sup>

Perhaps the greatest Iranian threat to civil aviation would come in the event of a military clash in the crowded skies over the Persian Gulf. The U.S. Federal Aviation Administration issued a warning to commercial airlines on May 16, 2019, during a period of heightened tensions with Iran, explaining that civilian planes risked being targeted by "miscalculation or misidentification" from the Iranian military.<sup>71</sup>

**Space.** Iran has launched satellites into orbit, but there is no evidence that it has an offensive space capability. Tehran successfully launched three satellites in February 2009, June 2011, and February 2012 using the Safir space launch vehicle, which uses a modified Ghadr-1 missile for its first stage and has a second stage that is based on an obsolete Soviet submarine-launched ballistic missile, the R-27.<sup>72</sup> The technology probably was transferred by North Korea, which built its BM-25 missiles using the R-27 as a model.<sup>73</sup> Safir technology could be used to develop long-range ballistic missiles.

Iran claimed that it launched a monkey into space and returned it safely to Earth twice in 2013.<sup>74</sup> Tehran also announced in June 2013 that it had established its first space tracking center to monitor objects in "very remote space" and help manage the "activities of satellites."<sup>75</sup> On July 27, 2017, Iran tested a Simorgh (Phoenix) space launch vehicle that it claimed could place a satellite weighing up to 250 kilograms (550 pounds) in an orbit of 500 kilometers (311 miles).<sup>76</sup>

**Cyber Threats.** Iranian cyber capabilities present a significant threat to the U.S. and its allies. Iran has developed offensive cyber capabilities as a tool of espionage and sabotage and claims "to possess the 'fourth largest' cyber force in the world—a broad network of quasi-official elements, as well as regime-aligned 'hacktivists,' who engage in cyber activities broadly consistent with the Islamic Republic's interests and views."<sup>77</sup>

The creation of the "Iranian Cyber Army" in 2009 marked the beginning of a cyber offensive against those whom the Iranian government

regards as enemies. A hacking group dubbed the Ajax Security Team, believed to be operating out of Iran, has used malware-based attacks to target U.S. defense organizations and has breached the Navy Marine Corps Intranet.<sup>78</sup> The group also has targeted dissidents within Iran, seeding versions of anti-censorship tools with malware and gathering information about users of those programs.<sup>79</sup> Iran has invested heavily in cyber activity, reportedly spending “over \$1 billion on its cyber capabilities in 2012 alone.”<sup>80</sup>

According to an April 2015 report released by the American Enterprise Institute, hostile Iranian cyber activity has increased significantly since the beginning of 2014 and could threaten U.S. critical infrastructure. The Islamic Revolutionary Guard Corps and Sharif University of Technology are two Iranian institutions that investigators have linked to efforts to infiltrate U.S. computer networks.<sup>81</sup>

Iran allegedly has used cyber weapons to engage in economic warfare, most notably the sophisticated and debilitating “[distributed] denial-of-service (DDoS) attacks against a number of U.S. financial institutions, including the Bank of America, JPMorgan Chase, and Citigroup.”<sup>82</sup> In February 2014, Iran launched a crippling cyberattack against the Sands Casino in Las Vegas, owned by Sheldon Adelson, a leading supporter of Israel who is known to be critical of the Iranian regime.<sup>83</sup> In 2012, Tehran was suspected of launching both the “Shamoon” virus attack on Saudi Aramco, the world’s largest oil-producing company—an attack that destroyed approximately 30,000 computers—and an attack on Qatari natural gas company Rasgas’s computer networks.<sup>84</sup>

U.S. officials warned of a surge of sophisticated computer espionage by Iran in the fall of 2015 that included a series of cyberattacks against State Department officials.<sup>85</sup> In March 2016, the Justice Department indicted seven Iranian hackers for penetrating the computer system that controlled a dam in the State of New York.<sup>86</sup>

The sophistication of these and other Iranian cyberattacks, together with Iran’s

willingness to use these weapons, has led various experts to characterize Iran as one of America’s most cyber-capable opponents. Iranian cyber forces have gone so far as to create fake online personas in order to extract information from U.S. officials through such accounts as LinkedIn, YouTube, Facebook, and Twitter.<sup>87</sup> Significantly, the FBI sent the following cyber alert to American businesses on May 22, 2018:

The FBI assesses [that] foreign cyber actors operating in the Islamic Republic of Iran could potentially use a range of computer network operations—from scanning networks for potential vulnerabilities to data deletion attacks—against U.S.-based networks in response to the U.S. government’s withdrawal from the Joint Comprehensive Plan of Action (JCPOA).<sup>88</sup>

## Conclusion

Iran represents by far the most significant security challenge to the United States, its allies, and its interests in the greater Middle East. Its open hostility to the United States and Israel, sponsorship of terrorist groups like Hezbollah, and history of threatening the commons underscore the problem it could pose. Today, Iran’s provocations are mostly a concern for the region and America’s allies, friends, and assets there. Iran relies heavily on irregular (to include political) warfare against others in the region and fields more ballistic missiles than any of its neighbors. The development of its ballistic missiles and potential nuclear capability also mean that it poses a long-term threat to the security of the U.S. homeland.

According to the International Institute for Strategic Studies, among the key weapons in Iran’s inventory are up to 50 medium-range ballistic missile launchers, as many as 100 short-range ballistic missile launchers, 336 combat-capable aircraft, 1,513 or more main battle tanks, 640 or more armored personnel carriers, 21 tactical submarines, six corvettes, and 15 amphibious landing ships. There are 523,000 personnel in the armed forces,

including 350,000 in the Army, upwards of 125,000 in the Islamic Revolutionary Guard Corps, 30,000 in the Air Force, and 18,000 in the Navy. With regard to these capabilities, the IISS assesses that:

The armed forces are numerous by regional standards and its personnel are reasonably well trained, with some benefitting from operational experience. The IRGC's Quds Force is a principal element of Iran's military power abroad, while elements of the Basij militia also

play a foreign role. The regular navy has limited power-projection capabilities, while the IRGC navy is responsible for maritime security close to home. The armed forces struggle with an aging inventory of primary combat equipment that ingenuity and asymmetric warfare techniques can only partially offset.<sup>89</sup>

This *Index* assesses the overall threat from Iran, considering the range of contingencies, as "aggressive." Iran's capability score holds at "gathering."<sup>90</sup>

## Threats: Iran

	HOSTILE	AGGRESSIVE	TESTING	ASSERTIVE	BENIGN
Behavior		✓			
	FORMIDABLE	GATHERING	CAPABLE	ASPIRATIONAL	MARGINAL
Capability		✓			

## Endnotes

1. Rebecca Leung, "Hezbollah: 'A-Team of Terrorists,'" CBS News, *60 Minutes*, April 18, 2003, <http://www.cbsnews.com/news/hezbollah-a-team-of-terrorists/> (accessed July 8, 2019).
2. Suzanne Kelly, "Experts: Hezbollah Positioned for Attack in U.S.," CNN, March 21, 2012, <http://security.blogs.cnn.com/2012/03/21/house-panel-hears-testimony-on-hezbollah-in-u-s/> (accessed July 8, 2019).
3. Ellie Kaufman, "2 Americans Led Double Lives as Hezbollah Agents, Officials Say," CNN, updated June 9, 2017, <http://www.cnn.com/2017/06/08/us/americans-accused-hezbollah-agents/> (accessed July 8, 2019).
4. Nathan A. Sales, Ambassador-at-Large and Coordinator for Counterterrorism, and Nicholas J. Rasmussen, National Counterterrorism Center Director, "Briefing on U.S. Efforts to Counter Hizballah," U.S. Department of State, October 10, 2017, <https://www.state.gov/briefing-on-u-s-efforts-to-counter-hizballah/> (accessed July 8, 2019).
5. Kenneth Katzman, "Iran's Foreign and Defense Policies," Congressional Research Service *Report for Members and Committees of Congress*, updated May 8, 2019, pp. 15 and 17, <https://fas.org/sgp/crs/mideast/R44017.pdf> (accessed July 8, 2019).
6. Anthony Cordesman, with the assistance of Bryan Gold and Garrett Berntsen, *The Gulf Military Balance, Volume I: The Conventional and Asymmetric Dimensions*, Center for Strategic and International Studies (Lanham, MD: Rowman & Littlefield, January 2014), pp. 14–16, [https://csis-prod.s3.amazonaws.com/s3fs-public/legacy\\_files/files/publication/140131\\_Cordeman\\_GulfMilitaryBalance\\_VolumeI\\_Web.pdf](https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/publication/140131_Cordeman_GulfMilitaryBalance_VolumeI_Web.pdf) (accessed July 8, 2019).
7. Elias Groll, "Iran Is Deploying Drones in Iraq. Wait, What? Iran Has Drones?" *Foreign Policy*, June 25, 2014, <https://foreignpolicy.com/2014/06/25/iran-is-deploying-drones-in-iraq-wait-what-iran-has-drones/> (accessed July 12, 2019).
8. Saeed Ghasseminejad, "Iran Doubles Down on Its Military Budget," Foundation for Defense of Democracies *Policy Brief*, June 3, 2016, <http://www.defenddemocracy.org/media-hit/saeed-ghasseminejad-iran-doubles-down-on-its-military-budget/> (accessed July 8, 2019).
9. International Institute for Strategic Studies, *The Military Balance 2019: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2019), p. 340.
10. Sima Shine and Zvi Magen, "President Rouhani's Visit to Russia: A New Level of Relations?" Tel Aviv University, Institute for National Security Studies, *INSS Insight* No. 914, April 5, 2017, <https://www.inss.org.il/wp-content/uploads/2017/04/No.-914.pdf> (accessed July 9, 2019).
11. President of Russia, Events, "Meeting with President of Iran Hassan Rouhani," June 9, 2018, <http://en.kremlin.ru/events/president/news/57710> (accessed July 8, 2019).
12. Reuters, "Iran Says Russia Delivers First Part of S-300 Defense System," April 11, 2016, <http://www.reuters.com/article/us-russia-iran-arms-idUSKCN0X80MM?elqTrackId=e02d5aca6d48418984d902ced0c33d77&elq=39fecef381094e0cbc6de535feb74a3c&elqId=17334&elqat=1&elqCampaignId=10743> (accessed July 8, 2019).
13. Tony Capaccio, "Iran's Russian Anti-Aircraft Missile Now Operational, U.S. Says," Bloomberg, last updated March 8, 2018, <https://www.bloomberqint.com/politics/iran-s-russian-anti-aircraft-missile-now-operational-u-s-says> (accessed July 8, 2019).
14. Farzin Nadimi, "Iran and Russia's Growing Defense Ties," Washington Institute for Near East Policy *Policy Watch* No. 2563, February 18, 2016, <http://www.washingtoninstitute.org/policy-analysis/view/iran-and-russias-growing-defense-ties> (accessed July 8, 2019).
15. Sam Dagher and Asa Fitch, "Iran Expands Role in Syria in Conjunction with Russia's Airstrikes," *The Wall Street Journal*, October 2, 2015, <http://www.wsj.com/articles/iran-expands-role-in-syria-in-conjunction-with-russias-airstrikes-1443811030> (accessed July 8, 2019).
16. Nader Uskowi, "The Evolving Iranian Strategy in Syria: A Looming Conflict with Israel," Atlantic Council *Issue Brief*, September 27, 2018, p. 2, <https://www.atlanticcouncil.org/publications/issue-briefs/the-evolving-iranian-strategy-in-syria-a-looming-conflict-with-israel> (accessed July 8, 2019).
17. BBC News, "Syrian Conflict: Russian Bombers Use Iran Base for Air Strikes," August 16, 2016, <https://www.bbc.com/news/world-middle-east-37093854> (accessed July 8, 2019).
18. Oren Lieberman, Salma Abdelaziz, and James Masters, "Netanyahu Says Iran 'Crossed a Red Line' After Israel Pounds Iranian Targets in Syria," CNN, updated May 11, 2018, <https://www.cnn.com/2018/05/09/middleeast/israel-rockets-syria/index.html> (accessed July 8, 2019).
19. Carla E. Humud, Kenneth Katzman, and Jim Zanotti, "Iran and Israel: Tensions over Syria," Congressional Research Service *In Focus*, updated June 5, 2019, <https://fas.org/sgp/crs/mideast/IFI0858.pdf> (accessed July 8, 2019).



20. Anna Ahronheim and Seth J. Frantzman, "Israel Strikes Syria in Rare Daytime Attack; Syria Fires at Golan," *The Jerusalem Post*, January 20, 2019, <https://www.jpost.com/Breaking-News/Report-Israel-Air-Force-strikes-southern-Syria-578020> (accessed July 8, 2019).
21. Kyle Rempfer, "Iran Killed More US Troops in Iraq than Previously Known, Pentagon Says," *Military Times*, April 4, 2019, <https://www.militarytimes.com/news/your-military/2019/04/04/iran-killed-more-us-troops-in-iraq-than-previously-known-pentagon-says/> (accessed July 8, 2019).
22. Matthew Levitt, "A Proxy for Iran," Washington Institute for Near East Policy *Cipher Brief*, July 14, 2016, <http://www.washingtoninstitute.org/policy-analysis/view/a-proxy-for-iran> (accessed July 8, 2019).
23. Yaya J. Fanusie and Alex Entz, "Hezbollah: Financial Assessment," Foundation for Defense of Democracies, Center on Sanctions and Illicit Finance, *Terror Finance Briefing Book*, September 2017, p. 8, [http://www.defenddemocracy.org/content/uploads/documents/CSIF\\_TFBB\\_Hezbollah.pdf](http://www.defenddemocracy.org/content/uploads/documents/CSIF_TFBB_Hezbollah.pdf) (accessed July 8, 2019).
24. James Phillips, "Hezbollah's Terrorist Threat to the European Union," testimony before the Subcommittee on Europe, Committee on Foreign Affairs, U.S. House of Representatives, June 20, 2007, <http://www.heritage.org/research/testimony/hezbollahs-terrorist-threat-to-the-european-union>.
25. Matthew Levitt, "Inside Hezbollah's European Plots," Washington Institute for Near East Policy, *Policy Analysis*, July 20, 2015, <https://www.washingtoninstitute.org/policy-analysis/view/inside-hezbollahs-european-plots> (accessed July 8, 2019).
26. Nuclear Threat Initiative, "Iran: Missile," last updated July 2017, <https://www.nti.org/learn/countries/iran/delivery-systems/> (accessed July 8, 2019).
27. Amos Harel and Associated Press, "Iran's Missile Attack on Syria Failed: 5 Missed, 3 Landed in Iraq," *Haaretz*, June 21, 2017, <http://www.haaretz.com/middle-east-news/1.796836> (accessed July 8, 2019).
28. Nuclear Threat Initiative, "Iran: Missile."
29. Zachary Keck, "Iran Has Amassed the Largest Ballistic Missile Force in the Middle East," *The National Interest*, May 22, 2019, <https://nationalinterest.org/print/blog/buzz/iran-has-amassed-largest-ballistic-missile-force-middle-east-58882> (accessed July 8, 2019).
30. Center for Strategic and International Studies, Missile Defense Project, "Shahab-3," *Missile Threat*, last updated June 15, 2018, <https://missilethreat.csis.org/missile/shahab-3/> (accessed July 8, 2019).
31. Lieutenant General Michael T. Flynn, U.S. Army, Director, Defense Intelligence Agency, "Annual Threat Assessment," statement before the Committee on Armed Services, U.S. Senate, February 11, 2014, p. [20], [http://www.dia.mil/Portals/27/Documents/News/2014\\_DIA\\_SFR\\_SASC\\_ATA\\_FINAL.pdf](http://www.dia.mil/Portals/27/Documents/News/2014_DIA_SFR_SASC_ATA_FINAL.pdf) (accessed July 8, 2019).
32. Tim Hume and Alireza Hajhosseini, "Iran Fires Ballistic Missiles a Day After Test; U.S. Officials Hint at Violation," CNN, updated March 9, 2016, <http://www.cnn.com/2016/03/09/middleeast/iran-missile-test/> (accessed June 22, 2017).
33. James Phillips, "Iran's Nuclear Program: What Is Known and Unknown," Heritage Foundation *Backgrounder* No. 2393, March 26, 2010, <http://www.heritage.org/research/reports/2010/03/iran-s-nuclear-program-what-is-known-and-unknown>, and Nuclear Threat Initiative, "Arak Nuclear Complex," last updated July 11, 2017, <http://www.nti.org/learn/facilities/177/> (accessed July 8, 2019).
34. Valerie Lincy and Gary Milhollin, "Iran's Nuclear Potential Before the Implementation of the Nuclear Agreement," Wisconsin Project for Nuclear Arms Control, Iran Watch, November 18, 2015, <http://www.iranwatch.org/our-publications/articles-reports/irans-nuclear-timetable> (accessed July 8, 2019).
35. News release, "Statement by the President on Iran," The White House, July 14, 2015, <https://www.whitehouse.gov/the-press-office/2015/07/14/statement-president-iran> (accessed July 8, 2019).
36. "Remarks by President Trump on the Joint Comprehensive Plan of Action," The White House, May 8, 2018, <https://www.whitehouse.gov/briefings-statements/remarks-president-trump-joint-comprehensive-plan-action/> (accessed July 8, 2019).
37. James Phillips, "Sanctioning Revolutionary Guard as Terrorist Group Will Hit Iran Hard. Here's Why," *The Daily Signal*, April 8, 2019, <https://www.heritage.org/middle-east/commentary/sanctioning-revolutionary-guard-terrorist-group-will-hit-iran-hard-heres-why>.
38. David Adesnik, "U.S. Aims Lethal Blow at Tehran's Finances by Prohibiting Oil Exports," Foundation for the Defense of Democracies *Policy Brief*, April 23, 2019, <https://www.fdd.org/analysis/2019/04/23/u-s-aims-lethal-blow-at-tehrans-finances-by-prohibiting-oil-exports/> (accessed July 8, 2019).
39. James Griffiths, Joshua Berlinger, and Sheena McKenzie, "Iranian Leader Announces Partial Withdrawal from Nuclear Deal," CNN, updated May 8, 2019, <https://www.cnn.com/2019/05/08/middleeast/iran-nuclear-deal-intl/index.html> (accessed July 8, 2019).
40. Cordesman et al., *The Gulf Military Balance, Volume I: The Conventional and Asymmetric Dimensions*, p. 19.

41. Kenneth Katzman, "Iran, Gulf Security, and U.S. Policy," Congressional Research Service *Report for Members and Committees of Congress*, August 19, 2016, p. 25, [http://www.parstimes.com/history/crs\\_august\\_16.pdf](http://www.parstimes.com/history/crs_august_16.pdf) (accessed July 8, 2019).
42. Avi Issacharoff, "Israel Raises Hezbollah Rocket Estimate to 150,000," *The Times of Israel*, November 12, 2015, <http://www.timesofisrael.com/israel-raises-hezbollah-rocket-estimate-to-150000/> (accessed July 8, 2019).
43. Israel Defense Forces, "4 Reasons Why Hamas Is a Terror Organization," June 12, 2017, <https://www.idf.il/en/minisites/hamas/4-reasons-why-hamas-is-a-terror-organization/> (accessed July 8, 2019).
44. Felicia Schwartz and Dov Lieber, "Israel Blames Islamic Jihad for Spoiling Gaza Truce Talks," *The Wall Street Journal*, May 6, 2019, <https://www.wsj.com/articles/israel-blames-islamic-jihad-for-spoiling-gaza-truce-talks-11557165910> (accessed July 8, 2019).
45. For more information on the inter-Arab dispute with Qatar, see "Assessing the Global Operating Environment: Middle East," *supra*.
46. Middle East Media Research Institute, "Former IRGC General Close to Supreme Leader Khamenei: 'Bahrain Is a Province of Iran That Should Be Annexed to [It],'" *Special Dispatch* No. 6358, March 23, 2016, <http://www.memri.org/report/en/0/0/0/0/0/9090.htm> (accessed July 8, 2019).
47. Maayan Groisman, "Iranian Commander Threatens to Make Bahrain's Royal Family 'Disappear,'" *The Jerusalem Post*, June 21, 2016, <http://www.jpost.com/Middle-East/Iran-News/Iranian-Quds-Force-commander-threatens-to-make-Bahrains-royal-family-disappear-457354> (accessed July 8, 2019).
48. Ben Hubbard, "Saudi Arabia Cuts Ties with Iran Amid Fallout of Cleric's Execution," *The New York Times*, January 3, 2016, <https://www.nytimes.com/2016/01/04/world/middleeast/iran-saudi-arabia-execution-sheikh-nimr.html> (accessed July 8, 2019).
49. Jon Gambrell, "Bomb-Laden Drones of Yemen Rebels Threaten Arabian Peninsula," Associated Press, May 16, 2019, <https://www.apnews.com/18f9c169f398464ba53c19e3963d3fba> (accessed July 8, 2019).
50. Reuters, "Factbox: Strait of Hormuz—the World's Most Important Oil Artery," May 13, 2019, <https://www.reuters.com/article/us-saudi-oil-emirates-tanker/factbox-strait-of-hormuz-the-worlds-most-important-oil-artery-idUSKCNISJOPS> (accessed July 12, 2019).
51. Thom Shanker, "Rice Dismisses Iranian Cleric's Warning on Oil," *The New York Times*, June 5, 2006, [http://www.nytimes.com/2006/06/05/world/middleeast/05dipl.html?\\_r=0](http://www.nytimes.com/2006/06/05/world/middleeast/05dipl.html?_r=0) (accessed July 8, 2019).
52. Radio Free Europe/Radio Liberty, "Iranian Commander Says Navy Could Shut Down Strait of Hormuz If Needed," updated April 28, 2019, <https://www.rferl.org/a/iran-suggests-quitting-nuclear-treaty-after-u-s-tightens-sanctions/29908567.html?lflags=mailer> (accessed July 8, 2019).
53. Tom O'Connor, "Iran's Military Fires New Cruise Missiles Amid Gulf Tensions with U.S.," *Newsweek*, April 26, 2017, <https://www.newsweek.com/iran-military-fire-cruise-missiles-gulf-tensions-us-590462> (accessed July 8, 2019), and Editor, "Iranian Navy Test-Fires Long-Range Qadir Cruise Missile During Drills," *DefenceTalk.com*, January 26, 2018, <https://www.defencetalk.com/iranian-navy-test-fires-long-range-qadir-cruise-missile-during-drills-71175/> (accessed July 8, 2019).
54. Cordesman et al., *The Gulf Military Balance, Volume I: The Conventional and Asymmetric Dimensions*, p. 205.
55. Michael Knights, *Troubled Waters: Future U.S. Security Assistance in the Persian Gulf*, Washington Institute for Near East Policy, 2006, p. 71, <http://www.washingtoninstitute.org/uploads/Documents/pubs/TroubledWaters.pdf.pdf> (accessed July 8, 2019).
56. Cordesman et al., *The Gulf Military Balance, Volume I: The Conventional and Asymmetric Dimensions*, pp. 82–95.
57. Fariborz Haghsheenas, "Iran's Asymmetric Naval Warfare," Washington Institute for Near East Policy, *Policy Focus* No. 87, September 2008, p. 1, <https://www.washingtoninstitute.org/uploads/Documents/pubs/PolicyFocus87.pdf> (accessed July 8, 2019).
58. Asa Fitch, "Iranian Authorities Release Maersk Tigris," *The Wall Street Journal*, updated May 7, 2015, <http://www.wsj.com/articles/iranian-authorities-release-maersk-tigris-1430991500> (accessed July 8, 2019).
59. Jonathan Saul, "Tanker Attacked by Iranian Craft Collided with Iran Oil Platform in March: Owner," Reuters, May 15, 2015, <https://www.reuters.com/article/us-gulf-iran-ship/tanker-attacked-by-iranian-craft-collided-with-iran-oil-platform-in-march-owner-idUSKBNO01F620150515> (accessed July 8, 2019).
60. James Phillips, "The Dangerous Regional Implications of the Iran Nuclear Agreement," Heritage Foundation *Backgrounder* No. 3124, May 9, 2016, <http://www.heritage.org/middle-east/report/the-dangerous-regional-implications-the-iran-nuclear-agreement>.
61. Jeanette Steele, "Why Is Iran Harassing U.S. Warships?" *The San Diego Union-Tribune*, August 26, 2016, <https://www.sandiegouniontribune.com/military/sdut-iran-navy-harass-analysis-2016aug26-htm1story.html> (accessed July 8, 2019).
62. Robert Burns, "US Military Official: Iran Naval Forces Have Deliberately Halted 'Provocations,'" Associated Press, March 15, 2018, <https://www.apnews.com/a36e23a8d549464caaea7dc1932babae> (accessed July 8, 2019).

63. BBC News, "Tankers Almost Certainly Damaged by Iranian Naval Mines, US Says," May 29, 2019, <https://www.bbc.com/news/world-middle-east-48443454> (accessed July 8, 2019).
64. Sam LaGrone, "Analyst: New Photos Are 'Smoking Gun' Proving Iranian Involvement in Tanker Attack," U.S. Naval Institute News, updated June 18, 2019, <https://news.usni.org/2019/06/17/analyst-new-photos-are-smoking-gun-proving-iranian-involvement-in-tanker-attack> (accessed July 8, 2019).
65. Michael R. Gordon, Sune Engel Rasmussen, and Siobhan Hedges, "U.S. Planned Strike on Iran After Downing of Drone but Called Off Mission," *The Wall Street Journal*, updated June 21, 2019, <https://www.wsj.com/articles/u-s-and-iran-move-closer-to-military-conflict-after-downing-of-drone-11561076307> (accessed July 8, 2019).
66. Kenneth Katzman, Neelesh Nerurkar, Ronald O'Rourke, R. Chuck Mason, and Michael Ratner, "Iran's Threat to the Strait of Hormuz," Congressional Research Service *Report for Members and Committees of Congress*, January 23, 2012, p. 9, <https://fas.org/sgp/crs/mideast/R42335.pdf> (accessed July 8, 2019).
67. Sune Engel Rasmussen, "Iran's Fast Boats and Mines Bring Guerrilla Tactics to Persian Gulf," *The Wall Street Journal*, updated May 30, 2019, <https://www.wsj.com/articles/irans-fast-boats-and-mines-bring-guerrilla-tactics-to-persian-gulf-11559208602> (accessed July 12, 2019).
68. Paul Bucala, Caitlin Shayda Pendleton, Christopher Harmer, Emily Estelle, and Marie Donovan, "Iranian Involvement in Missile Attacks on the USS Mason," American Enterprise Institute, Critical Threats Project, October 19, 2016, <https://www.criticalthreats.org/analysis/iranian-involvement-in-missile-attacks-on-the-uss-mason> (accessed July 8, 2019).
69. Gambrell, "Bomb-Laden Drones of Yemen Rebels Threaten Arabian Peninsula."
70. Jon Gambrell, "Bomb-Carrying Drone from Yemen Rebels Targets Saudi Airport," Associated Press, May 21, 2019, <https://apnews.com/d7a332d8303349b6bc2f63b8eb8675e8> (accessed July 8, 2019).
71. Jon Gambrell, "US: Iran Military Could Misidentify Airliners Amid Tension," Associated Press, May 18, 2019, <https://www.apnews.com/b4f5c00455fb4ffb878ed29df58abc03> (accessed July 8, 2019).
72. Nuclear Threat Initiative, "Iran: Missile."
73. Duncan Gardham, "WikiLeaks: Iran 'Obtains North Korea Missiles Which Can Strike Europe,'" *The Telegraph*, November 29, 2017, <https://www.telegraph.co.uk/news/worldnews/8166848/WikiLeaks-Iran-obtains-North-Korea-missiles-which-can-strike-Europe.html> (accessed July 8, 2019).
74. Lateef Mungin, "Iran Claims 2nd Launch of Monkey into Space and Back," CNN, updated December 14, 2013, <http://www.cnn.com/2013/12/14/world/meast/iran-monkey-space/> (accessed July 9, 2019).
75. Nasser Karimi, "Iran Says It Sets up Space Monitoring Center," Associated Press, June 9, 2013, <http://news.yahoo.com/iran-says-sets-space-monitoring-center-072742942.html> (accessed July 9, 2019).
76. Reuters, "U.S. Says Iran Rocket Test Breaches U.N. Resolution," July 27, 2017, <https://www.reuters.com/article/us-iran-satellite/u-s-says-iran-rocket-test-breaches-u-n-resolution-idUSKBN1ACIYY> (accessed July 9, 2019).
77. Ilan Berman, Vice President, American Foreign Policy Council, "The Iranian Cyber Threat, Revisited," statement before the Subcommittee on Cybersecurity, Infrastructure Protection, and Security Technologies, Committee on Homeland Security, U.S. House of Representatives, March 20, 2013, p. 3, <https://docs.house.gov/meetings/HM/HM08/20130320/100523/HHRG-113-HM08-Wstate-BermanI-20130320.pdf> (accessed July 9, 2019).
78. "Report: Iran Hackers Infiltrated Airlines, Energy, Defense Firms," *Defense News*, December 2, 2014, <https://www.defensenews.com/global/mideast-africa/2014/12/02/report-iran-hackers-infiltrated-airlines-energy-defense-firms/> (accessed July 9, 2019).
79. Nart Villeneuve, Ned Moran, Thoufique Haq, and Mike Scott, "Operation Saffron Rose 2013," *FireEye Special Report*, 2014, <https://www.fireeye.com/content/dam/fireeye-www/global/en/current-threats/pdfs/rpt-operation-saffron-rose.pdf> (accessed July 9, 2019).
80. Ian Bremmer, "These 5 Facts Explain the State of Iran," *Time*, March 27, 2015, <http://time.com/3761786/5-facts-explain-iran-nuclear-talks-sanctions/> (accessed July 9, 2019). Israel's Institute for National Security Studies similarly reported in October 2012 that "[I]n order to realize the goals of its strategy, Iran has allocated about \$1 billion to develop and acquire technology and recruit and train experts." Gabi Siboni and Sami Kronenfeld, "Iran's Cyber Warfare," Tel Aviv University, Institute for National Security Studies, *INSS Insight* No. 375, October 15, 2012, <https://www.inss.org.il/wp-content/uploads/systemfiles/375.pdf> (accessed July 9, 2019).
81. Frederick W. Kagan and Tommy Stiansen, *The Growing Cyberthreat from Iran: The Initial Report of Project Pistachio Harvest*, American Enterprise Institute Critical Threats Project and Norse Corporation, April 2015, <https://www.aei.org/wp-content/uploads/2015/04/Growing-Cyberthreat-From-Iran-final.pdf> (accessed July 9, 2019).

82. Berman, "The Iranian Cyber Threat, Revisited," p. 3.
83. Tony Capaccio, David Lerman, and Chris Strohm, "Iran Behind Cyber-Attack on Adelson's Sands Corp., Clapper Says," Bloomberg, February 26, 2015, <http://www.bloomberg.com/news/articles/2015-02-26/iran-behind-cyber-attack-on-adelson-s-sands-corp-clapper-says> (accessed July 8, 2019).
84. Christopher Bronk and Eneken Tikk-Ringas, "The Cyber Attack on Saudi Aramco," *Survival: Global Politics and Strategy*, Vol. 55, No. 2 (April/May 2013), pp. 81–96.
85. David E. Sanger and Nicole Perloth, "Iranian Hackers Attack State Dept. via Social Media Accounts," *The New York Times*, November 24, 2015, [http://www.nytimes.com/2015/11/25/world/middleeast/iran-hackers-cyberespionage-state-department-social-media.html?\\_r=0](http://www.nytimes.com/2015/11/25/world/middleeast/iran-hackers-cyberespionage-state-department-social-media.html?_r=0) (accessed July 9, 2019).
86. Ellen Nakashima and Matt Zapposky, "U.S. Charges Iran-Linked Hackers with Targeting Banks, N.Y. Dam," *The Washington Post*, March 24, 2016, [https://www.washingtonpost.com/world/national-security/justice-department-to-unseal-indictment-against-hackers-linked-to-iranian-government/2016/03/24/9b3797d2-f17b-11e5-a61f-e9c95c06edca\\_story.html](https://www.washingtonpost.com/world/national-security/justice-department-to-unseal-indictment-against-hackers-linked-to-iranian-government/2016/03/24/9b3797d2-f17b-11e5-a61f-e9c95c06edca_story.html) (accessed July 9, 2019).
87. David E. Sanger, "Iran Hackers Dangle a Familiar Name to Fish for Data," *The New York Times*, May 30, 2014, [http://www.nytimes.com/2014/05/31/world/middleeast/iran-hackers-dangle-a-familiar-name-to-fish-for-data.html?\\_r=2](http://www.nytimes.com/2014/05/31/world/middleeast/iran-hackers-dangle-a-familiar-name-to-fish-for-data.html?_r=2) (accessed July 9, 2019).
88. Bill Gertz, "FBI: Iran to Launch New Cyber Attacks," *The Washington Free Beacon*, May 24, 2018, <http://freebeacon.com/national-security/fbi-iran-launch-new-cyber-attacks/> (accessed July 9, 2019).
89. International Institute for Strategic Studies, *The Military Balance 2019*, pp. 340–344.
90. This *Index* scores threat capability as it relates to the vital national interests of the U.S. and the role and utility of U.S. military forces. Terrorist groups clearly have the ability to conduct attacks using improvised explosive devices (IEDs), firearms, and even hijacked airplanes. The bombing of the Boston Marathon in April 2013, an attempted car bomb attack in New York City's Times Square in May 2010, and al-Qaeda's attacks on September 11, 2001, are stark examples. Often, the U.S. has handled terrorism as a law enforcement and intelligence collection matter, especially within the United States and when it presents a threat to particular U.S. interests in other countries. Compared to the types of threats posed by states such as China or Russia, terrorism is a lesser sort of threat to the security and viability of the U.S. as a global power. This *Index* does not dismiss the deaths, injuries, and damage that terrorists can inflict on Americans at home and abroad; it places the threat posed by terrorism in context with substantial threats to the U.S. homeland, the potential for major regional conflict, and the potential to deny U.S. access to the global commons. With this in mind, terrorist groups seldom have the physical ability either to accomplish the extreme objectives they state or to present a physical threat that rises to a level that threatens U.S. vital security interests. Of course, terrorist organizations can commit acts of war on a continuing basis, as reflected in their conduct in the war against al-Qaeda and its associates in which the United States has been engaged for more than a decade.

# North Korea

With its active and growing ballistic missile capability, North Korea poses definite threats to the U.S. homeland in addition to contributing to the general threat of regional war in Asia and threatening U.S. bases in South Korea, Japan, and Guam. North Korean belligerence toward the United States has included military and diplomatic threats. Pyongyang's provocative behavior also includes nuclear and missile tests and tactical-level attacks on South Korea, a critical American ally that remains under active threat of attack and invasion from the North, and Japan faces both intimidation attacks intended to deny the U.S. its base access to Japan and nuclear attacks on U.S. bases in the case of conflict on the Korean Peninsula.<sup>1</sup>

## Threats to the Homeland

In 2017, North Korea conducted three successful tests of two variants of its road-mobile intercontinental ballistic missile (ICBM). All launches were flown in an elevated trajectory so as not to fly over Japan and to allow testing of a reentry vehicle to protect a nuclear warhead during an attack. Experts assess that the Hwasong-14 ICBM has the capability to fly 10,000 or perhaps 11,000 kilometers. At that range, Los Angeles, Denver, and Chicago (and possibly New York City, Boston, and Washington, D.C.) are within range.<sup>2</sup> The Hwasong-15 has a range of 13,000 kilometers and could reach the entire continental U.S.<sup>3</sup> North Korea conducted its fourth and fifth nuclear tests in 2016 and its sixth—the first test of a much more powerful hydrogen bomb—in 2017.

These events clearly signaled that new leader Kim Jong-un had no intention of abiding

by U.N. resolutions that require a cessation of Pyongyang's nuclear and missile programs. North Korea has declared that it already has a full nuclear strike capability, even altering its constitution to enshrine itself as a nuclear-armed state.<sup>4</sup> In 2017, Kim Jong-un declared that North Korea had completed development of a nuclear ICBM to threaten the American homeland and vowed to “bolster up the nuclear force in quality and quantity.”<sup>5</sup>

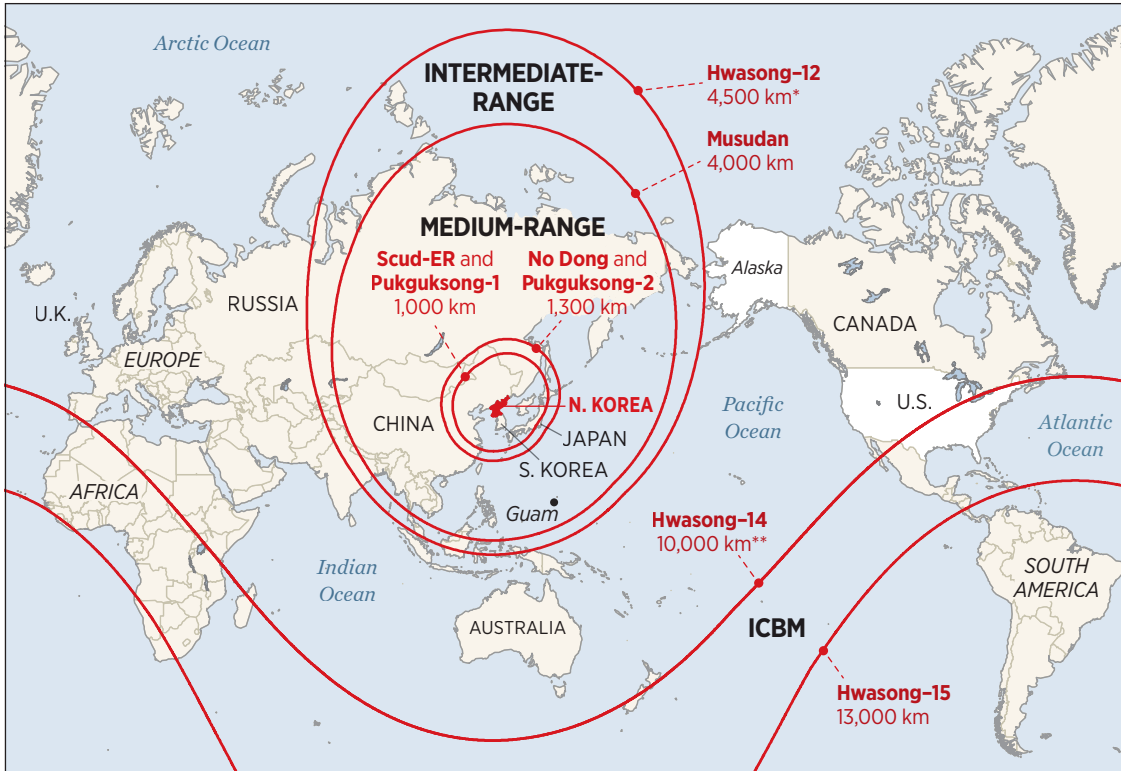
In January 2018, then-CIA Director Mike Pompeo assessed that North Korea would attain an ICBM capability within a “handful of months.”<sup>6</sup> Several U.S. military commanders, however, have stated their assessment that North Korea already has that capability, including U.S. Forces Korea in its *2019 Strategic Digest*.<sup>7</sup>

In 2016 and 2017, North Korea had breakthrough successes with many missiles in development. It successfully test-launched the Hwasong 12 intermediate-range ballistic missile, which can target critical U.S. bases in Guam, and both the Pukguksong-2 road-mobile medium-range ballistic missile and the Pukguksong-1 submarine-launched ballistic missile (SLBM).<sup>8</sup>

In June 2018, President Trump met with Kim Jong-un in Singapore and subsequently declared that “there is no longer a nuclear threat from North Korea” and that “total denuclearization already start[ed] taking place.”<sup>9</sup> Secretary of State Michael Pompeo repeatedly claimed that North Korean leader Kim Jong-un had accepted U.N.-mandated complete, verifiable, and irreversible dismantling of his nuclear, missile, and biological and chemical

## North Korean Missiles

North Korean missiles can target South Korea, Japan, and U.S. bases in Guam and can now reach the United States



\* First tested May 2017. \*\* First tested July 2017.  
**SOURCE:** Heritage Foundation research and media reports.

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weapons (BCW) programs. However, during the February 2019 Trump–Kim summit, it became clear that Kim has not agreed to do so and that the two sides still do not even have a common definition of “denuclearization” or what constitutes the Korean Peninsula.

Despite two U.S.–North Korea summit meetings, there has been no decrease in North Korea’s weapons of mass destruction (WMD) arsenal or production capabilities. The U.S. Intelligence Community subsequently assessed that Pyongyang had increased its production of fissile material for nuclear weapons, and

satellite imagery showed upgrades to missile, reentry vehicle, missile launcher, and nuclear weapon production facilities.<sup>10</sup> The Intelligence Community continues to assess that North Korea “is unlikely to give up all of its WMD stockpiles, delivery systems, and production capabilities.”<sup>11</sup>

### Threat of Regional War

North Korea’s conventional and nuclear missile forces threaten U.S. bases in South Korea, Japan, and Guam. Beyond its nuclear weapons programs, North Korea poses

additional risks to its neighbors. North Korea has an extensive conventional ballistic missile force and has deployed approximately 800 Scud short-range tactical ballistic missiles, 300 No-dong medium-range missiles, and 50 Musudan intermediate-range ballistic missiles. The Scud missiles threaten South Korea, the No-dong can target all of Japan and South Korea, and the Musudan and Hwasong-12 intermediate-range ballistic missiles can hit U.S. bases on Okinawa and Guam. Pyongyang continues to develop several different ICBMs with enough range to hit the continental U.S.<sup>12</sup>

North Korea has “more than 1 million soldiers, making it the world’s fourth-largest military,” with reserves numbering several million more. In addition, “[a]bout 70 percent of [its] ground forces and 50 percent of its air and naval forces are deployed within approximately 60 miles of the Demilitarized Zone (DMZ),” making it possible to attack “with little to no warning,” which is of particular concern because South Korea’s capital, Seoul, is only 30 miles south of the DMZ.<sup>13</sup>

The April 2018 inter-Korean summit led to bilateral pledges of nonaggression and mutual force reduction. Similar pledges were also contained in the 1972, 1992, 2000, and 2007 joint statements, all of which Pyongyang subsequently violated or abrogated. None of those pledges prevented North Korea from conducting provocations, attempted assassinations of South Korea’s president, terrorist acts, military and cyberattacks, and acts of war.

In September 2018, the two Koreas signed a Comprehensive Military Agreement to ease military tension and build confidence. The agreement seeks to reduce the danger that inadvertent tactical military clashes along the DMZ might escalate to larger strategic conflicts. However, static defensive positions like fixed concrete bunkers and minefields are not threatening and have never been the source of military clashes on the peninsula. Rather, the greatest danger arises from the forward, offensively oriented disposition of North Korea’s forces and the regime’s history of making threats and initiating hostilities. The

confidence-building measures implemented to date have not reduced North Korea’s tactical or strategic conventional military threat to South Korea, nor do they represent progress in denuclearization.

Due to a predicted shortfall of 18-year-old conscripts by 2025, South Korea has initiated a comprehensive defense reform strategy to transform its military into a smaller but more capable force to deal with the North Korean threat. Overall, South Korean military manpower will be reduced approximately 25 percent, from 681,000 to 500,000. The army would face the largest cuts, disbanding four corps and 23 divisions and cutting troops from 560,000 in 2004 to 370,000 in 2020. Seoul planned to compensate for decreased troop levels by procuring advanced fighter and surveillance aircraft, naval platforms, and ground combat vehicles.<sup>14</sup> Some advisers to the Moon Jae-in administration have suggested that force levels could be reduced further if progress is made in improving inter-Korean relations.

That North Korea’s conventional forces are a very real threat to South Korea was vividly demonstrated by two deadly attacks on South Korea in 2010. In March, a North Korean submarine sank the South Korean naval corvette *Cheonan* in South Korean waters, killing 46 sailors.<sup>15</sup> In November, North Korean artillery shelled Yeonpyeong Island, killing four South Koreans.<sup>16</sup>

Since the North Korean military is equipped predominantly with older ground force equipment, Pyongyang has prioritized deployment of strong asymmetric capabilities that include special operations forces, long-range artillery, and missiles. As noted, North Korea has deployed hundreds of Scud short-range ballistic missiles that can target all of South Korea with explosive, chemical, and biological warheads. The land and sea borders between North and South Korea remain unsettled, heavily armed, and subject to occasional, limited armed conflict.

Most nongovernment experts assess that North Korea has perhaps 16–20 nuclear weapons. However, South Korean Minister of

Unification Cho Myoung-gyon commented in October 2018 that North Korea could have as many as 60 nuclear weapons.<sup>17</sup> North Korea’s September 2017 hydrogen bomb test—in excess of 150 kilotons—demonstrated a thermo-nuclear hydrogen bomb capability.<sup>18</sup>

### Conclusion

The North Korean military poses a security challenge for American allies South Korea and Japan, as well as for U.S. bases in those countries and Guam. North Korean officials are belligerent toward the United States, often issuing military and diplomatic threats. Pyongyang has also engaged in a range of provocative behavior, including nuclear and missile tests and tactical-level attacks on South Korea.

North Korean forces arrayed against American allies in South Korea and Japan are substantial, and North Korea’s history of provocation is a consistent indicator of its intent to achieve its political objectives by at least the

threat of force. Its missile capabilities are advancing, and although it has fewer warheads and systems than China, as well as questionable means of delivery, it is also less stable and less predictable, with a vastly lower stake in the international system.

North Korea has used its missile and nuclear tests to enhance its prestige and importance domestically, regionally, and globally and to extract various concessions from the United States in negotiations over its nuclear program and various aid packages. Such developments also improve North Korea’s military posture. Pyongyang likely has already achieved warhead miniaturization, the ability to place nuclear weapons on its medium-range missiles, and an ability to reach the continental United States with a missile.

This *Index* assesses the overall threat from North Korea, considering the range of contingencies, as “testing” for level of provocation of behavior and “gathering” for level of capability.

## Threats: North Korea

	HOSTILE	AGGRESSIVE	TESTING	ASSERTIVE	BENIGN
Behavior			✓		
	FORMIDABLE	GATHERING	CAPABLE	ASPIRATIONAL	MARGINAL
Capability		✓			



## Endnotes

1. North Korea Leadership Watch, "Kim Jong Un Supervises Missile Drill," March 6, 2017, <http://www.nkleadershipwatch.org/2017/03/06/kim-jong-un-supervises-missile-drill/> (accessed June 25, 2019).
2. David Wright, "North Korean ICBM Appears Able to Reach Major US Cities," Union of Concerned Scientists, July 28, 2017, <http://allthingsnuclear.org/dwright/new-north-korean-icbm> (accessed June 25, 2019).
3. Josh Smith, "How North Korea's Latest ICMB Test Stacks Up," Reuters, November 28, 2017, <https://af.reuters.com/article/worldNews/idAFKBNIDT0ID> (accessed June 25, 2019).
4. Yonhap News Agency, "N.K. Calls Itself 'Nuclear-Armed State' in Revised Constitution," May 30, 2012, <http://english.yonhapnews.co.kr/northkorea/2012/05/30/76/0401000000AEN20120530005200315F.HTML> (accessed June 25, 2019).
5. Lee Sung-eun and Jeon Yong-soo., "Nuke Program Complete, Claims Kim Jong-un," *Korea JoongAng Daily*, December 14, 2017, <http://koreajoongangdaily.joins.com/news/article/Article.aspx?aid=3042044> (accessed June 25, 2019).
6. Yonhap News Agency, "N. Korea 'Handful of Months' Away from Ability to Nuke U.S.: CIA Chief," January 23, 2018, <http://english.yonhapnews.co.kr/news/2018/01/23/0200000000AEN20180123000200315.html> (accessed June 25, 2019).
7. United Nations Command, Continental Forces Command, and United States Forces Korea, 2018: *The Year on Pen, U.S. Military Forces Korea 2019 Strategic Digest*, pp. 8, 9, 47, [https://www.usfk.mil/Portals/105/Documents/Strategic%20Newsletter/2019%20ENG%20508\\_SD2019-ENG.pdf?ver=2019-07-09-011123-927](https://www.usfk.mil/Portals/105/Documents/Strategic%20Newsletter/2019%20ENG%20508_SD2019-ENG.pdf?ver=2019-07-09-011123-927) (accessed August 19, 2019).
8. Joshua Berlinger, "North Korea's Missile Tests: What You Need to Know," CNN, updated December 3, 2017, <https://www.cnn.com/2017/05/29/asia/north-korea-missile-tests/index.html> (accessed June 25, 2019).
9. David Brunnstrom and James Oliphant, "Trump: North Korea 'Total Denuclearization' Started; Officials See No New Moves," Reuters, June 21, 2018, <https://www.reuters.com/article/us-northkorea-usa-sites/trump-north-korea-total-denuclearization-started-officials-see-no-new-moves-idUSKBN1JH2QX> (accessed June 25, 2019).
10. Jonathan Cheng, "North Korea Expands Key Missile-Manufacturing Plant," *The Wall Street Journal*, updated July 1, 2018, <https://www.wsj.com/articles/north-korea-expands-key-missile-manufacturing-plant-1530486907> (accessed June 25, 2019); Courtney Kube, Ken Dilanian, and Carol E. Lee, "North Korea Has Increased Nuclear Production at Secret Sites, Say U.S. Officials," NBC News, updated June 30, 2018, <https://www.nbcnews.com/news/north-korea/north-korea-has-increased-nuclear-production-secret-sites-say-u-n887926> (accessed June 25, 2019); Frank V. Pabian, Joseph S. Bermudez Jr., and Jack Liu, "Infrastructure Improvements at North Korea's Yongbyon Nuclear Research Facility," *38 North*, June 26, 2018, <https://www.38north.org/2018/06/yongbyon062618/> (accessed June 25, 2019); and Ankit Panda, "Exclusive: North Korea Has Continued Ballistic Missile Launcher Production in 2018, Per US Intelligence," *The Diplomat*, June 30, 2018, <https://thediplomat.com/2018/07/exclusive-north-korea-has-continued-ballistic-missile-launcher-production-per-us-intelligence/> (accessed June 25, 2019).
11. Daniel R. Coats, Director of National Intelligence, "Worldwide Threat Assessment of the US Intelligence Community," statement before the Select Committee on Intelligence, U.S. Senate, January 29, 2019, p. 8, <https://www.dni.gov/files/ODNI/documents/2019-ATA-SFR---SSCI.pdf> (accessed June 25, 2019).
12. See, for example, Mary Beth D. Nikitin, "North Korea's Nuclear and Ballistic Missile Programs," Congressional Research Service *In Focus* No. 10472, updated June 6, 2019, <https://fas.org/sgp/crs/nuke/IF10472.pdf> (accessed July 18, 2019).
13. U.S. Department of Defense, Office of the Secretary of Defense, *Report to Congress: Military and Security Developments Involving the Democratic People's Republic of Korea 2017*, p. 9, <https://media.defense.gov/2018/May/22/2001920587/-1/-1/1/REPORT-TO-CONGRESS-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-DEMOCRATIC-PEOPLES-REPUBLIC-OF-KOREA-2017.PDF> (accessed June 25, 2019).
14. Bruce W. Bennett, "A Brief Analysis of the Republic of Korea's Defense Reform Plan," RAND Corporation, National Defense Research Institute, *Occasional Paper* No. OP-165-OSD, December 2005, [http://www.rand.org/content/dam/rand/pubs/occasional\\_papers/2006/RAND\\_OPI65.pdf](http://www.rand.org/content/dam/rand/pubs/occasional_papers/2006/RAND_OPI65.pdf) (accessed June 25, 2019).
15. Reuters, "North Korean Torpedo Sank Cheonan, South Korea Military Source Claims," April 22, 2010, <https://www.theguardian.com/world/2010/apr/22/north-korea-cheonan-sinking-torpedo> (accessed June 25, 2019).
16. Yonhap News Agency, "Two Civilians Found Dead on S. Korean Island Shelled by N. Korea," November 24, 2010, <https://en.yna.co.kr/view/AEN20101124012600315> (accessed June 25, 2019).
17. Associated Press, "North Korea Is Believed to Have up to 60 Nuclear Weapons, South Korea Says," NBC News, October 2, 2018, <https://www.nbcnews.com/news/north-korea/north-korea-believed-have-60-nuclear-weapons-south-korea-says-n915721> (accessed June 25, 2019).

18. Michelle Ye Hee Lee, "North Korea's Latest Nuclear Test Was So Powerful It Reshaped the Mountain Above It," *The Washington Post*, September 14, 2017, [https://www.washingtonpost.com/news/worldviews/wp/2017/09/14/orth-koreas-latest-nuclear-test-was-so-powerful-it-reshaped-the-mountain-above-it/?utm\\_term=.e5cc8c9f8968](https://www.washingtonpost.com/news/worldviews/wp/2017/09/14/orth-koreas-latest-nuclear-test-was-so-powerful-it-reshaped-the-mountain-above-it/?utm_term=.e5cc8c9f8968) (accessed June 25, 2019).

# Afghanistan/Pakistan

**T**errorist threats from non-state actors in ungoverned areas of Afghanistan and Pakistan are an ongoing threat to the U.S. homeland, and the threat of regional war is exacerbated by nuclear rivalry and territorial disputes between Pakistan and India. One of the keys to America's strategic footprint in Asia is its growing security partnership with India, which is geographically positioned between two major security threats: Pakistan to its west and China to its northeast. From Pakistan, India also faces the additional threat of terrorism, whether state-enabled or carried out without state knowledge or control.

**Afghanistan War.** On October 7, 2001, U.S. forces invaded Afghanistan in response to the September 11, 2001, terrorist attacks on the United States. This marked the beginning of Operation Enduring Freedom to combat al-Qaeda and its Taliban supporters. The U.S., in alliance with the United Kingdom and the anti-Taliban Afghan Northern Alliance forces, ousted the Taliban from power in December 2001. Most Taliban and al-Qaeda leaders fled across the border into Pakistan's Federally Administered Tribal Areas, where they regrouped and started an insurgency in Afghanistan in 2003.

In August 2003, NATO joined the war in Afghanistan and assumed control of the International Security Assistance Force (ISAF). At the height of the war in 2011, there were 50 troop-contributing nations and nearly 150,000 NATO and U.S. forces on the ground in Afghanistan.

On December 28, 2014, NATO formally ended combat operations and relinquished

responsibility to the Afghan security forces, which numbered around 352,000 (including army and police).<sup>1</sup> After Afghan President Ashraf Ghani signed a bilateral security agreement with the U.S. and a Status of Forces Agreement with NATO, the international coalition launched Operation Resolute Support to train and support Afghan security forces.

In August 2017, while declining to announce specific troop levels, President Donald Trump recommitted America to the effort in Afghanistan and announced that “[c]onditions on the ground—not arbitrary timetables—will guide our strategy from now on.”<sup>2</sup> According to the most recent available public information, the U.S. currently has around 14,000 troops in Afghanistan, split between the roughly 5,500 for the U.S.-led Operation Freedom Sentinel counterterrorism mission and slightly less than 8,500 for the NATO-led Resolute Support training mission. The latter also includes another approximately 8,500 troops from various NATO countries, bringing the total U.S. and NATO troop presence in Afghanistan to approximately 17,000.<sup>3</sup> Most U.S. and NATO forces are stationed at bases in Kabul, with tactical advise-and-assist teams located there and in Mazar-i-Sharif, Herat, Kandahar, and Laghman.

In 2018, U.S. Special Envoy Zalmay Khalilzad began negotiations with the Taliban in Qatar in an attempt to find a political solution to the fighting. To date, little progress has been made. The Afghan government has not participated in the talks because the Taliban has refused to meet with them. This has caused tension between the U.S. and Afghan governments.

Whether the U.S. will be able to bring all parties to the table and achieve a politically acceptable conclusion to the war remains to be seen. Meanwhile, U.S. forces in Afghanistan continue to face regular attacks from Taliban militants and their allies, although casualties have fallen considerably in recent years, with less than a dozen U.S. troops killed in combat in 2015, 2016, and 2017.<sup>4</sup> There were 14 U.S. troop casualties in Afghanistan in 2018.<sup>5</sup>

In the spring of 2019, the Administration was rumored to be considering a plan to reduce American troop levels in Afghanistan by half while shifting the focus from counterterrorism to the training of Afghan security forces,<sup>6</sup> but no final decision has been made.

## Threats to the Homeland

**Terrorist Groups Operating in Afghanistan and Pakistan (AfPak).** Terrorist groups operating from Pakistan continue to pose a direct threat to the U.S. homeland. Pakistan is home to a host of terrorist groups that keep the region unstable and contribute to the spread of global terrorism. The killing of Osama bin Laden at his hideout in Abbottabad, Pakistan, in May 2011 and an intensive drone campaign in Pakistan's tribal areas bordering Afghanistan have helped to degrade the al-Qaeda threat there, but the residual presence of al-Qaeda and the emergence of ISIS in neighboring Afghanistan remain serious concerns.

This is a deadly region. In December 2016, General John W. Nicholson, Jr., then-Commander, Resolute Support and U.S. Forces-Afghanistan, stated that "there are 98 U.S.-designated terrorist groups globally. Twenty of them are in the AfPak region. This represents the highest concentration of terrorist groups anywhere in the world...13 in Afghanistan, seven in Pakistan."<sup>7</sup>

Efforts by ISIS to make inroads into Pakistan and Afghanistan have met with only limited success, most likely because of other terrorist groups' well-established roots in the region. The Afghan Taliban views ISIS as a direct competitor for financial resources, recruits, and ideological influence. This competition

was evident in a June 16, 2015, letter sent by the Taliban to ISIS leader Abu Bakr al-Baghdadi, urging his group not to take actions that could lead to "division of the Mujahideen's command."<sup>8</sup> There also have been reports of clashes between ISIS militants and the Taliban in eastern and southern Afghanistan.

Reports of an ISIS presence in Afghanistan first began to surface in 2014, and the group has slowly gained a small foothold in the country. Though its actual numbers remain modest, its high-profile, high-casualty terrorist attacks have helped it to attract followers. In 2017 and 2018, several high-profile attacks in the Afghan capital and elsewhere targeted cultural centers, global charities, voter registration centers, and Afghan military and intelligence facilities, although they still pale in comparison to the number of attacks launched by the Taliban. In 2017 and 2018, ISIS representatives claimed responsibility for a series of attacks across Pakistan that killed over one hundred people and injured countless more.<sup>9</sup>

In April 2017, the U.S. military claimed that there were 700 ISIS fighters in Afghanistan; in November, however, General Nicholson said that 1,600 ISIS fighters had been "remov[ed]" from the battlefield since March.<sup>10</sup> In June 2017, a U.S. air strike killed Abu Sayed, the head of ISIS-Khorasan. A report issued by the United Nations Security Council in February 2019 claimed that ISIS had "between 2,500 and 4,000" fighters in Afghanistan.<sup>11</sup> U.S. estimates are roughly in agreement; the Lead Inspector General's January 1, 2019–March 31, 2019, quarterly report on Operation Freedom's Sentinel specifies 3,000–5,000.<sup>12</sup> In March 2019, General Joseph Votel, the head of CENTCOM, said that he believed "ISIS Khorasan does have ideations focused on external operations toward our homeland."<sup>13</sup>

Experts believe that there is little coordination between the ISIS-Khorasan branch operating in Afghanistan and the central command structure of the group located in the Middle East. Instead, it draws recruits from disaffected members of the Pakistani Taliban and other radicalized Afghans and has frequently

found itself at odds with the Afghan Taliban, with which it competes for resources, territory, and recruits.

Pakistan's continued support for terrorist groups that have links to al-Qaeda, the Taliban, and the Haqqani Network undermines U.S. counterterrorism goals in the region. Pakistan's military and intelligence leaders maintain a short-term tactical approach of fighting some terrorist groups that are deemed to be a threat to the state while supporting others that are aligned with Pakistan's goal of extending its influence and curbing India's.

A December 16, 2014, terrorist attack on a school in Peshawar that killed over 150 people, most of whom were children, shocked the Pakistani public and prompted Prime Minister Nawaz Sharif's government to introduce a National Action Plan (NAP) to reinvigorate the country's fight against terrorism. Implementation of the NAP and the Pakistani military's operations against TTP (Pakistani Taliban) hideouts in North Waziristan have helped to reduce Pakistan's internal terrorist threat to some degree. According to the India-based South Asia Terrorism Portal, total fatalities in Pakistan (including terrorists/insurgents) have been on a steady decline since 2009, when they peaked at 11,704. Since then, they have fallen to 5,496 in 2014, 1,803 in 2016, 1,260 in 2017, 691 in 2018, and 228 as of June 23, 2019.<sup>14</sup>

However, there are few signs that Pakistan's crackdown on terrorism extends to groups that target India, such as the Lashkar-e-Taiba (LeT), which was responsible for the 2008 Mumbai attacks, and the Jaish-e-Mohammed (JeM), which carried out an attack on the Indian parliament in 2001, another on the airbase at Pathankot in 2016, and the deadliest attack on Indian security forces in Kashmir in February 2019.<sup>15</sup>

## Threat of Regional War

### **Pakistan's Nuclear Weapons Stockpile.**

In September 2018, the *Bulletin of the Atomic Scientists* estimated that Pakistan "has a nuclear weapons stockpile of 140 to 150 warheads" that could "realistically grow to 220 to 250

warheads by 2025, if the current trend continues."<sup>16</sup> The possibility that terrorists could gain effective access to Pakistani nuclear weapons is contingent on a complex chain of circumstances. In terms of consequence, however, it is the most dangerous regional threat scenario. Concern about the safety and security of Pakistan's nuclear weapons increases when India-Pakistan tensions increase. During the 1999 Kargil crisis, for example, U.S. intelligence indicated that Pakistan had made "nuclear preparations," and this spurred greater U.S. diplomatic involvement in defusing the crisis.<sup>17</sup>

If Pakistan were to move around its nuclear assets or, worse, take steps to mate weapons with delivery systems, the likelihood of terrorist theft or infiltration would increase. Increased reliance on tactical nuclear weapons (TNWs) is of particular concern because launch authorities for TNWs are typically delegated to lower-tier field commanders far from the central authority in Islamabad. Another concern is the possibility that miscalculations could lead to regional nuclear war if India's leaders were to lose confidence that nuclear weapons in Pakistan are under government control or, conversely, were to assume that they were under Pakistani government control after they ceased to be.

There are additional concerns that Islamist extremist groups with links to the Pakistan security establishment could exploit those links to gain access to nuclear weapons technology, facilities, and/or materials. The realization that Osama bin Laden stayed for six years within a half-mile of Pakistan's premier defense academy has fueled concern that al-Qaeda can operate relatively freely in parts of Pakistan and might eventually gain access to Pakistan's nuclear arsenal. The Nuclear Threat Initiative's *Nuclear Security Index* ranks 22 countries with "weapons useable nuclear material" for their susceptibility to theft. Pakistan's weapons-grade materials were ranked the 20th least secure in 2018, with only Iran's and North Korea's ranking lower.<sup>18</sup>

There is the additional (though less likely) scenario of extremists gaining access through

a collapse of the state. While Pakistan remains unstable because of its weak economy, regular terrorist attacks, sectarian violence, civil–military tensions, and the growing influence of religious extremist groups, it is unlikely that the Pakistani state will collapse altogether. The country’s most powerful institution, the 550,000-strong army that has ruled Pakistan for almost half of its existence, would almost certainly intervene and assume control once again if the political situation began to unravel. The potential breakup of the Pakistani state would have to be preceded by the disintegration of the army, which currently is not plausible.<sup>19</sup>

**Pakistan–India Conflict.** India and Pakistan have fought four wars since partition in 1947, including conflicts in 1947, 1965, 1971, and 1999. Deadly border skirmishes across the Line of Control in Kashmir, a disputed territory claimed in full by both India and Pakistan, are commonplace.

Another India–Pakistan conflict would jeopardize multiple U.S. interests in the region and could increase the threat of global terrorism if Pakistan were destabilized. Pakistan would rely on militant non-state actors to help it fight India, thereby creating a more permissive environment in which various terrorist groups could operate freely. The potential for a nuclear conflict would threaten U.S. businesses in the region and disrupt investment and trade flows, mainly between the U.S. and India, whose bilateral trade in goods and services “totaled an estimated \$142.1 billion in 2018.”<sup>20</sup> A conflict would also strain America’s ties with one or both of the combatants at a time when Pakistan–U.S. ties are already under severe stress and America is trying to build a stronger partnership with India. The effects of an actual nuclear exchange—both the human lives lost and the long-term economic damage—would be devastating.

India and Pakistan are engaged in a nuclear competition that threatens stability throughout the subcontinent. Both countries tested nuclear weapons in 1998, establishing themselves as overtly nuclear weapons states,

although India first conducted a “peaceful” nuclear weapons test in 1974. Both countries also are developing naval nuclear weapons and already possess ballistic missile and aircraft-delivery platforms.<sup>21</sup>

As noted, Pakistan has a stockpile of 140 to 150 nuclear warheads. It also “has lowered the threshold for nuclear weapons use by developing tactical nuclear weapons capabilities to counter perceived Indian conventional military threats.”<sup>22</sup> This in turn affects India’s nuclear use threshold, which could affect China and possibly others.

The broader military and strategic dynamic between India and Pakistan has grown more volatile since the May 2014 election of Bharatiya Janata Party (BJP) leader Narendra Modi as India’s prime minister. Modi invited Pakistani Prime Minister Nawaz Sharif to his swearing-in ceremony but then later called off foreign secretary–level talks that were scheduled for August 2014 to express anger over a Pakistani official’s meeting with Kashmiri separatist leaders. During the same month, the two sides engaged in intense firing and shelling along their international border (called the working boundary) and across the Line of Control that divides Kashmir. A similar escalation in border tensions occurred again in October 2014 when a series of firing incidents claimed more than a dozen casualties with several dozen more injured.<sup>23</sup>

On December 25, 2015, a meeting did occur when Modi made an impromptu visit to Lahore—the first visit to Pakistan by an Indian leader in 12 years—to meet with Sharif. The visit created enormous goodwill between the two countries and raised hope that official dialogue would soon resume. Again, however, violence marred the new opening. Six days after the meeting, militants attacked an Indian airbase at Pathankot, killing seven Indian security personnel.<sup>24</sup>

As a result, official India–Pakistan dialogue remains deadlocked even though the two sides are reportedly communicating quietly through their foreign secretaries and national security advisers. With Prime Minister Modi’s BJP

sweeping national elections in May 2019 and earning him a second term in office, few expect any major breakthroughs in the near term. As noted, Pakistan continues to harbor terrorist groups like Lashkar-e-Taiba and Jaish-e-Mohammed. The latter was responsible for a January 2, 2016, attack on the Indian airbase at Pathankot, a February 2018 attack on an Indian army camp in Kashmir, and a February 2019 attack on Indian security forces in Kashmir, the deadliest single terrorist attack in the disputed region since an insurgency erupted in 1989.<sup>25</sup>

Hafez Muhammed Saeed, LeT's founder and the leader of its front organization Jamaat-ud-Dawa (JuD), has periodically been placed under arrest, only later to be released. Previously, he had operated freely in Pakistan, often holding press conferences and inciting violence against India during large public rallies.

Some observers remain concerned about the impact of an international troop drawdown in Afghanistan. Such a drawdown could enable the Taliban and other extremist groups to strengthen their grip in the region, further undermining stability in Kashmir and raising the chances of another major terrorist attack against India. A successful future attack on Indian interests in Afghanistan along the lines of the bombing of the Indian embassy in Kabul in 2008 would sharpen tensions between New Delhi and Islamabad.

With terrorist groups operating relatively freely in Pakistan and maintaining links to the country's military and intelligence services, there is a moderate risk that the two countries might eventually engage in all-out conflict. Pakistan's recent focus on incorporating tactical nuclear weapons into its warfighting doctrine has also raised concern that conflict now involves a higher risk of nuclear exchange.<sup>26</sup>

Pakistan's nuclear weapons capability appears to have acted as a deterrent against Indian military escalation, both during the 2001–2002 military crisis and following the 2008 Mumbai attacks, but the Indian government has been under growing pressure to react strongly to terrorist provocations. In 2016,

following an attack on an Indian army base in Uri, Kashmir, that killed 19 Indian soldiers, the Indian military reportedly launched surgical strikes on terrorist targets across the Line of Control in Pakistan-administered Kashmir. The Indian press indicated that up to 80 Indian commandos crossed the Line of Control on foot and destroyed seven "terror launch pads," with attack helicopters on standby.<sup>27</sup>

Following a deadly attack on Indian security forces in Pulwama, Kashmir, in February 2019, India launched an even more daring cross-border raid. For the first time since the Third India–Pakistan War of 1971, the Indian air force crossed the Line of Control and dropped ordinance inside Pakistan proper (as opposed to disputed Kashmir), targeting several JeM training camps in Khyber Pakhtunkhwa province.<sup>28</sup> Delhi stressed that the "non-military" operation was designed to avoid civilian casualties and was preemptive in nature because it had credible intelligence that JeM was attempting other suicide attacks in the country.

In response, Pakistan launched fighter jets to conduct their own strike on targets located on India's side of the Line of Control in Kashmir, prompting a dogfight that resulted in the downing of an Indian MiG-21. Whether there were any casualties on either side in either strike is unclear. Pakistan released the captured MiG-21 pilot days later, putting an end to the brief but dangerous crisis.

## Conclusion

The threat to the American homeland emanating from the AfPak region is diverse, complex, and mostly indirect, largely involving non-state actors. The intentions of non-state terrorist groups like the TTP, al-Qaeda, and ISIS toward the U.S. are demonstrably hostile. In addition, despite the broad and deep U.S. relationships with Pakistan's governing elites and military, it is likely that the political–military interplay in Pakistan and instability in Afghanistan will continue to result in an active threat to the American homeland.

Pakistan represents a paradox: It is both a security partner and a security challenge.

Islamabad provides a home and support to terrorist groups that are hostile to the U.S., to other U.S. partners in South Asia like India, and to the government in Afghanistan, which is particularly vulnerable to destabilization efforts. Both Pakistan and Afghanistan are already among the world’s most unstable states, and the instability of the former, given its nuclear arsenal, has a direct bearing on U.S. security.

In addition, ongoing tensions between nuclear-armed rivals India and Pakistan could lead eventually to broader military conflict with some prospect of escalating to a nuclear

exchange. Neither side desires another general war, and both countries have limited objectives and have demonstrated their intent to avoid escalation. However, the likelihood of miscalculation and escalation has grown considerably since 2016 when India ended its policy of not responding to Pakistani-backed terrorist attacks.

This *Index* assesses the overall threat from AfPak-based actors to the U.S. homeland as “testing” for level of provocation of behavior and “capable” for level of capability.

### Threats: Af-Pak Terrorism

	HOSTILE	AGGRESSIVE	TESTING	ASSERTIVE	BENIGN
Behavior			✓		
	FORMIDABLE	GATHERING	CAPABLE	ASPIRATIONAL	MARGINAL
Capability			✓		



## Endnotes

1. U.S. Department of Defense, *Enhancing Security and Stability in Afghanistan*, December 2016, p. 33, <https://dod.defense.gov/Portals/1/Documents/pubs/Afghanistan-1225-Report-December-2016.pdf> (accessed June 25, 2019).
2. “Remarks by President Trump on the Strategy in Afghanistan and South Asia,” Fort Myer, Arlington, Virginia, August 21, 2017, <https://www.whitehouse.gov/briefings-statements/remarks-president-trump-strategy-afghanistan-south-asia/> (accessed June 25, 2019).
3. North Atlantic Treaty Organization, Resolute Support Mission, “Resolute Support Mission (RSM): Key Facts and Figures,” February 2019, [https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/pdf\\_2019\\_02/20190215\\_2019-02-RSM-Placemat.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2019_02/20190215_2019-02-RSM-Placemat.pdf) (accessed June 25, 2019). See also North Atlantic Treaty Organization, “NATO–Afghanistan Relations,” *Media Backgrounder*, February 2019, [https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/pdf\\_2019\\_02/20190213\\_1902-backgrounder-afghanistan-en.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2019_02/20190213_1902-backgrounder-afghanistan-en.pdf) (accessed June 25, 2019).
4. Nesar Azadzoï and Rod Nordland, “3 U.S. Soldiers Died in Afghanistan: Why This Fight Drags On,” *The New York Times*, November 27, 2018, <https://www.nytimes.com/2018/11/27/world/asia/us-soldiers-killed-afghanistan.html> (accessed May 28, 2019).
5. Joanne Stocker, “US Service Members Killed in Afghanistan Operation,” *The Defense Post*, March 22, 2019, <https://thedefensepost.com/2019/03/22/us-service-members-killed-afghanistan/> (accessed June 25, 2019).
6. Thomas Gibbons-Neff and Julian E. Barnes, “Under Peace Plan, U.S. Military Would Exit Afghanistan Within Five Years,” *The New York Times*, February 28, 2019, <https://www.nytimes.com/2019/02/28/us/politics/afghanistan-military-withdrawal.html> (accessed May 28, 2019).
7. Transcript, “Department of Defense Press Briefing by General Nicholson in the Pentagon Briefing Room,” U.S. Department of Defense, December 2, 2016, <https://www.defense.gov/News/Transcripts/Transcript-View/Article/1019029/department-of-defense-press-briefing-by-general-nicholson-in-the-pentagon-brief/> (accessed June 25, 2019). See also General John W. Nicholson, Commander, U.S. Forces–Afghanistan, statement on “The Situation in Afghanistan” before the Committee on Armed Services, U.S. Senate, February 9, 2017, p. 1, [https://www.armed-services.senate.gov/imo/media/doc/Nicholson\\_02-09-17.pdf](https://www.armed-services.senate.gov/imo/media/doc/Nicholson_02-09-17.pdf) (accessed June 25, 2019).
8. Sudarsan Raghavan, “Taliban in Afghanistan Tells Islamic State to Stay out of Country,” *The Washington Post*, June 16, 2016, [https://www.washingtonpost.com/world/asia\\_pacific/taliban-warns-islamic-state-to-stay-out-of-afghanistan/2015/06/16/a88bafb8-1436-11e5-8457-4b431bf7ed4c\\_story.html?utm\\_term=.4f4de593d5e9](https://www.washingtonpost.com/world/asia_pacific/taliban-warns-islamic-state-to-stay-out-of-afghanistan/2015/06/16/a88bafb8-1436-11e5-8457-4b431bf7ed4c_story.html?utm_term=.4f4de593d5e9) (accessed June 25, 2019). See also Mirwais Harooni and Kay Johnson, “Taliban Urge Islamic State to ‘Interference’ in Afghanistan,” Reuters, June 16, 2015, <https://www.reuters.com/article/us-afghanistan-islamicstate-idUSKBN00W19220150616> (accessed June 25, 2019), and Aaron Y. Zelin, “Letter from the Taliban to Abu Bakr al-Baghdadi from the Head of the Shura Council,” Lawfare, June 27, 2015, <https://www.lawfareblog.com/letter-taliban-abu-bakr-al-baghdadi-head-shura-council> (accessed June 25, 2019).
9. Kunwar Khuldun Shahid, “Quetta Attack a Gory Reminder of Islamic State’s Presence in Balochistan,” *The Diplomat*, April 5, 2018, <https://thediplomat.com/2018/04/quetta-attack-a-gory-reminder-of-islamic-states-presence-in-balochistan/> (accessed June 25, 2019).
10. Transcript, “Department of Defense Press Briefing by General Nicholson via Teleconference from Kabul, Afghanistan,” U.S. Department of Defense, November 28, 2017, <https://www.defense.gov/News/Transcripts/Transcript-View/Article/1382901/department-of-defense-press-briefing-by-general-nicholson-via-teleconference-fr/> (accessed June 25, 2019).
11. United Nations Security Council, *Eighth Report of the Secretary-General on the Threat Posed by ISIL (Da’esh) to International Peace and Security and the Range of United Nations Efforts in Support of Member States in Countering the Threat*, S/2019/103, February 1, 2019, p. 7, [https://www.un.org/sc/ctc/wp-content/uploads/2019/02/N1901937\\_EN.pdf](https://www.un.org/sc/ctc/wp-content/uploads/2019/02/N1901937_EN.pdf) (accessed August 21, 2019).
12. Office of Inspector General, U.S. Department of Defense; Office of Inspector General, U.S. Department of State; and Office of Inspector General, U.S. Agency for International Development, *Operation Freedom’s Sentinel: Lead Inspector General Report to the United States Congress*, January 1, 2019–March 31, 2019, p. 25, [https://media.defense.gov/2019/May/21/2002134153/-1/-1/1/FY2019\\_LIG\\_OCO\\_REPORT.PDF](https://media.defense.gov/2019/May/21/2002134153/-1/-1/1/FY2019_LIG_OCO_REPORT.PDF) (accessed August 21, 2019).
13. Eric Schmitt, Thomas Gibbons-Neff, Helene Cooper, and Alissa J. Rubin, “Its Territory May Be Gone, but the U.S. Fight Against ISIS Is Far from Over,” *The New York Times*, March 24, 2019, <https://www.nytimes.com/2019/03/24/us/politics/us-isis-fight.html> (accessed May 28, 2019).
14. Institute for Conflict Management, South Asia Terrorism Portal, “Fatalities in Terrorist Violence in Pakistan 2000–2019,” data as of June 23, 2019, <https://www.satp.org/satporgtp/countries/pakistan/database/casualties.htm> (accessed June 25, 2019).
15. Ankit Panda, “Jaish-e-Mohammed Leader’s ‘Global Terrorist’ Designation Is Overdue,” *The Diplomat*, March 4, 2019, <https://thediplomat.com/2019/03/jaish-e-mohammed-leaders-global-terrorist-designation-is-overdue/> (accessed June 25, 2019).

16. Hans M. Kristensen, Robert S. Norris, and Julia Diamond “Pakistani Nuclear Forces, 2018,” *Bulletin of the Atomic Scientists*, Vol. 74, Issue 5 (September 2018), pp. 346–358, <https://www.tandfonline.com/doi/full/10.1080/00963402.2018.1507796> (accessed June 25, 2019). See also Zeba Siddiqui, “Factbox: India and Pakistan–Nuclear Arsenal and Strategies,” Reuters, March 1, 2019, <https://www.reuters.com/article/us-india-kashmir-pakistan-nuclear-factbo/factbox-india-and-pakistan-nuclear-arsenal-and-strategies-idUSKCN1QI405> (accessed June 25, 2019).
17. Peter R. Lavoy, ed., *Asymmetric Warfare in South Asia: The Causes and Consequences of the Kargil Conflict* (Cambridge, UK: Cambridge University Press, 2009), p. 10.
18. Nuclear Threat Initiative, *NTI Nuclear Security Index, Theft/Sabotage: Building a Framework for Assurance, Accountability, and Action, Fourth Edition*, September 2018, [https://ntiindex.org/wp-content/uploads/2018/08/NTI\\_2018-Index\\_FINAL.pdf](https://ntiindex.org/wp-content/uploads/2018/08/NTI_2018-Index_FINAL.pdf) (accessed June 25, 2019).
19. Stephen P. Cohen, “The Future of Pakistan,” The Brookings Institution, South Asia Initiative, January 2011, p. 51, [https://www.brookings.edu/wp-content/uploads/2016/06/01\\_pakistan\\_cohen.pdf](https://www.brookings.edu/wp-content/uploads/2016/06/01_pakistan_cohen.pdf) (accessed June 25, 2019).
20. Executive Office of the President, Office of the United States Trade Representative, “India: U.S.–India Bilateral Trade and Investment,” last updated April 8, 2019, <https://ustr.gov/countries-regions/south-central-asia/india> (accessed June 25, 2019).
21. International Institute for Strategic Studies, *The Military Balance 2018: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2018), p. 264 (India’s nuclear capabilities), and *ibid.*, pp. 291 and 294 (Pakistan’s nuclear capabilities).
22. Fact Sheet, “Nuclear Weapons: Who Has What at a Glance,” Arms Control Association, updated June 2018, <https://www.armscontrol.org/factsheets/Nuclearweaponswhohaswhat> (accessed June 25, 2019).
23. Associated Press, “Worst Fighting in Years over Disputed Kashmir,” CBS News, October 9, 2014, <https://www.cbsnews.com/news/india-pakistan-fighting-kashmir-thousands-civilians-flee-border-violence/> (accessed June 25, 2019).
24. Ralph Ellis, Euan McKirdy, and Harmeet Shah Singh, “Indian Prime Minister Urges Pakistan to Investigate Attack on Military Base,” CNN, updated January 5, 2016. <https://www.cnn.com/2016/01/04/asia/india-air-base-gunmen/index.html> (accessed June 25, 2019).
25. Ravi Krishnan Khajuria, “Jammu Army Camp Attack: Two Soldiers Killed as JeM Militants Storm into Sunjuwan Base,” *Hindustan Times*, updated February 10, 2018, <https://www.hindustantimes.com/india-news/terrorists-attack-army-camp-in-jammu-soldier-and-daughter-injured/story-201LSRP8tuSE6UM2nvxt10.html> (accessed June 25, 2019), and BBC News, “Pulwama Attack: Nine Killed in Kashmir Gun Battle,” February 18, 2019, <https://www.bbc.com/news/world-asia-india-47275072> (accessed June 25, 2019).
26. Ayaz Gul, “Pakistan Equips Military with Tactical Nuke-Capable Missile,” Voice of America, January 24, 2019, <https://www.voanews.com/south-central-asia/pakistan-equips-military-tactical-nuke-capable-missile> (accessed August 21, 2019).
27. Sushant Singh, “Inside the Surgical Strike: Choppers on Standby, 70–80 Soldiers,” *The Indian Express*, updated October 1, 2016, <https://indianexpress.com/article/india/india-news-india/surgical-strikes-india-pakistan-loc-jammu-and-kashmir-indian-army-3059059/> (accessed June 25, 2019).
28. Joanna Slater, “India Strikes Pakistan in Severe Escalation of Tensions Between Nuclear Rivals,” *The Washington Post*, February 26, 2019, [https://www.washingtonpost.com/world/pakistan-says-indian-fighter-jets-crossed-into-its-territory-and-carried-out-limited-airstrike/2019/02/25/901f3000-3979-11e9-a06c-3ec8ed509d15\\_story.html?utm\\_term=.f777f64b5340](https://www.washingtonpost.com/world/pakistan-says-indian-fighter-jets-crossed-into-its-territory-and-carried-out-limited-airstrike/2019/02/25/901f3000-3979-11e9-a06c-3ec8ed509d15_story.html?utm_term=.f777f64b5340) (accessed June 25, 2019).

# Non-State Actors

**T**errorist groups come in many forms but have one thing in common: the use of violence to achieve their political objectives, whether their cause is driven by religious, ethnic, or ideological motivations. In general, these non-state actors operate in a very local context, usually within a specific country or sub-region. Sometimes a terrorist group's objectives extend beyond the internationally recognized borders of a state because their identity as a group transcends such legal or geographic boundaries.

Terrorist groups rarely pose a threat to the United States that rises to the threshold used by this *Index*: a substantial threat to the U.S. homeland; the ability to precipitate a war in a region of critical interest to the U.S.; or the ability to threaten the free movement of people, goods, or services through the global commons. Those that do meet these criteria are assessed in this section.

## Terrorist Threats to the Homeland from the Middle East and North Africa

Radical Islamist terrorism in its various forms remains a global threat to the safety of U.S. citizens. Many terrorist groups operate in the Middle East, but those inspired by Islamist ideology also operate in Europe, Asia, and Africa.

The primary terrorist groups of concern to the U.S. homeland and to Americans abroad are the Islamic State of Iraq and al-Sham (ISIS) and al-Qaeda. Their threat is amplified when they can exploit areas with weak or non-existent governance to plan, train, equip, and launch attacks.

**Al-Qaeda and Its Affiliates.** Al-Qaeda was founded in 1988 by foreign veterans from among those who flocked to Afghanistan to join the war against the Soviet occupation in the 1980s. With Osama bin Laden appointed emir, al-Qaeda was envisaged as a fighting force that could defend Sunnis across the world and expand the Islamist struggle into a global revolutionary campaign.<sup>1</sup>

After 9/11, al-Qaeda's leadership fled Afghanistan. Much of the original cadre has now been killed or captured, including Osama bin Laden, and other key al-Qaeda leaders have been killed by targeted strikes in Afghanistan, Pakistan, Syria, Yemen, and Somalia. However, segments of al-Qaeda's leadership, including its emir, Ayman al-Zawahiri, survived. Some al-Qaeda lieutenants are believed to remain in the Afghanistan–Pakistan (AfPak) region; others have taken refuge in Iran.<sup>2</sup> Al-Qaeda's central leadership therefore continues to pose a potential threat to the U.S. homeland.

Al-Qaeda also dispersed its fighters further afield, allowing for the development of regional affiliates that shared the long-term goals of al-Qaeda's general command and largely remained loyal to it. These affiliates have engaged with some success in local conflict environments. In particular, the Arab Spring uprisings that began in 2011 enabled al-Qaeda to advance its revolutionary agenda, taking advantage of failed or failing states in Iraq, Libya, Mali, Syria, and Yemen. It is through these affiliates that al-Qaeda is able to project regional strength most effectively.

*Yemen.* Yemen has long been a bastion of support for militant Islamism. Yemenis made

up a disproportionate number of the estimated 25,000 foreign Muslims in the Afghan jihad against the Soviet Union in the 1980s. After that conflict ended, Yemen also attracted Westerners into the country to carry out terrorist operations there. In 1998, several British citizens were jailed for planning to bomb Western targets, including hotels and a church.<sup>3</sup>

Al-Qaeda's first terrorist attack against Americans occurred in Yemen in December 1992 when a bomb was detonated in a hotel used by U.S. military personnel. Al-Qaeda launched a much deadlier attack in Yemen in October 2000 when it attacked the USS *Cole* in the port of Aden with a boat filled with explosives, killing 17 American sailors.<sup>4</sup> The first U.S. drone strike outside Afghanistan after 9/11 also took place in Yemen, targeting those connected to the attack on the *Cole*.<sup>5</sup>

After 9/11, and following crackdowns in other countries, Yemen became increasingly important as a base of operations for al-Qaeda. In September 2008, it launched an attack on the U.S. embassy in Yemen that killed 19 people, including an American woman. Yemen's importance to al-Qaeda increased further in January 2009 when al-Qaeda members who had been pushed out of Saudi Arabia merged with the Yemeni branch to form Al-Qaeda in the Arabian Peninsula (AQAP). This affiliate quickly emerged as one of the leading terrorist threats to the U.S.

Much of this threat initially centered on AQAP's Anwar al-Awlaki, a charismatic American-born Yemeni cleric who directed several terrorist attacks on U.S. targets before being killed in a drone air strike in September 2011. He had an operational role in the plot executed by Umar Farouk Abdulmutallab, the failed suicide bomber who sought to destroy an airliner bound for Detroit on Christmas Day 2009.<sup>6</sup> Awlaki was also tied to plots to poison food and water supplies, as well as to launch ricin and cyanide attacks,<sup>7</sup> and is suspected of playing a role in the November 2010 plot to dispatch parcel bombs to the U.S. in cargo planes. Additionally, Awlaki was in contact with Major Nidal Hassan, who perpetrated the 2009 Fort Hood shootings that killed 13 soldiers.<sup>8</sup>

Since Awlaki's death, the number of AQAP-sanctioned external operations in the West has diminished.<sup>9</sup> However, his videos on the Internet have continued to radicalize and recruit young Muslims, including the perpetrators of the April 2013 bombing of the Boston Marathon that killed three people.<sup>10</sup>

AQAP's threat to Western security, while seemingly slightly reduced by Awlaki's death, is still pronounced. Another attempt to carry out a bombing of Western aviation using explosives concealed in an operative's underwear was thwarted by a U.S.–Saudi intelligence operation in May 2012.<sup>11</sup> In August 2013, U.S. interception of al-Qaeda communications led to the closure of 19 U.S. embassies and consulates across the Middle East and Africa because of fears that AQAP was planning a massive attack.<sup>12</sup> In January 2015, two AQAP-trained terrorists murdered staff members and nearby police at *Charlie Hebdo* magazine in Paris.<sup>13</sup> Then, in 2017, aviation was targeted once again by a plan to conceal bombs in laptop batteries.<sup>14</sup>

Much of AQAP's recent activity has focused on exploiting the chaos of the Arab Spring in Yemen. AQAP acquired a significant amount of territory in 2011 and established governance in the country's South, finally relinquishing this territory only after a Yemeni military offensive in the summer of 2012.<sup>15</sup>

AQAP further intensified its domestic activities after the overthrow of Yemen's government by Iran-backed Houthi rebels in 2015, seizing the city of al-Mukalla and expanding its control of rural areas in southern Yemen. AQAP withdrew from al-Mukalla and other parts of the South in the spring of 2016, reportedly after the U.S.-backed Saudi–United Arab Emirates coalition had cut deals with AQAP, paying it to leave certain territory and even integrating some of its fighters into its own forces targeting the Houthis.<sup>16</sup>

More substantive progress has been achieved in the targeting of AQAP's leadership. Said al-Shehri, a top AQAP operative, was killed in a drone strike in 2013. The group's leader at the time, Nasir al-Wuhayshi, was killed in a drone strike in June 2015. Perhaps

most significantly, Ibrahim al-Asiri, AQAP's most notorious bomb maker, was killed in a U.S. strike in 2017. Since then, the tempo of U.S. drone strikes against AQAP has slowed.<sup>17</sup>

Despite U.S. drone activity, it is estimated that AQAP still has between 6,000 and 7,000 fighters.<sup>18</sup> It therefore remains a potent force that could capitalize on the anarchy of Yemen's multi-sided civil war to seize new territory and plan more attacks on the West.

*Syria.* Al-Qaeda's Syrian affiliate, the al-Nusra Front (ANF), was established as an offshoot of the Islamic State of Iraq (ISI), al-Qaeda's Iraq affiliate, in late 2011 by Abu Muhammad al-Julani, a lieutenant of ISI leader Abu Bakr al-Baghdadi.<sup>19</sup> ANF had an estimated 5,000 to 10,000 members and emerged as one of the top rebel groups fighting the Assad dictatorship in Syria.<sup>20</sup>

ANF had some success in attracting Americans to its cause. An American Muslim recruited by ANF, Moner Mohammad Abusalha, conducted a suicide truck bombing in northern Syria on May 25, 2014, in the first reported suicide attack by an American in that country.<sup>21</sup> At least five men have been arrested inside the U.S. for providing material assistance to ANF, including Abdirahman Sheik Mohamud, a naturalized U.S. citizen who was arrested in April 2015 after returning from training in Syria and was planning to launch a terrorist attack on U.S. soldiers based in Texas.<sup>22</sup>

In recent years, the al-Qaeda movement in Syria has undergone several name changes, allying itself with various Islamist rebel groups. This has made the degree of direct threat posed outside of Syria's borders harder to assess.

In a May 2015 interview, al-Julani stated that al-Nusra's intentions were purely local and that, "so as not to muddy the current war" in Syria, ANF was not planning to target the West.<sup>23</sup> Then, in July 2016, al-Nusra rebranded itself as Jabhat Fath Al Sham (JFS), and al-Julani stated that it would have "no affiliation to any external entity," a move that some regarded as a break from al-Qaeda and others regarded as a move to obscure its ties to al-Qaeda and reduce U.S. military pressure on the group.<sup>24</sup>

In January 2017, JFS merged as part of an alliance with other Islamist extremist movements into a new anti-Assad coalition: Hayat Tahrir al-Sham (HTS, Organization for the Liberation of the Levant). It was estimated that HTS had 12,000 to 14,000 fighters in March 2017.<sup>25</sup> Further complicating matters surrounding al-Qaeda's presence, another group in Syria connected to al-Qaeda, Hurras al-Din (Guardians of the Religion), was formed in March 2018.<sup>26</sup> Among its ranks were those who defected from HTS, and its suspected emir is an Ayman al-Zawahiri acolyte.<sup>27</sup>

HTS has adopted a more pragmatic course than its extremist parent organization and has cooperated with moderate Syrian rebel groups against the Assad regime, as well as against ISIS. However, the leadership of Abu Muhammad al-Julani and his tactical approach to the conflict, as well as the clear divisions within the Syrian jihad, have led to rebukes from Ayman al-Zawahiri and those loyal to him.<sup>28</sup> Zawahiri has stressed the need for unity while lambasting the jihadist movement in Syria and its emphasis on holding territory in northwest Syria at the expense of intensifying the struggle against Assad.<sup>29</sup>

One entity that did pose a direct threat to the West was the Khorasan group, which was thought to comprise dozens of veterans of al-Qaeda's operations in Afghanistan and Pakistan.<sup>30</sup> Al-Zawahiri had dispatched this cadre of operatives to Syria, where they were embedded with ANF and—despite al-Julani's statement that ANF was not targeting the West—charged with organizing terrorist attacks against Western targets. However, a series of U.S. air strikes in 2014–2015 degraded Khorasan's capacity to organize terrorist attacks.

Al-Qaeda's presence and activities in Syria, as well as the intent of those once aligned with it, are sometimes opaque, most likely on purpose. Even if offshoots of al-Qaeda are not currently emphasizing their hostility to the U.S., however, that will likely change if they succeed in further consolidating power in Syria.

*The Sahel.* Al-Qaeda in the Islamic Maghreb (AQIM) "has an estimated 1,000

fighters operating in the Sahel, including Algeria, northern Mali, southwest Libya, and Nigeria,” and “is based in southern and eastern Algeria (including isolated parts of the Kabylie region), Burkina Faso, Cote D’Ivoire, Libya, northern Mali, Niger, and Tunisia.”<sup>31</sup>

AQIM’s roots lie in the Algerian civil war of the 1990s, when the Algerian government cancelled the second round of elections following the victory of the Islamic Salvation Front (FIS) in the first round. The armed wing of the FIS, the Armed Islamic Group (GIA), responded by launching a series of attacks, executing those even suspected of working with the state. The group also attempted to implement sharia law in Algeria.

The GIA rapidly alienated regular Algerians, and by the late 1990s, an offshoot, the Salafist Group for Preaching and Combat (GSPC), emerged. Its violence, somewhat less indiscriminate than the GIA’s, was focused on security and military targets. Having failed to overthrow the Algerian state, the GSPC began to align itself with al-Qaeda, and Ayman al-Zawahiri announced its integration into the al-Qaeda network in a September 2006 video. The GSPC subsequently took the AQIM name.

AQIM has carried out a series of regional attacks and has focused on kidnapping Westerners. Some of these hostages have been killed,<sup>32</sup> but more have been used to extort ransoms from Western governments.<sup>33</sup> Like other al-Qaeda affiliates, AQIM also took advantage of the power vacuums that emerged from the Arab Spring, particularly in Libya where Islamist militias flourished. The weak central government was unable to tame fractious militias, curb tribal and political clashes, or dampen rising tensions between Arabs and Berbers in the West and Arabs and the Toubou tribe in the South.

The September 11, 2012, attack on the U.S. diplomatic mission in Benghazi underscored the extent to which Islamist extremism had flourished in the region. The radical Islamist group that launched the attack, Ansar al-Sharia, had links to AQIM and shared its violent ideology. AQIM and likeminded Islamist allies

also grabbed significant amounts of territory in northern Mali in late 2012, implementing a brutal version of sharia law, until a French military intervention helped to push them back.

AQIM continues to support and works alongside various jihadist groups in the region. In March 2017, the Sahara branch of AQIM merged with three other al-Qaeda or al-Qaeda-linked organizations based in the Sahel to form the Group for Support of Islam and Muslims (JNIM), an organization that has pledged allegiance to al-Qaeda emir Ayman al-Zawahiri.<sup>34</sup>

AQIM is not known to have explicitly targeted the U.S. homeland in recent years, but it does threaten regional stability and U.S. allies in North Africa and Europe, where it has gained supporters and operates extensive networks for the smuggling of arms, drugs, and people.

**The Islamic State of Iraq and al-Sham and Its Affiliates.** The Islamic State of Iraq and al-Sham (ISIS) is an al-Qaeda splinter group that has outstripped its parent organization in terms of its immediate threats to U.S. national interests.

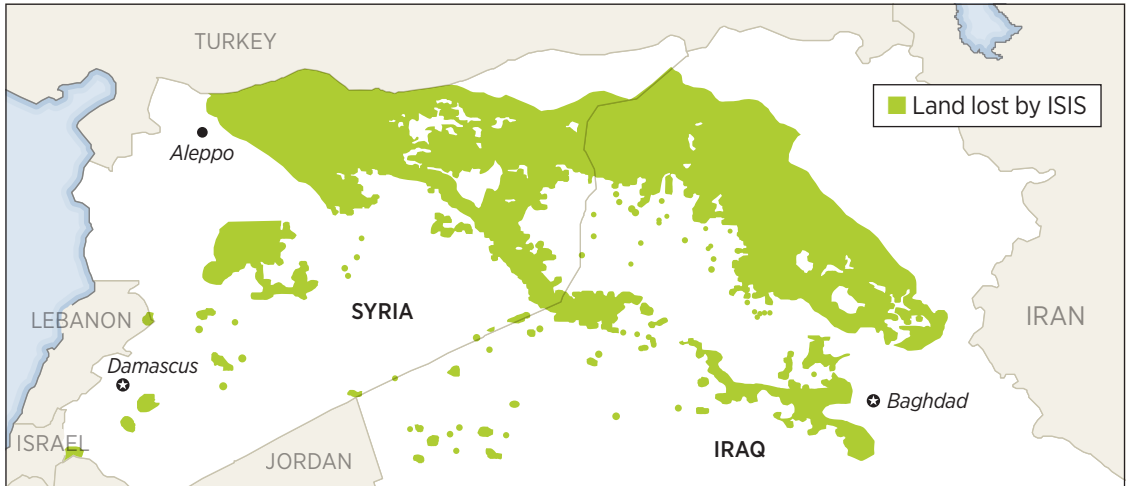
The Islamic State of Iraq (ISI), the precursor to ISIS and an al-Qaeda offshoot, was perceived by some Western policymakers as having been strategically defeated following the U.S. “surge” of 2006–2007 in Iraq. However, the group benefited from America’s effectively having withdrawn—both politically and militarily—from Iraq in the 2010–2011 period, as well as from the chaos in Syria where Bashar al-Assad responded to the Arab Spring protests with bloody persecution.

In both Iraq and Syria, ISI had space in which to operate and a large disaffected pool of individuals from which to recruit. In April 2013, ISI emir Abu Bakr al-Baghdadi declared that the al-Nusra Front, the al-Qaeda affiliate operating in Syria, was merely a front for his operation and that a new organization was being formed: the Islamic State of Iraq and al-Sham (ISIS).

ISIS sought to establish an Islamic state governed by its interpretation of sharia law, posing an existential threat to Christians,

## Territory Lost by ISIS

At its peak, ISIS controlled large swaths of territory within Iraq and Syria. As of June 2019, it had lost control over all of these areas, but it remains a potent terrorist threat.



**NOTE:** Areas are approximate.

**SOURCE:** U.S. Department of State, "November 2018 ISIS Area of Influence," <https://www.state.gov/november-2018-isis-area-of-influence/> (accessed July 11, 2019).

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Shiite Muslims, Yazidis, and other religious minorities. Its long-term goals continue to be a jihad to drive Western influence out of the Middle East; diminish and discredit Shia Islam, which it considers apostasy; and become the nucleus of a global Sunni Islamic empire.

With both al-Qaeda leader Ayman al-Zawahiri and ANF emir Abu Mohammed al-Julani unsuccessful in reining in al-Baghdadi, ISIS was expelled from the al-Qaeda network in February 2014. Despite this, ISIS swept through parts of northern and western Iraq and in June 2014 declared the return of the Caliphate, with its capital in the northern Syrian city of Raqqa. It subsequently kidnapped and then murdered Westerners working in Syria, including American citizens.

A U.S.-led international coalition was assembled to chip away at ISIS's control of territory. The Iraqi Army and Iranian-backed militias broke its control of Mosul in July 2017,

and the U.S.-backed Syrian Democratic Forces militia liberated Raqqa in October 2017, with ISIS's last town (Baghouz) falling in March 2019. ISIS fighters have retreated, have adopted insurgent tactics, and will continue to pose a regional terrorist threat with direct implications for the U.S. In January 2019, for example, U.S. troops were killed in a suicide bombing at a market in Manbij in northern Syria.<sup>35</sup>

Although ISIS's territorial control has now been broken in Iraq and Syria, its presence has spread far beyond that territory. Terrorist groups around the world have pledged allegiance to Abu Bakr al-Baghdadi, and ISIS now has affiliates in the Middle East, in South and Southeast Asia, and throughout Africa.

ISIS poses a threat to stability in all of these regions, seeking to overthrow their governments and impose Islamic law. In pursuit of this cause, ISIS has shown itself willing to kill Christians and other non-Muslims while

committing attacks on the police and soldiers. An Islamic State in the Greater Sahara ambush in Niger in October 2017, for example, resulted in the death of four U.S. special operations troops.<sup>36</sup> In addition, ISIS has made threats against government embassies, including those of the U.S., in its areas of influence.<sup>37</sup>

ISIS poses an ongoing threat to life in the West. In the U.S., on May 3, 2015, two extremists in contact with an ISIS operative in Syria were fatally shot by police before they could commit mass murder in Garland, Texas.<sup>38</sup>

More commonly, however, the ISIS ideology has inspired individuals and small groups to plan attacks in the U.S. Tashfeen Malik, one of the perpetrators of the December 2, 2015, shootings that killed 14 people in San Bernardino, California, pledged allegiance to al-Baghdadi.<sup>39</sup> ISIS then claimed responsibility for the June 12, 2016, shootings at a nightclub in Orlando, Florida, that killed 49 people. Omar Mateen, the perpetrator, had pledged allegiance to al-Baghdadi, although there is no evidence to show that the attacks were directed by ISIS.<sup>40</sup> The group also claimed responsibility for the October 31, 2017, vehicular attack by Sayfullo Saipov in New York that killed eight.<sup>41</sup> Saipov, too, had pledged allegiance to ISIS's emir but did not appear to be operationally guided by ISIS.<sup>42</sup> Such terrorist attacks, incited but not directed by ISIS, are likely to continue for the foreseeable future.

ISIS has also attempted complex attacks on aviation. It claimed responsibility for the October 31, 2015, downing of a Russian passenger jet over Egypt's Sinai Peninsula that killed 224 people and also tried to bring down a flight heading from Sydney to Abu Dhabi by concealing an explosive device inside a meat grinder.<sup>43</sup>

ISIS had well-publicized success in attracting the support of foreign fighters. Approximately 250 from the U.S. traveled or attempted to travel to Syria.<sup>44</sup> There is the potential for an ongoing threat from these individuals, who are likely to have received military training, upon return to the U.S. either in terms of attack planning or in recruiting future generations of jihadists.

ISIS had greater success attracting those from Europe, with approximately 6,000 departing from European countries.<sup>45</sup> The foreign fighter threat in that continent has led to several attacks. Mehdi Nemmouche, a French citizen of Algerian origin who shot and killed four civilians at the Jewish Museum in Brussels in May 2014, for example, was an ISIS-aligned terrorist who had fought in Syria.<sup>46</sup> In August 2015, Ayoub el-Khazzani, a Moroccan, attempted to gun down passengers in a train travelling between Amsterdam and Paris. Passengers, including two members of the U.S. Army, restrained him.<sup>47</sup>

Similarly, a group of ISIS foreign fighters teamed with local Islamist terrorists to launch a series of suicide and gun attacks on a music venue, restaurants, cafes, and a football stadium, killing 130 and injuring 368 people in Paris, France, in November 2015.<sup>48</sup> Recruits from within the same network then killed 32 people and injured around 300 more in shootings and suicide bombings across Brussels, Belgium, in March 2016.<sup>49</sup>

ISIS ideology has also inspired a wave of attacks in Europe, including one carried out by a Tunisian who used a truck to kill 86 people and injure 434 more at a Bastille Day celebration in Nice, France, in July 2016.<sup>50</sup> In another such attack, in June 2017, three men killed eight people and injured 47 on or near London Bridge in London, England, by running over them or stabbing them.<sup>51</sup>

ISIS has demonstrated an interest in carrying out biological attacks. Sief Allah H., a Tunisian asylum seeker who was in contact with ISIS, and his German wife Yasmin H. were arrested in Cologne in June 2018 after they successfully produced ricin as part of a suspected attack.<sup>52</sup> This was the first time that ricin was successfully produced in the West as part of an alleged Islamist plot.

Overall, as of May 2019, ISIS had had some involvement—ranging from merely inspirational to hands-on and operational—in over 150 plots and attacks in Europe since January 2014 that had led to 371 deaths and over 1,700 injuries.<sup>53</sup> This includes the loss of American



lives abroad. An American college student was killed in Paris in November 2015, four Americans were killed in the Brussels attack of March 2016, and another three were killed in the Nice attack of July 2016.<sup>54</sup> Moreover, the threat is by no means confined to Europe: Americans were also killed in ISIS-claimed attacks in Tajikistan in July 2018 and Sri Lanka in April 2019.<sup>55</sup>

### Conclusion

ISIS has lost its Caliphate, but it remains a highly dangerous adversary capable of planning and executing attacks regionally and—at the very least—inspiring them in the West. It appears to be transitioning from a quasi-state to an insurgency, relying on its affiliates to project strength far beyond its former Syrian and Iraqi strongholds.

Meanwhile, despite sustained losses to its leadership, al-Qaeda remains resilient. It has curried favor with other Sunnis in particular areas of strategic importance to it, has focused its resources on local conflicts, has occasionally

controlled territory, and has de-emphasized (but not eschewed) focus on the global jihad. This approach has been particularly noticeable since the Arab Spring.

Regardless of any short-term tactical considerations, both groups ultimately aspire to attack the U.S. at home and U.S. interests abroad. While the U.S. has hardened its domestic defenses, making this a tricky prospect for both groups, they can rely on radicalized individuals living within the U.S. to take up the slack. Furthermore, as has been demonstrated time and again, there are ample opportunities to target Americans based in countries that are more vulnerable to terrorist attack.

If it wishes to contain and ultimately end Islamist violence, the U.S. must continue to bring effective pressure to bear on these groups and those that support them. This *Index* assesses the threat from ISIS, al-Qaeda, and their affiliated organizations as “capable” and “aggressive.”

## Threats: Middle East Terrorism

	HOSTILE	AGGRESSIVE	TESTING	ASSERTIVE	BENIGN
Behavior		✓			
	FORMIDABLE	GATHERING	CAPABLE	ASPIRATIONAL	MARGINAL
Capability			✓		

## Endnotes

1. Peter L. Bergen, *The Osama bin Laden I Know: An Oral History of al Qaeda's Leader* (New York: Free Press, 2006), pp. 82–83.
2. See, for example, United Nations Security Council, *Twenty-Second Report of the Analytical Support and Sanctions Monitoring Team Submitted Pursuant to Resolution 2368 (2017) Concerning ISIL (Da'esh), Al-Qaida and Associated Individuals and Entities*, S/2018/705, July 27, 2018, pp. 15 and 18, [https://www.un.org/en/ga/search/view\\_doc.asp?symbol=S/2018/705&referer=/english/&Lang=E](https://www.un.org/en/ga/search/view_doc.asp?symbol=S/2018/705&referer=/english/&Lang=E) (accessed July 9, 2019).
3. BBC News, “Britons Convicted of Yemen Bomb Plot,” August 9, 1999, [http://news.bbc.co.uk/2/hi/middle\\_east/415096.stm](http://news.bbc.co.uk/2/hi/middle_east/415096.stm) (accessed July 9, 2019).
4. James Phillips, “The Yemen Bombing: Another Wake-up Call in the Terrorist Shadow War,” Heritage Foundation *Executive Memorandum* No. 773, October 25, 2000, <http://www.heritage.org/middle-east/report/the-yemen-bombing-another-wake-call-the-terrorist-shadow-war>.
5. CNN, “Sources: U.S. Kills Cole Suspect,” November 5, 2002, <http://www.cnn.com/2002/WORLD/meast/11/04/yemen.blast/index.html> (accessed July 9, 2019).
6. Jeremy Pelofsky, “Prosecutors Say al Qaeda Leader Awlaki Directed Underwear Bomber,” Reuters, February 10, 2012, <https://www.reuters.com/article/us-usa-security-abdulmutallab/prosecutors-say-al-qaeda-leader-awlaki-directed-underwear-bomber-idUSTRE8191VL20120210> (accessed July 9, 2019).
7. Daniel Klaidman, *Kill or Capture: The War on Terror and the Soul of the Obama Presidency* (New York: Houghton Mifflin Harcourt, 2012), p. 216.
8. Mark Schone and Rehab el-Buri, “Fort Hood: Hasan Asked Awlaki If It Was Okay to Kill American Soldiers,” ABC News, December 23, 2009, <https://abcnews.go.com/Blotter/FtHoodInvestigation/fort-hood-hasan-asked-awlaki-kill-american-soldiers/story?id=9410718> (accessed July 9, 2019).
9. For more on the potential decline of AQAP’s external operations program, see Gregory D. Johnsen, “The Two Faces of Al-Qaeda in the Arabian Peninsula,” *War on the Rocks*, October 11, 2018, <https://warontherocks.com/2018/10/the-two-faces-of-al-qaeda-in-the-arabian-peninsula/> (accessed July 9, 2019).
10. Scott Shane, “The Enduring Influence of Anwar al-Awlaki in the Age of the Islamic State,” *Combating Terrorism Center at West Point, CTC Sentinel*, Vol. 9, Issue 7 (July 2016), pp. 15–19, [https://ctc.usma.edu/app/uploads/2016/08/CTC-SENTINEL\\_Vol9Iss710.pdf](https://ctc.usma.edu/app/uploads/2016/08/CTC-SENTINEL_Vol9Iss710.pdf) (accessed July 9, 2019).
11. BBC News, “Al-Qaeda Yemen Plane Bomb Plot Foiled by ‘Insider,’” May 8, 2012, <https://www.bbc.com/news/world-us-canada-17994493> (accessed July 9, 2019).
12. CBS News, “Yemen Terror Threat Prompts State Department to Evacuate Some Embassy Staff, Warn Americans to Leave Country ‘Immediately,’” August 6, 2013, <https://www.cbsnews.com/news/yemen-terror-threat-prompts-state-department-to-evacuate-some-embassy-staff-warn-americans-to-leave-country-immediately/> (accessed July 9, 2019).
13. Thomas Joscelyn, “Al Qaeda in the Arabian Peninsula Claims Responsibility for Charlie Hebdo Attack,” *Foundation for Defense of Democracies Long War Journal*, January 14, 2015, [https://www.longwarjournal.org/archives/2015/01/al\\_qaeda\\_in\\_the\\_arab\\_2.php](https://www.longwarjournal.org/archives/2015/01/al_qaeda_in_the_arab_2.php) (accessed July 9, 2019).
14. Barbara Starr and Rene Marsh, “AQAP Trying to Hide Explosives in Laptop Batteries, Official Says,” CNN, updated March 22, 2017, <https://www.cnn.com/2017/03/21/politics/electronics-ban-devices-explosives-intelligence/index.html> (accessed July 9, 2019).
15. Robin Simcox, “Ansar al-Sharia and Governance in Southern Yemen,” *Current Trends in Islamist Ideology*, Vol. 14 (January 2013), pp. 58–72, <https://www.hudson.org/research/9779-ansar-al-sharia-and-governance-in-southern-yemen> (accessed July 9, 2019).
16. Maggie Michael, Trish Wilson, and Lee Keath, “AP Investigation: US Allies, al-Qaida Battle Rebels in Yemen,” Associated Press, August 7, 2018, <https://apnews.com/f38788a561d74ca78c77cb43612d50da> (accessed July 9, 2019).
17. Bill Roggio, “US Targets AQAP 8 Times in Past 3 Months,” *Foundation for Defense of Democracies Long War Journal*, April 2, 2019, <https://www.longwarjournal.org/archives/2019/04/us-targets-aqap-8-times-in-past-3-months.php> (accessed July 9, 2019).
18. United Nations Security Council, *Twenty-Second Report of the Analytical Support and Sanctions Monitoring Team*, p. 9.
19. Chapter 5, “Foreign Terrorist Organizations,” in U.S. Department of State, Bureau of Counterterrorism, *Country Reports on Terrorism 2017*, September 2018, pp. 320–321, [https://www.state.gov/wp-content/uploads/2019/04/crt\\_2017.pdf](https://www.state.gov/wp-content/uploads/2019/04/crt_2017.pdf) (accessed July 9, 2019).
20. Eric Schmitt, “Al Qaeda Turns to Syria, with a Plan to Challenge ISIS,” *The New York Times*, May 15, 2016, [http://www.nytimes.com/2016/05/16/world/middleeast/al-qaeda-turns-to-syria-with-a-plan-to-challenge-isis.html?\\_r=0](http://www.nytimes.com/2016/05/16/world/middleeast/al-qaeda-turns-to-syria-with-a-plan-to-challenge-isis.html?_r=0) (accessed July 9, 2019).

21. Adam Goldman, Greg Miller, and Nicole Rodriguez, "American Who Killed Himself in Syria Suicide Attack Was from South Florida," *The Washington Post*, May 31, 2014, [http://www.washingtonpost.com/world/national-security/american-who-killed-himself-in-syria-suicide-attack-was-from-south-florida-official-says/2014/05/30/03869b6e-e7f4-11e3-a86b-362fd5443d19\\_story.html](http://www.washingtonpost.com/world/national-security/american-who-killed-himself-in-syria-suicide-attack-was-from-south-florida-official-says/2014/05/30/03869b6e-e7f4-11e3-a86b-362fd5443d19_story.html) (accessed July 9, 2019).
22. Adam Goldman, "Ohio Man Who Trained with Jabhat al-Nusra Is Indicted on Terrorism Charges," *The Washington Post*, April 16, 2015, [http://www.washingtonpost.com/world/national-security/ohio-man-who-trained-with-jabhat-al-nusra-is-indicted-on-terrorism-charges/2015/04/16/8e8ded08-e455-11e4-b510-962fcfab310\\_story.html](http://www.washingtonpost.com/world/national-security/ohio-man-who-trained-with-jabhat-al-nusra-is-indicted-on-terrorism-charges/2015/04/16/8e8ded08-e455-11e4-b510-962fcfab310_story.html) (accessed July 9, 2019).
23. Agence France-Presse, "Chief of Al-Qaeda's Syria Affiliate Pledges No Attacks on the West," May 27, 2015, <https://www.yahoo.com/news/chief-al-qaedas-syria-affiliate-pledges-no-attacks-221912033.html?ref=gs> (accessed July 9, 2019).
24. Thomas Joscelyn, "Analysis: Al Nusrah Front Rebrands Itself as Jabhat Fath Al Sham," Foundation for Defense of Democracies *Long War Journal*, July 28, 2016, <https://www.longwarjournal.org/archives/2016/07/analysis-al-nusrah-front-rebrands-itself-as-jabhat-fath-al-sham.php> (accessed July 9, 2019).
25. Charles Lister, "Al Qaeda Is Starting to Swallow the Syrian Opposition," *Foreign Policy*, March 15, 2017, <http://foreignpolicy.com/2017/03/15/al-qaeda-is-swallowing-the-syrian-opposition/> (accessed July 9, 2019).
26. Thomas Joscelyn, "Jihadists Form 'Guardians of the Religion' Organization in Syria," Foundation for Defense of Democracies *Long War Journal*, March 4, 2018, <https://www.longwarjournal.org/archives/2018/03/jihadists-form-guardians-of-the-religion-organization-in-syria.php> (accessed July 9, 2019).
27. Thomas Joscelyn, "2 al Qaeda Leaders Reject Proposed Military Council in Syria," Foundation for Defense of Democracies *Long War Journal*, January 30, 2019, <https://www.longwarjournal.org/archives/2019/01/2-al-qaeda-leaders-reject-proposed-military-council-in-syria.php> (accessed July 9, 2019).
28. Thomas Joscelyn, "Analysis: Ayman al Zawahiri Calls for 'Unity' in Syria Amid Leadership Crisis," Foundation for Defense of Democracies *Long War Journal*, December 2, 2017, <https://www.longwarjournal.org/archives/2017/12/analysis-ayman-al-zawahiri-calls-for-unity-in-syria-amid-leadership-crisis.php> (accessed July 9, 2019).
29. Thomas Joscelyn, "Zawahiri Criticizes Jihadists in Syria for Clinging to Territory Under Turkey's Protection," Foundation for Defense of Democracies *Long War Journal*, February 7, 2019, <https://www.longwarjournal.org/archives/2019/02/zawahiri-criticizes-jihadists-in-syria-for-clinging-to-territory-under-turkeys-protection.php> (accessed July 9, 2019).
30. James Phillips, "The Rise of Al-Qaeda's Khorasan Group: What It Means for U.S. National Security," Heritage Foundation *Issue Brief* No. 4281, October 6, 2014, <http://www.heritage.org/middle-east/report/the-rise-al-qaedas-khorasan-group-what-it-means-us-national-security>.
31. U.S. Department of State, Bureau of Counterterrorism, *Country Reports on Terrorism 2017*, p. 330.
32. Raissa Kasolowsky and Kate Kelland, "Al Qaeda Kills British Hostage in Mali," Reuters, June 3, 2009, <https://www.reuters.com/article/us-qaeda-hostage/al-qaeda-kills-british-hostage-in-mali-idUSTRE552IH020090603> (accessed July 9, 2019).
33. U.S. Department of State, Bureau of Counterterrorism, *Country Reports on Terrorism 2017*, p. 329.
34. Thomas Joscelyn, "Analysis: Al Qaeda Groups Reorganize in West Africa," Foundation for Defense of Democracies *Long War Journal*, March 13, 2017, <https://www.longwarjournal.org/archives/2017/03/analysis-al-qaeda-groups-reorganize-in-west-africa.php> (accessed July 9, 2019).
35. BBC News, "Syria War: 'IS Suicide Bomber' Kills US Troops in Manbij," January 16, 2019, <https://www.bbc.com/news/world-middle-east-46892118> (accessed July 9, 2019).
36. Carley Petesch, "Niger May Have Arrested Militant with Ties to US Ambush," Associated Press, April 17, 2018, <https://apnews.com/d4d1fcf42f3241008227146f7b6db883> (accessed July 9, 2019).
37. Ryan Browne and Jennifer Hansler, "ISIS Threat Shuttters US Embassy in Democratic Republic of the Congo for More than a Week," CNN, updated December 3, 2018, <https://www.cnn.com/2018/12/03/politics/isis-threat-us-embassy-drc/index.html> (accessed July 9, 2019).
38. Nafees Hamid, "The British Hacker Who Became the Islamic State's Chief Terror Cybercoach: A Profile of Junaid Hussain," Combating Terrorism Center at West Point, *CTC Sentinel*, Vol. 11, Issue 4 (April 2018), pp. 30-37, <https://ctc.usma.edu/app/uploads/2018/04/CTC-SENTINEL-042018-3.pdf> (accessed July 9, 2019).
39. Laura Wagner and Bill Chappell, "FBI: San Bernardino Shooting Is Being Investigated as a Terrorist Act," NPR, December 4, 2015, <https://www.npr.org/sections/thetwo-way/2015/12/04/458464907/alleged-san-bernardino-attacker-pledged-allegiance-to-isis> (accessed July 9, 2019).

40. Thomas Joscelyn, "Orlando Terrorist Swore Allegiance to Islamic State's Abu Bakr al Baghdadi," *Foundation for Defense of Democracies Long War Journal*, June 20, 2016, <https://www.longwarjournal.org/archives/2016/06/orlando-terrorist-swore-allegiance-to-islamic-states-abu-bakr-al-baghdadi.php> (accessed July 9, 2019).
41. Peter Martinez, "ISIS Claims Responsibility for New York City Terror Attack that Killed 8," *CBS News*, November 2, 2017, <https://www.cbsnews.com/news/new-york-city-terror-attack-isis-claims-responsibility/> (accessed July 9, 2019).
42. Jeremy B. White, "New York Truck Attack Suspect 'Left Note Pledging Allegiance to Isis,'" *The Independent*, November 1, 2017, <https://www.independent.co.uk/news/world/americas/new-york-truck-attack-isis-suspect-sayfullo-saipov-a8030541.html> (accessed July 9, 2019).
43. Reuters, "Islamic State Claims Responsibility for Egypt's Sinai Attack," August 26, 2018, <https://www.reuters.com/article/us-egypt-security/islamic-state-claims-responsibility-for-egypts-sinai-attack-idUSKCN1LB090> (accessed July 9, 2019), and ABC News, "Sydney Terror Plot: Lebanon Says It Helped Australia Foil Plane Bomb Plan Linked to Raids," updated August 21, 2017, <https://www.abc.net.au/news/2017-08-22/lebanon-says-it-helped-foil-the-sydney-plane-bomb-plot/8829234> (accessed July 9, 2019).
44. Lisa Curtis, ed., "Combating the ISIS Foreign Fighter Pipeline: A Global Approach," Heritage Foundation *Special Report* No. 180, January 6, 2016, p. 5, <https://www.heritage.org/middle-east/report/combating-the-isis-foreign-fighter-pipeline-global-approach>.
45. Agence France-Presse, "More than 6,000 Have Left Europe for Isis Jihad: EU," *The Local*, April 13, 2015, <https://www.thelocal.de/20150413/up-to-6000-europeans-fighting-for-islamic-groups-isis-syria-iraq> (accessed July 9, 2019).
46. BBC News, "Brussels Jewish Museum Murders: Mehdi Nemmouche Jailed for Life," March 12, 2019, <https://www.bbc.co.uk/news/world-europe-47533533> (accessed July 9, 2019).
47. Paul Cruickshank, "Train Attack Suspect Confesses After Revelations in Academic Journal," *CNN*, updated December 19, 2016, <https://edition.cnn.com/2016/12/19/europe/isis-train-attack-suspect-confession/index.html> (accessed May 30, 2019).
48. BBC News, "Paris Attacks: What Happened on the Night," December 9, 2015, <https://www.bbc.co.uk/news/world-europe-34818994> (accessed July 9, 2019).
49. Jennifer Rankin and Jon Hedley, "Islamic State Claims Attacks at Brussels Airport and Metro Station," *The Guardian*, March 22, 2016, <https://www.theguardian.com/world/2016/mar/22/brussels-airport-explosions-heard> (accessed July 9, 2019).
50. BBC News, "Nice Attack: What We Know About the Bastille Day Killings," August 19, 2016, <https://www.bbc.com/news/world-europe-36801671> (accessed July 9, 2019).
51. BBC News, "London Bridge Attack: What Happened," May 3, 2019, <https://www.bbc.co.uk/news/uk-england-london-40147164> (accessed July 9, 2019).
52. "Kölns Bombenbauer: Sief Allah H. (29) heiratete sich nach Deutschland," *Kronen Zeitung*, June 15, 2018, <https://www.krone.at/1723722> (accessed July 9, 2019).
53. Unpublished data building on Robin Simcox, "European Islamist Plots and Attacks Since 2014—and How the U.S. Can Help Prevent Them," Heritage Foundation *Backgrounder* No. 3236, August 1, 2017, <http://www.heritage.org/europe/report/european-islamist-plots-and-attacks-2014-and-how-the-us-can-help-prevent-them>.
54. CBS News, "American Killed in Paris Terror Attacks," updated November 14, 2015, <https://www.cbsnews.com/news/paris-attacks-americans-us-state-department/> (accessed July 9, 2019); Camila Domonoske, "Americans Were Among Those Killed in Brussels Attacks, Says Kerry," *NPR*, March 25, 2016, <https://www.npr.org/sections/thetwo-way/2016/03/25/471829453/kerry-americans-were-among-those-killed-in-brussels-attacks> (accessed July 9, 2019); and BBC News, "Nice Attack: Who Were the Victims?" August 19, 2016, <https://www.bbc.co.uk/news/world-europe-36805164> (accessed July 9, 2019).
55. BBC News, "Tajikistan 'Attack' Leaves Four Foreign Cyclists Dead," July 30, 2018, <https://www.bbc.co.uk/news/world-asia-45004059> (accessed July 9, 2019), and Morgan Winsor and Dragana Jovanovic, "ISIS Claims Responsibility for Sri Lanka Easter Bombings that Killed over 350," *ABC News*, April 23, 2019, <https://abcnews.go.com/International/isis-claims-responsibility-sri-lanka-easter-bombings-killed/story?id=62570339> (accessed July 9, 2019).

# Conclusion: Global Threat Level

America faces challenges to its security at home and interests abroad from countries and organizations that have:

- Interests that conflict with those of the U.S.;
- Sometimes hostile intentions toward the U.S.; and
- In some cases, growing military capabilities that are leveraged to impose their will by coercion or intimidation of neighboring countries, thereby creating regional instabilities.

The government of the United States constantly faces the challenge of employing, sometimes alone but more often in concert with allies, the right mix of diplomatic, economic, public information, intelligence, and military capabilities to protect and advance U.S. interests.

Russia remains the primary threat to American interests in Europe and is the most pressing threat to the United States. The *2020 Index* again assesses the threat emanating from Russia as “aggressive” in its behavior and “formidable” (the highest category on the scale) in its growing capabilities. Moscow continues to engage in massive pro-Russia propaganda campaigns in Ukraine and other Eastern European countries, actively supports separatist forces in Ukraine, regularly performs provocative military exercises and training missions, and continues to sell and export arms to countries that are hostile to U.S. interests. It also

has increased its investment in modernizing its military and has gained significant combat experience while continuing to sabotage U.S. and Western policy in Syria and Ukraine.

China, the most comprehensive threat the U.S. faces, remained “aggressive” in the scope of its provocative behavior and earns the score of “formidable” for its capability because of its ongoing military modernization and buildup. The People’s Liberation Army continues to extend its reach and military activity beyond its immediate region and engages in larger and more comprehensive exercises, including live-fire exercises in the East China Sea near Taiwan. It also has continued to conduct probes of the South Korean and Japanese air defense identification zones, drawing rebukes from both Seoul and Tokyo. In addition, there is little evidence that Chinese cyber espionage and computer network exploitation have abated.

Iran remains the state actor that is most hostile to American interests in the Middle East. The *2020 Index* assesses Iran’s behavior as “aggressive” and its capability as “gathering.” In the years since publication of the *2015 Index*, Iran has methodically moved closer to becoming a nuclear power, and it continues to enhance its ICBM, missile defense, and unmanned systems capabilities. Iran also continues to perpetuate and exploit instability to expand its influence in the region, both in its direct involvement in regional engagements and through its proxies, particularly in Syria. This year also saw aggressive activity in the Strait of Hormuz, including the downing of a U.S. drone in international airspace and attacks on merchant shipping.

North Korea’s level of behavior remained “testing” in the *2020 Index*. North Korea’s capability level has also remained at “gathering” as Pyongyang continues to develop and refine its missile technology, especially in the area of submarine-launched ballistic missiles. With its ICBM program, North Korea remains both a threat to U.S. allies and assets in the region and an ongoing threat to the U.S. homeland.

The terrorist threats emanating from the Afghanistan–Pakistan region remained “testing” in the *2020 Index*. Fatalities attributed to terrorism inside Pakistan continue to fall as various terrorist groups within the region find themselves in competition with each other for recruits, territory, and resources.

A broad array of terrorist groups remain the most hostile of any of the threats to America examined in the *Index*. As of mid-2018, the Islamic State had been decimated, having

lost more than 98 percent of previously held territory, and its further reduction continued in 2019. However, it has not been completely eliminated and has made efforts to reassert itself in the region. Fortunately, Middle East terrorist groups are the least capable of the threats facing the U.S.

Just as there are American interests that are not covered by this *Index*, there may be additional threats to American interests that are not identified here. The *Index* focuses on the more apparent sources of risk and those that appear to pose the greatest threat.

Compiling the assessments of these threat sources, the *2020 Index* again rates the overall global threat environment as “aggressive” and “gathering” in the areas of threat actor behavior and material ability to harm U.S. security interests, respectively, leading to an aggregated threat score of “high.”

## Behavior of Threats

	HOSTILE	AGGRESSIVE	TESTING	ASSERTIVE	BENIGN
Russia		✓			
Iran		✓			
Middle East Terrorism		✓			
Af-Pak Terrorism			✓		
China		✓			
North Korea			✓		
<b>OVERALL</b>		✓			

## Capability of Threats

	FORMIDABLE	GATHERING	CAPABLE	ASPIRATIONAL	MARGINAL
Russia	✓				
Iran		✓			
Middle East Terrorism			✓		
Af-Pak Terrorism			✓		
China	✓				
North Korea		✓			
<b>OVERALL</b>		✓			

## Threats to U.S. Vital Interests

	SEVERE	HIGH	ELEVATED	GUARDED	LOW
Russia		✓			
Iran		✓			
Middle East Terrorism		✓			
Af-Pak Terrorism			✓		
China		✓			
North Korea		✓			
<b>OVERALL</b>		✓			

Our combined score for threats to U.S. vital interests can be summarized as:

### Threats to U.S. Vital Interests: Summary







# U.S. Military Power



# An Assessment of U.S. Military Power

America is a global power with global interests. Its military is tasked first and foremost with defending America from attack. Beyond that, it must be capable of protecting Americans abroad, allies, and the freedom to use international sea, air, and space while retaining the ability to engage in more than one major contingency at a time. America must be able not only to defend itself and its interests, but also to deter enemies and opportunists from taking action that would challenge U.S. interests, a capability that includes both preventing the destabilization of a region and guarding against threats to the peace and security of America's friends.

As noted in the five preceding editions of the *Index*, however, the U.S. does not have the necessary force to meet a two-major regional contingency (two-MRC) requirement and is not ready to carry out its duties effectively. Consequently, as we have seen during the past few years, the U.S. risks seeing its interests increasingly challenged and the world order it has led since World War II undone.

## How to Think About Sizing Military Power

Military power begins with the people and equipment used to conduct war: the weapons, tanks, ships, airplanes, and supporting tools such as communications systems that make it possible either for one group to impose its will on another or to prevent such an outcome from happening.

However, simply counting the number of people, tanks, or combat aircraft that the U.S. possesses would be insufficient because it would lack context. For example, the U.S.

Army might have 100 tanks, but to accomplish a specific military task, 1,000 or more might be needed or none at all. It might be that the terrain on which a battle is fought is especially ill-suited to tanks or that the tanks one has are inferior to the enemy's. The enemy could be quite adept at using tanks, or his tank operations might be integrated into a larger employment concept that leverages the supporting fires of infantry and airpower, whereas one's own tanks are poorly maintained, the crews are not well-prepared, or one's doctrine is irrelevant.

Success in war is partly a function of matching the tools of warfare to a specific task and employing those tools effectively in battle. Get these wrong—tools, objective, competence, or context—and you lose.

Another key element is the military's capacity to conduct operations: how many of the right tools—people, tanks, planes, or ships—it has. One might have the right tools and know how to use them effectively but not have enough to win. Given that one cannot know with certainty beforehand just when, where, against whom, and for what reason a battle might be fought, determining how much capability is needed is an exercise of informed but not certain judgment.

Further, two different combatants can use the same set of tools in radically different ways to quite different effects. The concept of employment matters. Concepts are developed to account for numbers, capabilities, material readiness, and all sorts of other factors that enable or constrain one's actions, such as whether one fights alone or alongside

allies, on familiar or strange terrain, or with a large, well-equipped force or a small, poorly equipped force.

All of these factors and a multitude of others affect the outcome of any military contest. Military planners attempt to account for them when devising requirements, developing training and exercise plans, formulating war plans, and providing advice to the President in his role as Commander in Chief of U.S. military forces.

Measuring hard combat power in terms of its capability, capacity, and readiness to defend U.S. vital interests is difficult, especially in such a limited space as this *Index*, but it is not impossible. However difficult determining the adequacy of one's military forces may be, the Secretary of Defense and the military services have to make such decisions every year when the annual defense budget request is submitted to Congress.

The adequacy of hard power is affected most directly by the resources the nation is willing to apply. Although that decision is informed to a significant degree by an appreciation of threats to U.S. interests and the ability of a given defense portfolio to protect U.S. interests against such threats, it is not informed solely by such considerations; hence the importance of clarity and honesty in determining just what is needed in terms of hard power and the status of such power from year to year.

Administrations take various approaches in determining the type and amount of military power needed and, by extension, the amount of money and other resources to commit to it. After defining the national interests to be protected, the Department of Defense (DOD) can use worst-case scenarios to determine the maximum challenges the U.S. military might have to overcome. Another way is to redefine what constitutes a threat. By taking a different view of whether major actors pose a meaningful threat and of the extent to which friends and allies have the ability to assist the U.S. in meeting security objectives, one can arrive at different conclusions about necessary military strength.

For example, one Administration might view China as a rising belligerent power bent

on dominating the Asia-Pacific region. Another Administration might view China as an inherently peaceful rising economic power, with the expansion of its military capabilities a natural occurrence commensurate with its strengthening status. The difference between these views can have a dramatic impact on how one thinks about U.S. defense requirements. So, too, can policymakers amplify or downplay risk to justify defense budget decisions.

There also can be strongly differing views on requirements for operational capacity.

- Does the country need enough for two major combat operations (MCOs) at roughly the same time or just enough for a single major operation and some number of lesser cases?
- To what extent should “presence” tasks—the use of forces for routine engagement with partner countries or simply to be on hand in a region for crisis response—be in addition to or a subset of a military force sized to handle two major regional conflicts?
- How much value should be assigned to advanced technologies as they are incorporated into the force?

### Where to Start

There are two major references that one can use to help sort through the variables and arrive at a starting point for assessing the adequacy of today's military posture: government studies and historical experience. The government occasionally conducts formal reviews that are meant to inform decisions on capabilities and capacities across the Joint Force relative to the threat environment (current and projected) and evolutions in operating conditions, the advancement of technologies, and aspects of U.S. interests that may call for one type of military response over another.

The 1993 Bottom-Up Review (BUR) conducted by then-Secretary of Defense Les Aspin is one such frequently cited example. Secretary

Aspin recognized that “the dramatic changes that [had] occurred in the world as a result of the end of the Cold War and the dissolution of the Soviet Union” had “fundamentally altered America’s security needs” and were driving an imperative “to reassess all of our defense concepts, plans, and programs from the ground up.”<sup>1</sup>

The BUR formally established the requirement that U.S. forces should be able “to achieve decisive victory in two nearly simultaneous major regional conflicts and to conduct combat operations characterized by rapid response and a high probability of success, while minimizing the risk of significant American casualties.”<sup>2</sup> Thus was formalized the two-MRC standard.

Dr. Daniel Gouré, in his 2015 *Index* essay “Building the Right Military for a New Era: The Need for an Enduring Analytic Framework,” noted that various Administrations have redefined force requirements based on their perceptions of what was necessary to protect U.S. interests.<sup>3</sup> In an attempt to formalize the process, and perhaps to have a mechanism by which to influence the executive branch in such matters, Congress mandated that each incoming Administration must conduct a comprehensive strategic review of the global security environment, articulate a relevant strategy suited to protecting and promoting U.S. security interests, and recommend an associated military force posture.<sup>4</sup>

The Quadrennial Defense Reviews (QDRs) have been conducted since 1997, accompanied in 1997, 2010, and 2014 by independent National Defense Panel (NDP) reports that have reviewed and commented on them. Both sets of documents purport to serve as key assessments, but analysts have come to minimize their value, regarding them as justifications for executive branch policy preferences (the QDR reports) or overly broad generalized commentaries (the NDP reports) that lack substantive discussion about threats to U.S. interests, a credible strategy for dealing with them, and the actual ability of the U.S. military to meet national security requirements.

The QDR was replaced by the National Defense Strategy (NDS), released in 2018, and the independent perspectives of the formal DOD review by the National Defense Strategy Commission, which released its view of the NDS in November 2018. Departing from their predecessors, neither document proposed specific force structures or end strength goals for the services.<sup>5</sup>

### **Correlation of Forces as a Factor in Force Sizing**

During the Cold War, the U.S. used the Soviet threat as its primary reference in determining its hard-power needs. At that time, the correlation of forces—a comparison of one force against another to determine strengths and weaknesses—was highly symmetrical. U.S. planners compared tanks, aircraft, and ships against their direct counterparts in the opposing force. These comparative assessments drove the sizing, characteristics, and capabilities of fleets, armies, and air forces.

The evolution of guided, precision munitions and the rapid technological advancements in surveillance and targeting systems, however, made comparing combat power more difficult. What was largely a platform v. platform model has shifted somewhat to a munitions v. target model.

The proliferation of precise weaponry means increasingly that each round, bomb, rocket, missile, and even (in some instances) individual bullet can hit its intended target, thus decreasing the number of munitions needed to prosecute an operation. It also means that the lethality of an operating environment increases significantly for the people and platforms involved. We are now at the point where, instead of focusing primarily on how many ships or airplanes the enemy can bring to bear against one’s own force, one must consider how many “smart munitions” the enemy has when thinking about how many platforms and people are needed to win a combat engagement.<sup>6</sup>

In one sense, increased precision and the technological advances now being

incorporated into U.S. weapons, platforms, and operating concepts make it possible to do far more than ever before with fewer assets.

- Platform signature reduction (stealth) makes it harder for the enemy to find and target them, and the increased precision of weapons makes it possible for fewer platforms to hit many more targets.
- The ability of the U.S. Joint Force to harness computers, modern telecommunications, space-based platforms—such as for surveillance, communications, and positioning-navigation-timing (PNT) support from GPS satellites—and networked operations potentially means that in certain situations, smaller forces can have far greater effect in battle than at any other time in history (although these same advances also enable enemy forces).
- Certain military functions—such as seizing, holding, and occupying territory—may require a certain number of soldiers no matter how state-of-the-art their equipment may be. For example, securing an urban area where line of sight is constrained and precision weapons have limited utility requires the same number of squads of infantry as were needed in World War II.

With smaller forces, each individual element of the force represents a greater percentage of its combat power. Each casualty or equipment loss therefore takes a larger toll on the ability of the force to sustain high-tempo, high-intensity combat operations over time, especially if the force is dispersed across a wide theater or across multiple theaters of operation.

As advanced technology has become more affordable, it has become more accessible for nearly any actor, whether state or non-state. Consequently, it may well be that the outcomes of future wars will depend far more on the skill of the forces and their capacity to sustain

operations over time than they will on some great disparity in technology. If so, readiness and capacity will take on greater importance than absolute advances in capability.

All of this illustrates the difficulties of and need for exercising judgment in assessing the adequacy of America’s military power. Yet without such an assessment, all that remains are the defense strategy reviews, which are subject to filtering and manipulation to suit policy interests; annual budget submissions, which typically favor desired military programs at presumed levels of affordability and are therefore necessarily budget-constrained; and leadership posture statements, which often simply align with executive branch policy priorities.

### **The U.S. Joint Force and the Art of War**

This section of the *Index* assesses the adequacy of the United States’ defense posture as it pertains to a conventional understanding of “hard power,” defined as the ability of American military forces to engage and defeat an enemy’s forces in battle at a scale commensurate with the vital national interests of the U.S. While some hard truths in military affairs are appropriately addressed by math and science, others are not. Speed, range, probability of detection, and radar cross-section are examples of quantifiable characteristics that can be measured. Specific future instances in which U.S. military power will be needed, the competence of the enemy, the political will to sustain operations in the face of mounting deaths and destruction, and the absolute amount of strength needed to win are matters of judgment and experience, but they nevertheless affect how large and capable a force one might need.

In conducting the assessment, we accounted for both quantitative and qualitative aspects of military forces, informed by an experience-based understanding of military operations and the expertise of external reviewers. The authors of these military sections bring a combined total of more than a hundred years of uniformed military experience to their analysis.

Military effectiveness is as much an art as it is a science. Specific military capabilities represented in weapons, platforms, and military units can be used individually to some effect. Practitioners of war, however, have learned that combining the tools of war in various ways and orchestrating their tactical employment in series or simultaneously can dramatically amplify the effectiveness of the force that is committed to battle.

Employment concepts are exceedingly hard to measure in any quantitative way, but their value as critical contributors in the conduct of war is undeniable. How they are used is very much an art-of-war matter that is learned through experience over time.

### What Is Not Being Assessed

In assessing the current status of the military forces, this *Index* uses the primary measures used by the military services themselves when they discuss their ability to employ hard combat power.

- The Army's unit of measure is the brigade combat team (BCT);
- The Marine Corps structures itself by battalions;
- For the Navy, it is the number of ships in its combat fleet; and
- The most consistent measure for the Air Force is total number of aircraft, sometimes broken down into the two primary subtypes of fighters and bombers.

Obviously, this is not the totality of service capabilities, and it certainly is not everything needed for war, but these measures can be viewed as surrogates that subsume or represent the vast number of other things that make these "units of measure" possible and effective in battle. For example, combat forces depend on a vast logistics system that supplies everything from food and water to fuel, ammunition, and repair parts. Military operations require

engineer support, and the force needs medical, dental, and administrative capabilities. The military also fields units that transport combat power and its sustainment wherever they may be needed around the world.

The point is that the military spear has a great deal of shaft that makes it possible for the tip to locate, close with, and destroy its target, and there is a rough proportionality between shaft and spear tip. Thus, in assessing the basic units of measure for combat power, one can get a sense of what is probably needed in the combat support, combat service support, and supporting establishment echelons.

The scope of this *Index* does not extend to analysis of everything that makes hard power possible; it focuses on the status of the hard power itself. It also does not assess the services' Reserve and National Guard components, although they account for roughly one-third of the U.S. military force<sup>7</sup> and have been essential to the conduct of operations since September 2001. Consistent assessment of their capability, readiness, and operational role is a challenge because each service determines the balance among its Active, Reserve, and National Guard elements differently (only the Army and Air Force have Guard elements; the Navy and Marine Corps do not). This balance can change from year to year and is based on factors that include cost of the respective elements, availability for operational employment, time needed to respond to an emergent crisis, allocation of roles among the elements, and political considerations.<sup>8</sup>

As with other elements essential to the effective employment of combat power—logistics, medical support, strategic lift, training, etc.—the U.S. military could not handle a major conflict without the Reserve and Guard forces. Nevertheless, to make the challenge of annually assessing the status of U.S. military strength using consistent metrics over time more manageable, this *Index* looks at something that is usually associated with the Active component of each service: the baseline requirement for a given amount of combat power that is readily available for use in a major combat operation.

There are exceptions, however. For example, in this edition of the *Index*, four Army National Guard BCTs are counted as “available” for use because of the significant amounts of additional resources that have been dedicated specifically to these formations to raise their readiness levels.

## The Defense Budget and Strategic Guidance

When it comes to the defense budget, how much we spend does not automatically determine the posture or capacity of the U.S. military. As a matter of fact, simply looking at how much is allocated to defense does not tell us much about the capacity, modernity, or readiness of the forces. Proper funding is a necessary condition for a capable, modern, and ready force, but it is not sufficient by itself. It is possible that a larger defense budget could be associated with less military capability if the money were allocated inappropriately or spent wastefully. That said, however, the budget does reflect the importance assigned to defending the nation and its interests in prioritizing federal spending.

Absent a significant threat to the country’s survival, the U.S. government will always balance spending on defense against spending in all of the other areas of government activity that are deemed necessary or desirable. Ideally, defense requirements are determined by identifying national interests that might need to be protected with military power; assessing the nature of threats to those interests, what would be needed to defeat those threats, and the costs associated with that capability; and then determining what the country can afford or is willing to spend. *Any difference between assessed requirements and affordable levels of spending on defense would constitute a risk to U.S. security interests.*

This *Index* enthusiastically adopts this approach: interests, threats, requirements, resulting force, and associated budget. Spending less than the amount needed to maintain a two-MRC force results in policy debates about where to accept risk: force modernization, the

capacity to conduct large-scale or multiple simultaneous operations, or force readiness.

The National Defense Strategy released in late January 2018 by the Department of Defense is the DOD’s current effort to establish the connection among interests, threats, requirements, and resources.<sup>9</sup> It serves to orient how the DOD intends to prepare the country’s defense and establishes a public baseline of mission and associated requirements against which the country can measure its defense efforts. When discussing resources, the strategy calls for an increased, sustained, and predictable budget as the necessary precondition for its execution—something that has proved elusive in the current budgetary climate of two-year deals designed to circumvent the Budget Control Act of 2011 (BCA).<sup>10</sup>

The decision to fund national defense commensurate with interests and prevailing threats reflects our national priorities and risk tolerance. This *Index* assesses the ability of the nation’s military forces to protect vital national security interests within the world *as it is* so that the debate about the level of funding for hard power is better informed.

The fiscal year (FY) 2019 base discretionary budget for the Department of Defense was \$616 billion.<sup>11</sup> This represents the resources allocated to pay for the forces (manpower, equipment, training); enabling capabilities (things like transportation, satellites, defense intelligence, and research and development); and institutional support (bases and stations, facilities, recruiting, and the like). The base budget does not pay for the cost of major ongoing overseas operations, which is captured in supplemental funding known as OCO (overseas contingency operations).

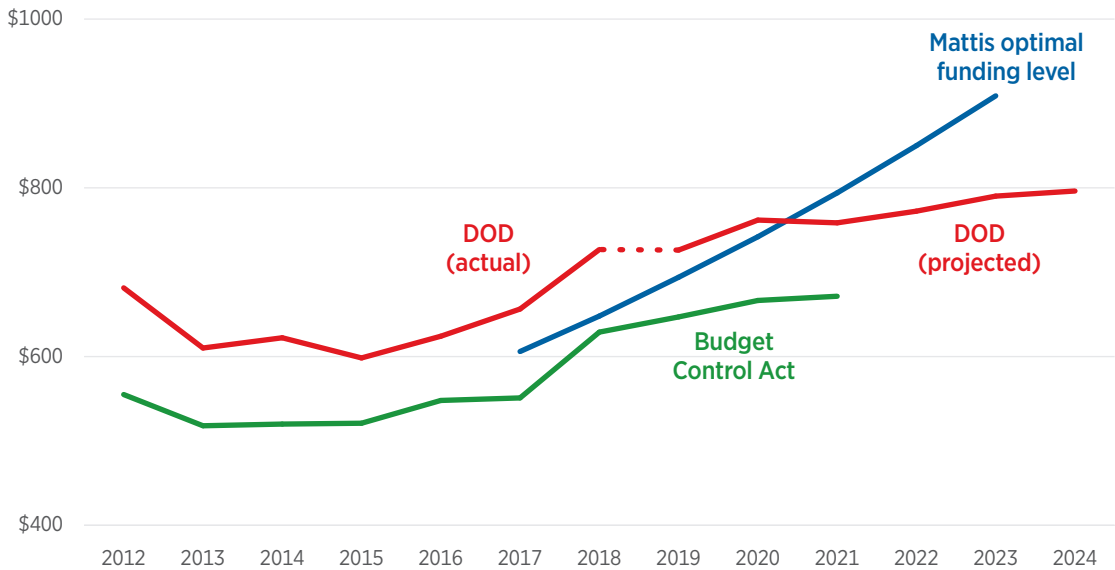
The debate about how much funding should be allocated to defense has been framed by the current Administration’s campaign promise to rebuild the military, an objective that is generally supported by Congress. Despite repeated emphasis on the importance of investing more to fix obvious readiness, capacity, and modernization problems, the debate has been determined by larger political dynamics that



## Defense Spending Improves but Falls Short of Optimal Levels

Despite expected increases, defense spending is projected to fall short of former Defense Secretary Gen. Mattis's optimal funding levels.

IN BILLIONS OF DOLLARS



**NOTES:** DOD spending includes mandatory spending (about \$9 billion per year) and OCO spending, which is exempt from the BCA.  
**SOURCES:**

- Department of Defense: Office of Management and Budget, *Historical Tables*, “Table 5.1—Budget Authority by Function and Subfunction: 1976–2024,” <https://www.whitehouse.gov/omb/historical-tables/> (accessed June 20, 2019).
- Budget Control Act: Brendan W. McGarry, “The Defense Budget and the Budget Control Act: Frequently Asked Questions,” Congressional Research Service *Report R44039*, July 13, 2018, <https://fas.org/sgp/crs/natsec/R44039.pdf> (accessed June 20, 2019), and Congress.gov, “H.R. 3877-Bipartisan Budget Act of 2019,” August 2, 2019, <https://www.congress.gov/bill/116th-congress/house-bill/3877> (accessed September 12, 2019).
- Mattis optimal funding levels: Frederico Bartels, “Current Planned Defense Budget Falls Short,” Heritage Foundation *Backgrounder* 3352, September 21, 2018, <https://www.heritage.org/defense/report/current-planned-defense-budget-falls-short>.

 heritage.org

pitted those who want to see an overall reduction in federal spending against those who advocate higher levels of defense spending and those who want to see any increase in defense spending matched by commensurate increases in domestic spending.

Passage of the Bipartisan Budget Act of 2018 (BBA)<sup>12</sup> in early February 2018 raised the BCA caps for FY 2018 and FY 2019. The legislation raised the cap by \$71 billion to \$629 billion in

FY 2018 and by \$69 billion to \$647 billion in FY 2019. This provided substantial budgetary relief for the DOD and, given its two-year coverage, a modicum of stability. This stability was translated into on-time passage of the National Defense Authorization Act and the Defense Appropriations bill, a first since 2008.<sup>13</sup> Passage of a budget before the end of the fiscal year allowed the Pentagon to execute the budget properly and use all the months of the

fiscal year, in contrast with previous years that have been marked by continuing resolutions.<sup>14</sup>

The Department of Defense attributes many of the recent gains in readiness to the stability and predictability provided by the BBA:

The Bipartisan Budget Act of 2018 enabled the Department of Defense (DoD) to continue rebuilding the U.S. military after years of destructive budget cuts. In a time of competing priorities, Congress demonstrated political courage to ensure [that] America's sentinels remain the combat-credible military force we need to deter war and guarantee [that] the President and our diplomats always negotiate from a position of strength.<sup>15</sup>

Following the Bipartisan Budget Act of 2018, Congress and the President come to an agreement on altering the last two years of the BCA caps, and the Bipartisan Budget Act of 2019 became law on August 2, 2019.<sup>16</sup> The act raises the cap for FY 2020 from \$576 billion to \$666.5 billion and for FY 2021 from \$590 billion to \$671.5 billion. The law could yield a more predictable defense budget in the next two years, because the lawmakers will be able to begin their debates based on a defense budget level that is more acceptable to both sides of the aisle.

However, the growth in the defense budget as outlined by the Bipartisan Budget Act of 2019 falls short of what is assessed as needed.

In testimony before the House Armed Services Committee, for example, former Secretary of Defense James Mattis and Chairman of the Joint Chiefs of Staff General Joseph Dunford emphasized the need for sustained budget growth so that U.S. forces can maintain a competitive advantage over likely adversaries.<sup>17</sup> "We know now," General Dunford testified, "that continued growth in the base budget of at least 3 percent *above inflation* is the floor necessary to preserve just the competitive advantage we have today, and we can't assume our adversaries will remain still."<sup>18</sup> Further, the bipartisan commission that assessed the

National Defense Strategy also assessed the need to have budgetary growth of between 3 percent and 5 percent above inflation.<sup>19</sup> The BCA limits the increases to little over inflation, and the current budget request projects increases that are slightly below the inflationary rate.

### **Purpose as a Driver in Force Sizing**

The Joint Force is used for a wide range of purposes, only one of which is major combat operations. Fortunately, such events have been rare (but consistent), averaging roughly 15 years between occurrences.<sup>20</sup> In between (and even during) such occurrences, the military is used to support regional engagement, crisis response, strategic deterrence, and humanitarian assistance, as well as to support civil authorities and U.S. diplomacy.

All of the U.S. Unified Geographic Combatant Commands, or COCOMS—Northern Command (NORTHCOM); European Command (EUCOM); Central Command (CENTCOM); Indo-Pacific Command (INDOPACOM); Southern Command (SOUTHCOM); and Africa Command (AFRICOM)—have annual and long-term plans through which they engage with countries in their assigned regions. These engagements range from very small unit training events with the forces of a single partner country to larger bilateral and sometimes multilateral military exercises. Such events help to foster working relationships with other countries, acquire a more detailed understanding of regional political–military dynamics and on-the-ground conditions in areas of interest, and signal U.S. security interests to friends and competitors.

To support such COCOM efforts, the services provide forces that are based permanently in respective regions or that operate in them temporarily on a rotational basis. To make these regional rotations possible, the services must maintain base forces that are large enough to train, deploy, support, receive back, and again make ready a stream of units that ideally is enough to meet validated COCOM demand.

The ratio between time spent at home and time spent away on deployment for any given unit is known as OPTEMPO (operational tempo), and each service attempts to maintain a ratio that both gives units enough time to educate, train, and prepare their forces and allows the individuals in a unit to maintain some semblance of healthy home and family lives. This ensures that units are fully prepared for the next deployment cycle and that service-members do not become “burned out” or suffer adverse consequences in their personal lives because of excessive deployment time.

Experience has shown that a ratio of at least 3:1 (three periods of time at home for every period deployed) is sustainable. If a unit is to be out for six months, for example, it will be home for 18 months before deploying again. Obviously, a service needs enough people, units, ships, and planes to support such a ratio. If peacetime engagement were the primary focus for the Joint Force, the services could size their forces to support these forward-based and forward-deployed demands.

Thus, the size of the total force must necessarily be much larger than any sampling of its use at any point in time.

In contrast, sizing a force for major combat operations is an exercise informed by history—how much force was needed in previous wars—and then shaped and refined by analysis of current threats, a range of plausible scenarios, and expectations about what the U.S. can do given training, equipment, employment concept, and other factors. The defense establishment must then balance “force sizing” between COCOM requirements for presence and engagement and the amount of military power (typically measured in terms of combat units and major combat platforms, which inform total end strength) that is thought necessary to win in likely war scenarios.

Inevitably, compromises are made that account for how much military the country is willing to buy. Generally speaking:

- **The Army** sizes to major warfighting requirements;
- **The Marine Corps** focuses on crisis response demands and the ability to contribute to one major war;
- **The Air Force** attempts to strike a balance that accounts for historically based demand across the spectrum because air assets are shifted fairly easily from one theater of operations to another (“easily” being a relative term when compared to the challenge of shifting large land forces), and any peacetime engagement typically requires some level of air support; and
- **The Navy** is driven by global presence requirements. To meet COCOM requirements for a continuous fleet presence at sea, the Navy must have three to four ships in order to have one on station. A commander who wants one U.S. warship stationed off the coast of a hostile country, for example, needs the use of four ships from the fleet: one on station, one that left station and is traveling home, one that just left home and is traveling to station, and one that is otherwise unavailable because of major maintenance or modernization work.

This *Index* focuses on the forces required to win two major wars as the baseline force-sizing metric. The military’s effectiveness, both as a deterrent against opportunistic competitor states and as a valued training partner in the eyes of other countries, derives from its effectiveness (proven or presumed) in winning wars.

## Our Approach

With this in mind, we assessed the state of America’s military U.S. forces as it pertains to their ability to deliver hard power against an enemy in three areas:

- Capability,
- Capacity, and
- Readiness.

**Capability.** Examining the capability of a military force requires consideration of:

- The proper tools (material and conceptual) of sufficient design, performance characteristics, technological advancement, and suitability needed for the force to perform its function against an enemy force successfully;
- The sufficiency of armored vehicles, ships, airplanes, and other equipment and weapons to win against the enemy;
- The appropriate variety of options to preclude strategic vulnerabilities in the force and give flexibilities to battlefield commanders; and
- The degree to which elements of the force reinforce each other in covering potential vulnerabilities, maximizing strengths, and gaining greater effectiveness through synergies that are not possible in narrowly stovepiped, linear approaches to war.

The capability of the U.S. Joint Force was on ample display in its decisive conventional war victory over Iraq, in liberating Kuwait in 1991, and later in the conventional military operation in Iraq to depose Saddam Hussein in 2003. Aspects of its capability have also been seen in numerous other operations undertaken since the end of the Cold War. While the conventional combat aspect of power projection has been more moderate in places like Yugoslavia, Somalia, Bosnia and Serbia, and Kosovo, and even against the Taliban in Afghanistan in 2001, the fact that the U.S. military was able to conduct highly complex operations thousands of miles away in austere, hostile environments and sustain those operations as long as required is testament to the ability of U.S. forces to do things that the armed forces of few if any other countries can do.

A modern “major combat operation”<sup>21</sup> along the lines of those upon which Pentagon planners base their requirements would

feature a major opponent possessing modern integrated air defenses; naval power (surface and undersea); advanced combat aircraft (to include bombers); a substantial inventory of short-range, medium-range, and long-range missiles; current-generation ground forces (tanks, armored vehicles, artillery, rockets, and anti-armor weaponry); cruise missiles; and (in some cases) nuclear weapons. Such a situation involving an actor capable of threatening vital national interests would present a challenge that is comprehensively different from the challenges that the U.S. Joint Force has faced in past decades.

Throughout 2018 and 2019, the military community reenergized its debate about the extent to which the U.S. military is ready for major conventional warfare, given its focus on counterinsurgency, stability, and advise-and-assist operations since 2004 and Secretary Mattis’s directive to prepare for conflict in an era of great-power competition.<sup>22</sup> The Army in particular has noted the need to reengage in training and exercises that feature larger-scale combined arms maneuver operations, especially to ensure that its higher headquarters elements are up to the task.

This *Index* ascertains the relevance and health of military service capabilities by looking at such factors as average age of equipment, generation of equipment relative to the current state of competitor efforts as reported by the services, and the status of replacement programs that are meant to introduce more updated systems as older equipment reaches the end of its programmed service life. While some of the information is quite quantitative, other factors could be considered judgment calls made by acknowledged experts in the relevant areas of interest or as addressed by senior service officials when providing testimony to Congress or examining specific areas in other official statements.

It must be determined whether the services possess capabilities that are relevant to the modern combat environment.

**Capacity.** The U.S. military must have a sufficient quantity of the right capability or

capabilities. When speaking of platforms such as planes and ships, there is a troubling and fairly consistent trend that characterizes the path from requirement to fielded capability within U.S. military acquisition. Along the way to acquiring the capability, several linked things happen that result in far less of a presumed “critical capability” than supposedly was required.

- The manufacturing sector attempts to satisfy the requirements articulated by the military.
- “Unexpected” technological hurdles arise that take longer and much more money to solve than anyone envisioned.
- Programs are lengthened, and cost overruns are addressed, usually with more money.
- Then the realization sets in that the country either cannot afford or is unwilling to pay the cost of acquiring the total number of platforms originally advocated. The acquisition goal is adjusted downward, if not canceled altogether, and the military finally fields fewer platforms at a higher cost per unit than it originally said it needed to be successful in combat.

As deliberations proceed toward a decision on whether to reduce planned procurement, they rarely focus on and quantify the increase in risk that accompanies the decrease in procurement.

Something similar happens with force structure size: the number of units and total number of personnel the services say they need to meet the objectives established by the Commander in Chief and the Secretary of Defense in their strategic guidance. The Marine Corps has stated that it needs 27 infantry battalions to fully satisfy the validated requirements of the regional Combatant Commanders, yet it currently fields only 24. In 2012, the Army was building toward 48 brigade combat teams, but incremental budget cuts reduced that number

over time to 31—less than two-thirds the number that the Army originally thought was necessary. The Navy has produced various assessments of fleet size since the end of the Cold War, from 313 ships to 355 ships, and in 2019 conducted yet another force structure review.

Older equipment can be updated with new components to keep it relevant, and commanders can employ fewer units more expertly for longer periods of time in an operational theater to accomplish an objective. At some point, however, sheer numbers of updated, modern equipment and trained, fully manned units are going to be needed to win in battle against a credible opponent when the crisis is profound enough to threaten a vital interest.

Capacity (numbers) can be viewed in at least three ways: compared to a stated objective for each category by each service, compared to amounts required to complete various types of operations across a wide range of potential missions as measured against a potential adversary, and as measured against a set benchmark for total national capability. This *Index* employs the two-MRC metric as a benchmark.

The two-MRC benchmark for force sizing is the *minimum* standard for U.S. hard-power capacity because one will never be able to employ 100 percent of the force at the same time. Some percentage of the force will always be unavailable because of long-term maintenance overhaul, especially for Navy ships; unit training cycles; employment in myriad engagement and small-crisis response tasks that continue even during major conflicts; and the need to keep some portion of the force uncommitted to serve as a strategic reserve.

The historical record shows that, on average, the U.S. Army commits 21 BCTs to a major conflict; thus, a two-MRC standard would require 42 BCTs available for actual use. But an Army built to field only 42 BCTs would also be an Army that could find itself entirely committed to war, leaving nothing back as a strategic reserve, to replace combat losses, or to handle other U.S. security interests. Although new technologies and additional capabilities have made current

TABLE 1

## Historical U.S. Force Allocation

Troop figures are in thousands.

	Korean War	Vietnam War	Persian Gulf War	Operation Iraqi Freedom
<b>ARMY</b>				
Total Troop Deployment During Engagement	206.3	219.3	267.0	99.7
Divisions*	6	7	4	1
Reserve Component Divisions Total for Strategic Documents	n/a	n/a	n/a	n/a
Total Army End Strength During Engagement, During Year of Strategy Document Active	1,313.8	1,113.3	738.0	499.0
Total Active End Strength Recommendations	n/a	n/a	n/a	n/a
<b>NAVY</b>				
Total Fleet During Engagement	904	770	529	297
Aircraft Carriers	6	5	6	5
Carrier Air Wings	6	5	6	5
Large Surface Combatants	37	14	30	23
Small Surface Combatants	16	47	16	9
Attack Submarines	4	0	12	12
Amphibious Vessels	34	26	21	7
Combat Logistics and Support Ships	28	29	45	42
Fighter/Attack Squadrons	21	43	22	24
<b>MARINE CORPS</b>				
Total Troop Deployment During Engagement	33.5	44.7	90.0	66.2
Active Divisions*	1	2	2	1
Reserve Divisions	n/a	n/a	n/a	n/a
Marine Expeditionary Force	1	1	1	2
Air Wings Active/Reserve	1	1	1	1
Total Marine Corps End Strength During Engagement by Year of Strategy Document	187.0	289.0	196.3	178.0
Total Recommended End Strength	n/a	n/a	n/a	n/a
<b>AIR FORCE</b>				
Bombers or Bomber Squadrons**	21	23	3	4
Fighter Squadrons	26		30	30
Active Fighter Wings	7	8	10	10
Reserve Fighter Wings				
Airlift/Tankers	239	167	388	293

\* Figures for engagements are numbers deployed; figures for documents are totals.

\*\* Figures for Air Force bombers for Korean War, Vietnam War, Persian Gulf War, and Iraq are bomber squadrons.

All other figures are bombers.

\*\*\* 2014 QDR prescribed nine heavy bomber squadrons, equaling 96 aircraft.

	1993 BUR	1997 QDR	2001 QDR	2006 QDR	2010 QDR	2010 Indep. Panel	2-MRC Paper	2014 QDR	2014 NDP
<b>ARMY</b>									
Total Troop Deployment During Engagement	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Divisions*	10	10	10	11	18	11	10	10	n/a
Reserve Component Divisions Total for Strategic Documents	n/a	5	8	8		7	8	8	n/a
Total Army End Strength During Engagement, During Year of Strategy Document Active	572.0	492.0	481.0	505.0	566.0	566.0	550.0	490.0	490.0
Total Active End Strength Recommendations	n/a	n/a	n/a	482.4	n/a	1,106.0	600.0	450.0	490.0

<b>NAVY</b>									
Total Fleet During Engagement	346	310	n/a	n/a	n/a	346	350	n/a	346
Aircraft Carriers	12	12	12	11	11	11	11	11	n/a
Carrier Air Wings	12	11	11	n/a	10	10	10	10	n/a
Large Surface Combatants	124	116	116	n/a	84-88	n/a	120	92	n/a
Small Surface Combatants				n/a	14-28	n/a	n/a	43	n/a
Attack Submarines	55	50	55	n/a	53-55	55	50	51	n/a
Amphibious Vessels	41	36	36	n/a	29-31	n/a	38	33	n/a
Combat Logistics and Support Ships	65	n/a	n/a	n/a	58	n/a	75	n/a	n/a
Fighter/Attack Squadrons	33	30	30	n/a	30	30	30	30	n/a

<b>MARINE CORPS</b>									
Total Troop Deployment During Engagement	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Active Divisions*	4	3	3	n/a	3	n/a	n/a	3	n/a
Reserve Divisions	1	1	1	n/a	1	n/a	n/a	1	n/a
Marine Expeditionary Force	3	3	3	n/a	3	3	3	2	n/a
Air Wings Active/Reserve	n/a	4	4	n/a	4	n/a	n/a	4	n/a
Total Marine Corps End Strength During Engagement by Year of Strategy Document	174.0	174.0	173.0	180.0	202.0	202.0	196.0	182.0	182.0
Total Recommended End Strength	n/a	n/a	n/a	175.0	n/a	243.0	202.0	182.0	182.0

<b>AIR FORCE</b>									
Bombers or Bomber Squadrons**	200	187	112	n/a	96	180	200	96***	n/a
Fighter Squadrons	54	54	46	n/a	42	66	54	48	n/a
Active Fighter Wings	13	12+	15	n/a	n/a	20	20	9	n/a
Reserve Fighter Wings	7	8	12	n/a	n/a	n/a		7	n/a
Airlift/Tankers	n/a	n/a	n/a	n/a	1023	1023	1,000	954	n/a

BCTs more capable than those they replaced, one thing remains the same: Today's BCT, like its predecessors, can only be committed to one place at a time and must be able to account for combat losses, especially if it engages a similarly modernized enemy force. Thus, numbers still matter regardless of modernity.

Again, this *Index* assesses only the Active component of the service, though with full awareness that the Army also has Reserve and National Guard components that together account for half of the total Army. The additional capacity needed to meet these "above two-MRC requirements" could be handled by these other components or mobilized to supplement Active-component commitments. In fact, this is how the Army thinks about meeting operational demands and is at the heart of the long-running debate within the total Army about the roles and contributions of the various Army components. A similar situation exists with the Air Force and Marine Corps.

The balance among Active, Reserve, and Guard elements is beyond the scope of this study. Our focus here is on establishing a minimum benchmark for the capacity needed to handle a two-MRC requirement.

We conducted a review of the major defense studies (1993 BUR, QDR reports, and independent panel critiques) that are publicly available,<sup>23</sup> as well as modern historical instances of major wars (Korea, Vietnam, Gulf War, Operation Iraqi Freedom), to see whether there was any consistent trend in U.S. force allocation. The results of our review are presented in Table 1. To this we added 20 percent, both to account for forces and platforms that are likely to be unavailable and to provide a strategic reserve to guard against unforeseen demands.

Summarizing the totals, this *Index* concluded that a Joint Force capable of dealing with two MRCs simultaneously or nearly simultaneously would consist of:

- **Army:** 50 BCTs.
- **Navy:** at least 400 ships and 624 strike aircraft.

- **Air Force:** 1,200 fighter/attack aircraft.
- **Marine Corps:** 36 battalions.

America's security interests require that the services have the capacity to handle two major regional conflicts successfully.

**Readiness.** The consequences of the sharp reductions in funding mandated by sequestration have caused military service officials, senior DOD officials, and even Members of Congress to warn of the dangers of recreating the "hollow force" of the 1970s when units existed on paper but were staffed at reduced levels, minimally trained, and woefully ill-equipped.<sup>24</sup> To avoid this, the services have traded quantity/capacity and modernization to ensure that what they do have is "ready" for employment.

Supplemental funding in FY 2017, a higher topline in FY 2018, and sustained increases in funding through FY 2019 have helped to stop the bleeding and have enabled the services to plan and implement readiness recovery efforts. Although the return of further cuts under the BCA (to continue in force by law until 2021 unless modified by Congress) could threaten to undo these gains, readiness reporting has been largely optimistic compared to recent years.

It is one thing to have the right capabilities to defeat the enemy in battle. It is another thing to have enough of those capabilities to sustain operations and many battles against an enemy over time, especially when attrition or dispersed operations are significant factors. But sufficient numbers of the right capabilities are rather meaningless if the force is not ready to engage in the task.

**Scoring.** In our final assessments, we tried very hard not to convey a higher level of precision than we think is achievable using unclassified, open-source, publicly available documents; not to reach conclusions that could be viewed as based solely on assertions or opinion; and not to rely solely on data and information that can be highly quantified. Simple numbers, while important, do not tell the whole story.



## U.S. Military Power: Five-Grade Scale

VERY WEAK

WEAK

MARGINAL

STRONG

VERY STRONG

We believe that the logic underlying our methodology is sound. This *Index* drew from a wealth of public testimony from senior government officials, from the work of recognized experts in the defense and national security analytic community, and from historical instances of conflict that seemed most appropriate to this project. It then considered several questions, including:

- How does one place a value on the combat effectiveness of such concepts as Air-Sea Battle, Multi-Domain Operations, Littoral Operations in a Contested Environment, Distributed Maritime Operations, Network-centric Operations, or Joint Operational Access?
- Is it entirely possible to assess accurately (1) how well a small number of newest-generation ships or aircraft will fare against a much larger number of currently modern counterparts when (2) U.S. forces are operating thousands of miles from home, (3) orchestrated with a particular operational concept, and (4) the enemy is leveraging a “home field advantage” that includes strategic depth and much shorter and perhaps better protected lines of communication and (5) might be pursuing much dearer national objectives than the U.S. so that the political will to conduct sustained operations in the face of mounting losses might differ dramatically?

- How does one neatly quantify the element of combat experience, the erosion of experience as combat operation events recede in time and those who participated in them leave the force, the health of a supporting workforce, the value of “presence and engagement operations,” and the related force structures and patterns of deployment and employment that presumably deter war or mitigate its effects if it does occur?

This *Index* focused on the primary purpose of military power—to defeat an enemy in combat—and the historical record of major U.S. engagements for evidence of what the U.S. defense establishment has thought was necessary to execute a major conventional war successfully. To this we added the two-MRC benchmark; on-the-record assessments of what the services themselves are saying about their status relative to validated requirements; and the analysis and opinions of various experts, both in and out of government, who have covered these issues for many years.

Taking it all together, we rejected scales that would imply extraordinary precision and settled on a scale that conveys broader characterizations of status that range from very weak to very strong. Ultimately, any such assessment is a judgment call informed by quantifiable data, qualitative assessments, thoughtful deliberation, and experience. We trust that our approach makes sense, is defensible, and is repeatable.

## Endnotes

1. Les Aspin, Secretary of Defense, *Report on the Bottom-Up Review*, U.S. Department of Defense, October 1993, p. iii, [http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=OCCUQFjAB-ahUKEwjj4dWf6N3HAhVEmh4KHdG1Cdg&url=ht tp%3A%2F%2Fwww.dtic.mil%2Fcgi-bin%2FGetTRDoc%3FAD%3DADA359953&usq=AFQjCNFvz730XRz7YRxp5BNr5\\_UdfMiQ](http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=OCCUQFjAB-ahUKEwjj4dWf6N3HAhVEmh4KHdG1Cdg&url=ht tp%3A%2F%2Fwww.dtic.mil%2Fcgi-bin%2FGetTRDoc%3FAD%3DADA359953&usq=AFQjCNFvz730XRz7YRxp5BNr5_UdfMiQ) (accessed May 17, 2019).
2. *Ibid.*, p. 8.
3. Daniel Gouré, “Building the Right Military for a New Era: The Need for an Enduring Analytic Framework,” in *2015 Index of U.S. Military Strength*, ed. Dakota L. Wood (Washington: The Heritage Foundation, 2015), pp. 27–36, <http://index.heritage.org/militarystrength/important-essays-analysis/building-right-military-new-era/>.
4. John Y. Schrader, Leslie Lewis, and Roger Allen Brown, *Quadrennial Defense Review 2001: Lessons on Managing Change in the Department of Defense* (Santa Monica, CA: RAND Corporation, National Defense Research Institute, 2003), [http://www.rand.org/content/dam/rand/pubs/documented\\_briefings/2005/DB379.pdf](http://www.rand.org/content/dam/rand/pubs/documented_briefings/2005/DB379.pdf) (accessed May 17, 2019).
5. Commission on the National Defense Strategy, *Providing for the Common Defense: The Assessment and Recommendations of the National Defense Strategy Commission*, <https://www.usip.org/sites/default/files/2018-11/providing-for-the-common-defense.pdf> (accessed May 17, 2019), and press release, “National Defense Strategy Commission Releases Its Review of 2018 National Defense Strategy,” United States Institute of Peace, November 13, 2018, <https://www.usip.org/press/2018/11/national-defense-strategy-commission-releases-its-review-2018-national-defense> (accessed May 17, 2019).
6. The United States has not had to contend in combat with any credible air force since the Vietnam War, but U.S. Air Force planners are increasingly concerned about an enemy’s ground-based, anti-air missile capability. For naval planners, ship-based, air-based, and shore-based anti-ship cruise missiles are of much greater concern than is the number of conventional surface combatants armed with large-caliber guns that an enemy navy has. Likewise, ground force planners have to consider the numbers and types of guided anti-armor weapons that an enemy possesses and whether an opposing force has guided artillery, mortar, or rocket capabilities. Guided/precision weapons are typically less expensive (by orders of magnitude) than the platforms they target, which means that countries can produce far more guided munitions than primary weapons platforms. Some examples: Harpoon ASCM (\$2 million)/DDG-51 *Arleigh Burke*-Class destroyer (\$2 billion); AT4 anti-armor weapon (\$1,500)/M1A1 Abrams main battle tank (\$9 million); 120mm guided mortar round (\$10,000) or 155mm guided artillery round (\$100,000)/M198 155mm howitzer (\$500,000); S-300 anti-air missile (\$1 million)/F/A-18 Hornet (\$60 million) or F-35A Lightning II (\$180 million).
7. For a detailed discussion of this force, see Richard J. Dunn III, “America’s Reserve and National Guard Components: Key Contributors to U.S. Military Strength,” in *2016 Index of U.S. Military Strength*, ed. Dakota L. Wood (Washington: The Heritage Foundation, 2015), pp. 61–73, [https://s3.amazonaws.com/ims-2016/PDF/2016\\_Index\\_of\\_US\\_Military\\_Strength\\_FULL.pdf](https://s3.amazonaws.com/ims-2016/PDF/2016_Index_of_US_Military_Strength_FULL.pdf). For the percentage of U.S. military capability that resides in the Guard/Reserve, see *ibid.*, p. 63.
8. One example of balancing the forces was the Army’s Aviation Restructuring Initiative, in which the active-duty force sought to redistribute certain rotorcraft platforms among the active-duty Army and the National Guard. The Guard has contended that this plan would reduce the capabilities it has gained during recent combat engagements, such as its pilots’ proficiency in flying Apache helicopters. For more on this issue, see U.S. Government Accountability Office, *Force Structure: Army’s Analyses of Aviation Alternatives*, GAO-15-430R, updated April 27, 2015, <http://www.gao.gov/assets/670/669857.pdf> (accessed May 17, 2019).
9. James Mattis, U.S. Secretary of Defense, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military’s Competitive Edge*, U.S. Department of Defense, <https://www.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf> (accessed May 17, 2019).
10. Budget Control Act of 2011, Public Law 112-25, 112th Cong., August 2, 2011, <https://www.congress.gov/112/plaws/publ25/PLAW-112publ25.pdf> (accessed April 30, 2019).
11. Table A-7, “DoD Base Budget by Appropriation Title,” and Table A-8, “DoD Base Budget by Military Department,” in U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, *United States Department of Defense Fiscal Year 2020 Budget Request: Defense Budget Overview*, March 2019, pp. A-4 and A-5, [https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/fy2020\\_Budget\\_Request\\_Overview\\_Book.pdf](https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/fy2020_Budget_Request_Overview_Book.pdf) (accessed May 19, 2019).
12. Bipartisan Budget Act of 2018, Public Law 115-123, 115th Cong., February 9, 2018, <https://www.congress.gov/bill/115th-congress/house-bill/1892/text/eas2?q=%7B%22search%22%3A%5B%22bipartisan+budget+act+of+2018%22%5D%7D&r=1> (accessed May 20, 2019).
13. Joe Gould, “Pentagon Set to Win First On-Time Budget Since 2008,” *Defense News*, September 13, 2018, <https://www.defensenews.com/congress/2018/09/13/pentagon-set-to-win-first-on-time-budget-since-2008/> (accessed April 30, 2019).
14. Frederico Bartels, “Continuing Resolutions Invariably Harm National Defense,” Heritage Foundation *Issue Brief* No. 4819, February 21, 2018, <https://www.heritage.org/defense/report/continuing-resolutions-invariably-harm-national-defense>.

15. James N. Mattis, Secretary of Defense, introduction to U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, *Providing for the Common Defense: A Promise Kept to the American Taxpayer*, September 2018, n.p., <https://media.defense.gov/2018/Oct/03/2002047941/-1/-1/PROVIDING-FOR-THE-COMMON-DEFENSE-SEPT-2018.pdf> (accessed May 19, 2019).
16. Bipartisan Budget Act of 2019, Public Law No 116-37, 116th Cong., August 2, 2019, <https://www.congress.gov/bill/116th-congress/house-bill/3877/text> (accessed September 11, 2019).
17. James Mattis, U.S. Secretary of Defense, statement on President's budget request for FY 2018 before the Committee on Armed Services, U.S. House of Representatives, June 12, 2017, <https://docs.house.gov/meetings/AS/AS00/20170612/106090/HHRG-115-AS00-Bio-MattisJ-20170612.pdf> (accessed May 19, 2019).
18. Aaron Mehta, "DoD Needs 3-5 Percent Annual Growth 2023, Top Officials Say," *Defense News*, June 13, 2017, <http://www.defensenews.com/pentagon/2017/06/13/dod-needs-3-5-percent-annual-growth-through-2023-top-officials-say/> (accessed May 17, 2019). Emphasis added.
19. Commission on the National Defense Strategy, *Providing for the Common Defense: The Assessment and Recommendations of the National Defense Strategy Commission*, p. 22.
20. Since World War II, the U.S. has fought four major wars: the Korean War (1950-1953); the Vietnam War (1965-1973); the Gulf War/Operation Desert Shield/Desert Storm (1990-1991); and the Iraq War/Operation Iraqi Freedom (2003-2011).
21. Defense references to war have varied over the past few decades from "major combat operation" (MCO) and "major theater war" (MTW) to the current "major regional contingency" (MRC). Arguably, there is a supporting rationale for such shifts as planners attempt to find the best words to describe the scope and scale of significant military efforts, but the terms are basically interchangeable.
22. Mattis, *Summary of the 2018 National Defense Strategy of the United States of America*, p. 4.
23. The Department of Defense, through the Joint Staff and Geographic Combatant Commanders, manages a relatively small set of real-world operational plans (OPLANS) focused on specific situations where the U.S. feels it is most likely to go to war. These plans are reviewed and updated regularly to account for changes in the Joint Force or with the presumed enemy. They are highly detailed and account not only for the amount of force the U.S. expects that it will need to defeat the enemy, but also for which specific units would deploy; how the force would actually flow into the theater (the sequencing of units); what ports and airfields it would use; how much ammunition, fuel, and other supplies it would need at the start; how much transportation or "lift" would be needed to get the force there (by air, sea, trucks, or rail); and the basic plan of attack. The Pentagon also routinely develops, explores, and refines various notional planning scenarios in order to better understand the implications of different sorts of contingencies, which approaches might be more effective, how much of what type of force might be needed, and the regional issue or issues for which there would have to be an accounting. These types of planning events inform service efforts to develop, equip, train, and field military forces that are up to the task of defending national security interests. All of these efforts and their products are classified national security information and therefore not available to the public.
24. For more on the potential for a hollow force, see Association of the United States Army, "Preventing a Hollow Force Is Army's Top Priority," May 25, 2017, <https://www.ousa.org/news/preventing-hollow-force-army%E2%80%99s-top-priority> (accessed May 19, 2019), and J. V. Venable, "America's Air Force Is in Bad Shape," *National Review*, June 13, 2017, <http://www.nationalreview.com/article/448556/us-air-force-weakened-funding-cuts-shrinking-workforce-aging-fleet-hurt-preparedness> (accessed May 19, 2019).



# U.S. Army

The U.S. Army is America's primary land warfare component. Although it addresses all types of operations across the range of ground force employment, its chief value to the nation is its ability to defeat and destroy enemy land forces in battle.

The Army, more than any other service, has been affected by years of counterinsurgency (COIN) operations in Iraq and Afghanistan. "For the past 17 years," according to former Secretary of the Army Mark Esper, "the Army bore the brunt of the wars in Iraq and Afghanistan. For over a decade, we postponed modernization to procure equipment tailored to counter insurgency operations." Former Army Chief of Staff General Mark Milley has warned similarly that "[i]n the last 17 years, our strategic competitors have eroded our military advantages."<sup>1</sup>

- Modernization programs, such as air defense systems, that were not viewed as complementary to COIN operations were terminated;
- In addition to modernization, Army organizational structure, doctrine, and training were significantly modified to enable increased success in COIN operations;
- Brigade and division capabilities were reduced and realigned to facilitate COIN warfare;
- Combat Training Center rotations focused almost exclusively on COIN scenarios; and

- Leaders and soldiers often went for years without practicing their combat core tasks such as counterbattery fire or tank table gunnery.

When the Army sets its mind to doing something, it generally does it completely and without reservation. Such was the Army's adaptation to COIN operations.

Today, the Army is shifting in accordance with national direction to focus on great-power competition. Characteristically, it is "all in." Combat Training Center scenarios now focus nearly exclusively on high-end decisive action, new matériel programs like longer-range artillery with utility in near-peer competitor situations are being initiated, and organizational structures are being reexamined. Warfighting concepts and doctrine are also shifting to this new construct.

All of this is appropriate, but unlike its approach in the aftermath of the Vietnam War, when the 1976 version of its primary doctrinal manual contained absolutely no mention of COIN operations, the Army thus far has seen fit to preserve some capabilities like Security Force Assistance Brigades, counter-drone equipment, and robust Special Operations capabilities. As it moves into the future, the Army must both guard against allowing the pendulum to swing too far in the new direction of great-power competition and maintain critical capabilities for COIN and stability operations, including their supporting intellectual underpinnings.

Despite the clarity of guidance that was achieved in the 2018 National Defense Strategy (NDS), as well as welcome increases in the

defense budget obtained from fiscal year (FY) 2017 to FY 2019, the need to make up for years of underfunding and different priorities has put the Army behind in the key areas of size and modernization. There is, however, room for cautious optimism. General Milley has testified that with Congress's recent help, "we began to restore our competitive advantage" and that "our recent budgets have helped improve readiness and laid the ground work [*sic*] for future modernization."<sup>2</sup>

The Army is rebounding from direction to cut its strength that was promulgated in the latter half of the Obama Administration. In FY 2019, the Army's authorized Regular Army end strength was 478,000,<sup>3</sup> down from 566,000 as recently as FY 2011.<sup>4</sup> The Obama Administration had planned to cut Regular Army end strength still further to 450,000 by 2018 and as low as 420,000 in future years,<sup>5</sup> but the election of President Donald Trump forestalled those cuts.

According to then-Army Vice Chief of Staff General James C. McConville, if BCA-mandated budget caps returned in FY 2020, "[a]ll the readiness gains we made would be lost. We would not be able to modernize the Army. We'd have to reduce the end strength and we would hurt the quality of life for all our soldiers."<sup>6</sup>

Operationally, the Army "provid[es] Combatant Commanders over 179,000 Soldiers in more than 140 countries, including 110,000 Soldiers deployed on a rotational basis."<sup>7</sup>

## Capacity

The Army refers to its warfighting capacity in terms of brigade combat teams. BCTs are the basic building blocks for employment of Army combat forces. They are usually employed within a larger framework of U.S. land operations but are equipped and organized so that they can conduct independent operations as circumstances demand.<sup>8</sup> A BCT averages 4,500 soldiers depending on its variant: Stryker, Armored, or Infantry. A Stryker BCT is a mechanized infantry force organized around the Stryker combat vehicle. Armored BCTs are the Army's primary armored units and employ

the M1 Abrams Main Battle Tank and the M2 Bradley Fighting Vehicle. An Infantry BCT is a highly maneuverable dismounted unit. Variants of the Infantry BCT are the Airmobile BCT, optimized for helicopter assault, and the Airborne BCT, optimized for parachute forcible entry operations.

While end strength is a valuable metric in understanding Army capacity, the number of BCTs is a more telling measure of actual hard power. The reductions in Army end strength since 2011 have had a disproportionate effect on BCTs. The Regular Army decreased its 45 BCTs (552,100 soldiers) in FY 2013 to 31 BCTs (480,000 soldiers) in FY 2020.<sup>9</sup> Put another way, a 14 percent reduction in end strength led to a 31 percent reduction in BCTs.

When Congress reversed the drawdown in end strength and authorized growth starting in 2017, instead of "re-growing" BCTs, the Army chose primarily to "thicken" the force and raise the manning levels within the individual BCTs to increase unit readiness. The Army's goal is to fill operational units to 105 percent of their authorized manning by the end of 2020, and it is on track to meet this goal.<sup>10</sup>

The FY 2015 National Defense Authorization Act (NDAA) established a National Commission on the Future of the Army to conduct a comprehensive study of Army structure.<sup>11</sup> To meet the threat posed by a resurgent Russia and others, the commission recommended that the Army increase its numbers of Armored BCTs.<sup>12</sup> The Army converted two BCTs to Armored BCTs in 2018 and 2019, bringing the number of Armored BCTs to 16 and helping to "ensur[e] a more balanced distribution between its light and heavy fighting forces."<sup>13</sup>

The Army also has a separate air component organized into combat aviation brigades (CABs), which can operate independently.<sup>14</sup> CABs are made up of Army rotorcraft, such as the AH-64 Apache, and perform various roles including attack, reconnaissance, and lift. The number of Army aviation units also experienced a drawdown. In May 2015, the Army deactivated one of its 12 CABs, leaving only 11 in the Regular Army.

CABs and Stryker, Infantry, and Armored BCTs make up the Army's main combat forces, but not the entirety of the Army. About 90,000 troops form the Institutional Army and provide such forms of support as preparing and training troops for deployments, carrying out key logistics tasks, and overseeing military schools and Army educational institutions. The troops constituting the Institutional Army cannot be reduced at the same ratio as BCTs or CABs, and the Army endeavors to insulate these soldiers from drawdown and restructuring proposals in order to "retain a slightly more senior force in the Active Army to allow growth if needed."<sup>15</sup> In addition to the Institutional Army, a great number of functional or multifunctional support brigades, amounting to approximately 13 percent of the active component force based on historical averages,<sup>16</sup> provide air defense; engineering; explosive ordnance disposal (EOD); chemical/biological/radiological and nuclear protection; military police; military intelligence; and medical support among other types of battlefield support for BCTs.

In 2017, in a major initiative shepherded by General Milley, the Army established the first of six planned Security Force Assistance Brigades (SFABs). These units, composed of about 530 personnel each, are designed specifically to train, advise, and mentor other partner-nation military units. The Army had been using regular BCTs for this mission, but because train-and-assist missions typically require senior officers and noncommissioned officers, a BCT comprised predominantly of junior soldiers is a poor fit. The Army envisions that these SFABs will be able to reduce the stress on the service.<sup>17</sup> The Army's second SFAB was activated in January 2018 at Fort Bragg, North Carolina, and "is now deployed to Afghanistan."<sup>18</sup> Of the six envisioned SFABs, one will be in the National Guard, and the other five will be in the Regular Army.

In 2019, the Army was authorized a total end strength of 1,002,750 soldiers: 478,000 in the Regular Army, 189,250 in the Army Reserve, and 335,500 in the Army National Guard.<sup>19</sup>

Two years ago, in 2017, General Milley testified that in his judgment, the Regular Army should be in the range of 540,000–550,000; the National Guard, 350,000–355,000; and the Army Reserve, 205,000–209,000.<sup>20</sup> Since that time, with the publishing of the 2018 NDS and its emphasis on great-power competition, the missions and challenges that the Army is expected to handle have increased.

Today, the Regular Army is much smaller than General Milley recommended. During the week of March 20, 2019, the Regular Army stood at 476,477 soldiers—63,523 less than the minimum General Milley estimated was necessary even before the NDS directed a return to great-power competition.<sup>21</sup> Since 2017, General Milley and other senior Army leaders have been more circumspect in their assessments. Secretary Esper, for example, stated in April 2019 that "I can't tell you what the Army end strength will be. I know it has to be above 500,000."<sup>22</sup> This modification in messaging suggests either that the Army enjoys less freedom to discuss its necessary size openly or that fiscal realities preclude discussions of numbers higher than 500,000 for the Regular Army.

Most experts agree that the Army is too small. In the FY 2017 NDAA, Congress established the National Defense Strategy Commission to provide an "independent, non-partisan review of the 2018 NDS."<sup>23</sup> Among its findings, the Commission noted that:

[T]he United States now faces five credible challengers, including two major-power competitors, and three distinctly different geographic and operational environments. This being the case, a two-war force sizing construct makes more strategic sense today than at any previous point in the post-Cold War era. Instead, the NDS adopts what is functionally a one-war force sizing construct and recommends only modest increases in force capacity, an approach that is likely to create severe strategic and operational vulnerabilities for the

United States. Even if new technologies such as hypersonic weapons, AI, cyber, and autonomous systems eventually do change the face of warfare, in the near- and medium-term conventional capacity will still matter greatly in fighting and deterring conflict. Consequently, although further capability and posture enhancements are necessary, they are likely to be insufficient to meet America's strategic challenges.... *Simply put, the United States needs a larger force than it has today if it is to meet the objectives of the strategy.*<sup>24</sup>

Moreover, the Army has moved from a force that during the Cold War typically had a third of its personnel stationed overseas to a Continental United States–based force. In 1985, 31 percent of the Army was stationed abroad; in 2015, that figure had fallen to 9 percent.<sup>25</sup> The desire to find a so-called peace dividend following the dissolution of the Soviet Union, combined with the reluctance to close bases in the United States, led to large-scale base closure overseas.

In addition to the increased strategic risk of not being able to execute the NDS within the desired time frame, the result of an insufficient number of BCTs and a diminished Army end strength has been to maintain a higher than desired level of operational tempo (OPTEMPO). Despite a reduction in large unit deployments, particularly to Iraq and Afghanistan, Army units continue to experience sustained demand. In May 2018, the Army was experiencing “a deployment to dwell time ratio of about 1 to 1.2—even though the goal for years has been to level it off at 1-to-2.”<sup>26</sup>

Included in these deployments are the rotations of Armored BCTs to and from Europe and Korea. Rather than relying on forward-stationed BCTs, the Army now rotates Armored BCTs to Europe and Korea on a “heel-to-toe” basis. There is an ongoing debate about whether the rotational BCT or the forward-stationed BCT represents the best option. Proponents of rotational BCTs argue

that they arrive fully trained and remain at a high state of readiness throughout a typical nine-month overseas rotation; those who favor forward-stationed forces point to a lower cost, forces that typically are more familiar with the operating environment, and a more reassuring presence for our allies.<sup>27</sup>

Additionally, the Army is resourcing select Army National Guard (ARNG) BCTs and other units with additional numbers of training days, moving from the standard number of 39 training days to as many as 63 per year to increase readiness levels. Under a concept called “Army National Guard 4.0,” the National Guard has implemented a multiyear training cycle to build readiness over time. As part of this concept, the Army increased the number of National Guard BCTs participating in a Combat Training Center (CTC) rotation from two to four starting in FY 2019.<sup>28</sup> This continues in the fiscal year 2020 budget.<sup>29</sup>

Because of this change in strategy and the increased investment in the National Guard, the 2020 *Index of U.S. Military Strength* counts four ARNG BCTs in the overall Army BCT capacity count. This reflects both their ability to be employed on a dramatically shortened timeline as a result of their training at a Combat Training Center and the increased number of training days.

## Capability

The Army is using equipment designed primarily in the 1970s, fielded in the 1980s, and incrementally upgraded since then. This modernization gap was caused by several factors: preoccupation with the wars in Iraq and Afghanistan, budget cuts including those associated with the Budget Control Act, and failures of major modernization programs like the Future Combat System. Army leaders clearly see this as a challenge and are now striving to modernize the service. In 2020, however, most of their proposed programs are still aspirational and are sensitive to changes in funding or priorities.

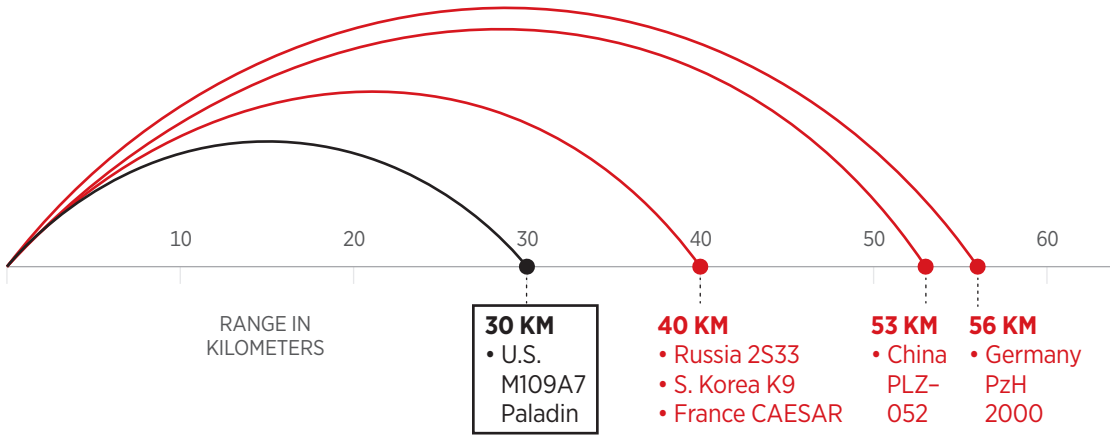
The challenge with self-propelled artillery systems illustrates the issue with Army



FIGURE 2

## U.S. Artillery Falls Short—Literally—Compared to Rivals

The U.S. M109A7 Paladin artillery system, in the U.S. Army’s arsenal since 2015, has a maximum range of only 30 kilometers—10 kilometers less than the range of Russia’s 2S33 system and 23 kilometers short of China’s PLZ-052.



**SOURCES:**

- **U.S.:** U.S. Army Acquisition Support Center, “Paladin Family Of Vehicles (FOV)—M109a6 Paladin/m992a2 Faasv/m109a7 Sph/m992a3 Cat and Extended Range Cannon Artillery (ERCA),” <https://asc.army.mil/web/portfolio-item/m109-family-of-vehicles-paladinfaasv-and-m109a7-sph-m992a3-cat/> (accessed July 1, 2019).
- **Russia:** Kris Osborn, “Introducing the Army’s Secret Weapon to Fight Russia: Super ‘Cannons,’” *National Interest*, June 14, 2018, <https://nationalinterest.org/blog/the-buzz/introducing-the-armys-secret-weapon-fight-russia-super-26255> (accessed July 1, 2019).
- **South Korea:** Christopher F. Foss, “South Korea’s K9 Self-propelled Artillery Production to Roll into 2021,” *Janes*, October 15, 2018, <https://www.janes.com/article/83805/south-korea-s-k9-self-propelled-artillery-production-to-roll-into-2021> (accessed July 1, 2019).
- **France:** Christopher F. Foss, “Denmark Introduces CAESAR 155 mm, Piranha 120 mm Indirect Fire Systems,” *Janes*, April 18, 2019, <https://www.janes.com/article/87988/denmark-introduces-caesar-155-mm-piranha-120-mm-indirect-fire-systems> (accessed July 1, 2019).
- **China:** Military Today, “PLZ-05,” <http://www.military-today.com/artillery/plz05.htm> (accessed July 1, 2019).
- **Germany:** Krauss-Maffei Wegmann, “PZH-2000: Spezifikation,” <https://www.kmweg.com/home/artillery/self-prop-howitzer/pzh-2000/product-spezifikation.html> (accessed July 1, 2019).

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modernization. The M109 series howitzer was introduced in the early 1960s and has been upgraded multiple times since then. An important part of an artillery system is its range, and most modern countries have artillery systems that can outrange the Paladin 109A7, the Army’s current self-propelled howitzer. The Paladin can fire an artillery shell about 22 km–30 km. The Russian 2S33 Msta-SM2 reportedly can hit targets at 40 km.<sup>30</sup> Similarly, the German Army’s PzH 2000, the Chinese PLZ-05,

the South Korean K9, and the French CAESAR systems all outrange the Paladin.<sup>31</sup>

The Army’s main combat platforms are ground vehicles and rotorcraft.

- The Abrams Main Battle Tank (latest version: M1A2 SEPv3, service entry date 2017) and Bradley Fighting Vehicle (latest version: M2A4, service entry date 2012) are found primarily in Armored BCTs.<sup>32</sup> Also in Armored BCTs, the venerable

M113 personnel carrier is scheduled to be replaced by the new Armored Multi-Purpose Vehicle (AMPV), which in 2018 entered its late testing phase.<sup>33</sup>

- Stryker BCTs are equipped with Stryker vehicles. In response to an Operational Needs Statement, the Stryker BCT (SBCT) in Europe received Strykers fitted with a 30 mm cannon to provide an improved anti-armor capability.<sup>34</sup> The Army recently decided to outfit three of its SBCTs, the ones equipped with the “double V hull,” with the 30 mm autocannon.<sup>35</sup>
- Infantry BCTs have fewer vehicles and rely on lighter platforms such as trucks and High Mobility Multipurpose Wheeled Vehicles (HMMWVs) for mobility.
- The Army is developing a Mobile Protected Firepower system to provide Infantry Brigade Combat Teams with the firepower to engage enemy armored vehicles and fortifications. It hopes to produce 24 prototypes for testing during FY 2020.<sup>36</sup>
- Airborne BCTs are scheduled to receive a new platform, the Ground Mobility Vehicle (GMV), starting in 2019 to increase their speed and mobility. It is anticipated that five airborne BCTs will be equipped by the third quarter of FY 2020.<sup>37</sup>
- Finally, CABs are composed of Army helicopters including AH-64 Apaches, UH-60 Black Hawks, and CH-47 Chinooks.

Overall, the Army’s equipment inventory, while increasingly dated, is well maintained. Despite high usage in Afghanistan and Iraq, because the Army deliberately undertook a “reset” plan, most Army vehicles are relatively “young” because recent remanufacture programs for the Abrams and Bradley vehicles have extended their service lives beyond FY 2028.<sup>38</sup> While the current equipment is well maintained and has received several incremental upgrades,

Abrams and Bradley vehicles first entered service in the early 1980s, making them approximately 38 years old.

The Army has also been methodically upgrading the oldest variants of its rotorcraft. Today, the UH-60M, the newest version of the UH-60, accounts for approximately two-thirds of the total UH-60 inventory. Similarly, the CH-47F Chinook, a rebuilt variant of the Army’s CH-47D heavy lift helicopter, is expected to “remain the Army’s heavy lift helicopter for the next several decades.”<sup>39</sup> However, because the Army has added to procurement programs other than aviation, its \$3.7 billion FY 2020 budget request for aircraft procurement<sup>40</sup> is \$600 million less than the FY 2019 enacted amount.

In addition to the viability of today’s equipment, the military must ensure the health of future programs. Although future modernizing programs are not current hard-power capabilities that can be applied against an enemy force today, they are a significant indicator of a service’s overall fitness for future sustained combat operations. The service may be able to engage an enemy but be forced to do so with aging equipment and no program in place to maintain viability or endurance in sustained operations.

The U.S. military services are continually assessing how best to stay a step ahead of competitors: whether to modernize the force today with currently available technology or wait to see what investments in research and development produce years down the road. Technologies mature and proliferate, becoming more accessible to a wider array of actors over time.

After years of a singular focus on counterinsurgency because of the wars in Iraq and Afghanistan, followed by a concentration on the readiness of the force, the Army is now playing catch-up in the area of equipment modernization. Secretary Esper has testified that “[i]f left unchecked, Russia and China will continue to erode the competitive military advantage we have held for years.”<sup>41</sup>

Secretary Esper has established a new four-star headquarters, Army Futures Command,

to manage modernization. It achieved initial operating capability (IOC) in the summer of 2018 and plans to reach “full operating capacity in summer 2019.”<sup>42</sup> Additionally, the Army has established eight cross-functional teams (CFTs) to improve the management of its top modernization priorities.<sup>43</sup> The Under Secretary and Vice Chief of Staff of the Army are devoting an extraordinary amount of time to issues of equipment modernization, but only time will tell whether the new structures, commands, and emphasis will result in long-term improvement in modernization posture.

The Army aspires to develop and procure an entire new generation of equipment based on its six new modernization priorities: long-range precision fires, next-generation combat vehicle, future vertical lift, the network, air and missile defense, and soldier lethality. Thirty-one programs flow from these programs, and the Army has shifted \$33 billion inside of its five-year program to fund them.<sup>44</sup> Two of the programs that lost money in this shift were the Joint Lightweight Tactical Vehicle (JLTV) and the CH-47F cargo helicopter.

The JLTV, ironically, is the only new-design Army Major Defense Acquisition Program (MDAP) currently underway. Intended to combine the protection offered by Mine Resistant Ambush Protected Vehicles (MRAPs) with the mobility of the original unarmored HMMWV, the JLTV features design improvements that will increase its survivability against anti-armor weapons and improvised explosive devices (IEDs). The Army had planned to procure 49,099 vehicles over the life of the program, replacing only a portion of the current HMMWV fleet. The JLTV is “capable of performing multiple mission roles and designed to provide protected, sustained, networked mobility for personnel and payloads across the full range of military operations.”<sup>45</sup> Recent statements by Army leaders call into question the commitment to the program, and Secretary Esper has expressed uncertainty about the program’s future.<sup>46</sup>

Requested FY 2020 Base Procurement of \$996 million supports 2,530 JLTVs of various

configurations to fulfill the requirements of multiple mission roles and minimize ownership costs for the Army’s Light Tactical Vehicle fleet.<sup>47</sup> Among other notable Army procurements requested in the FY 2020 budget are the M1A2 Abrams SEPv3 upgrade (165); M2 Bradley modifications (128); the Missile Segment Enhancement (MSE) interceptor (147); the UH-60M Black Hawk (73); and AH-64E Apache Block IIIA remanufacture (48).<sup>48</sup>

Similar to the rest of its modernization programs, the Army’s rotorcraft modernization programs do not include any new platform designs. Instead, the Army is upgrading current rotorcraft to account for more advanced systems and developing future aircraft systems under a Future Vertical Lift program.

The Army’s main modernization programs are not currently encumbered by any major problems, but there is justifiable concern about past difficulties and current status. Many new research and development programs have been initiated with an extraordinary amount of publicity and oversight. Only time will tell whether they prove to be successful.

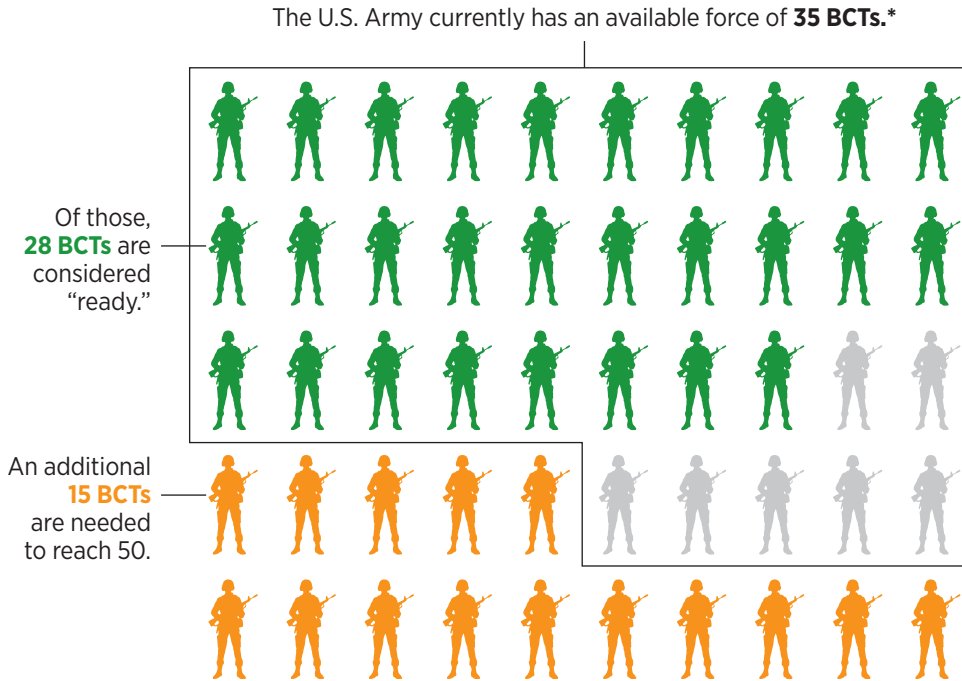
## Readiness

The Army has made progress in increasing the readiness of its forces. The Army’s goal is to have 66 percent of its Regular Army and 33 percent of National Guard Brigade Combat Teams at the highest levels of readiness. In March 2019, General Milley assessed that 28 of the Army’s 58 Total Army BCTs (48 percent) had reached the highest readiness levels, and Secretary Esper testified that “we have increased the number of fully ready brigade combat teams by 55 percent over the past two years.”<sup>49</sup> This would suggest that about 13 BCTs were at the highest levels of readiness two years ago. Further analysis is difficult because General Milley did not provide a breakout of the number of Regular Army versus National Guard Brigades.

As part of the \$716 billion provided for defense in the 2019 defense appropriations bill, Congress provided much-needed relief to the Army by appropriating approximately \$179

## Army Readiness: Brigade Combat Teams

Based on historical force requirements, Heritage Foundation experts assess that the Army needs a total of 50 Brigade Combat Teams (BCTs). In addition to active-duty forces, the Army National Guard has four BCTs that operate at a high level of readiness.



\* Includes four Army National Guard BCTs.

**SOURCES:** *Congressional Quarterly*, "Senate Armed Services Committee Holds Hearing on Fiscal 2020 Budget Request for the Army," CQ Congressional Transcripts, March 26, 2019, <https://plus.cq.com/doc/congressionaltranscripts-5493831?5> (accessed May 20, 2019), and Heritage Foundation research.

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billion. This influx of resources, combined with on-time funding, has had a very positive effect on the rebuilding of readiness.<sup>50</sup>

In the FY 2020 budget request, training activities are relatively well resourced. When measuring training resourcing, the Army uses operating tempo full-spectrum training miles and flying hours, which reflect the number of miles that formations are resourced to drive their primary vehicles on an annual basis and the number of hours that aviators can fly

their helicopters per month.<sup>51</sup> According to the Department of the Army's budget justification exhibits, "[t]he FY 2020 budget funds 1,549 annual Operating Tempo Full Spectrum Training Miles and 11.6 flying hours per crew, per month for an expected overall training proficiency of BCT-level."<sup>52</sup> These are far higher than resourced levels of 1,279 miles and 10.8 hours in FY 2019.

The Army reports that readiness increased broadly across all units by 11 percent from

September 2016 to December 2018. Part of this improvement is due to the Army's success in reducing the percentage of soldiers who are non-deployable from 15 in 2015 to six today. Nonetheless, structural readiness problems summarized by too small a force attempting to satisfy too many global presence requirements and Operations Plan (OPLAN) warfighting requirements will continue to challenge the Army. After years of high OPTEMPOs and sustained budget cuts, the Army does not expect to "achieve our readiness objectives" until 2022.<sup>53</sup>

Since March 2016, the Army has been running a program to increase the integration and readiness of select Army National Guard and Reserve formations so that they can be employed more easily when needed. The Army's Associated Units pilot program links select Regular Army and Reserve component units. In June 2018, for example, Vermont's 86th Infantry Brigade was associated with the Regular Army's 10th Mountain Division for an exercise

at Fort Drum, New York.<sup>54</sup> Twenty-seven units across the country are participating in this pilot program, which will be evaluated in 2019 to determine whether it should be made permanent.<sup>55</sup>

As part of its new Sustainable Readiness Model (SRM),<sup>56</sup> the Army uses Combat Training Centers to train its forces to desired levels of proficiency. Specifically, the CTC program's mission is to "provide realistic joint and combined arms training" to approximate actual combat and increase "unit readiness for deployment and warfighting."<sup>57</sup> The Army requested resources for 32 CTC rotations in FY 2020, including four for the Army National Guard.<sup>58</sup> Another change in the Army's training model involves the implementation of a system of Objective T metrics that seeks to remove the subjectivity behind unit commander evaluations of training. Under the Objective T program, the requirements that must be met for a unit to be assessed as fully ready for combat are to be made clear and quantitative.<sup>59</sup>

## Scoring the U.S. Army

### Capacity Score: Weak

Historical evidence shows that, on average, the Army needs 21 brigade combat teams to fight one major regional conflict. Based on a conversion of roughly 3.5 BCTs per division, the Army deployed 21 BCTs in Korea, 25 in Vietnam, 14 in the Persian Gulf War, and around four in Operation Iraqi Freedom—an average of 16 BCTs (or 21 if the much smaller Operation Iraqi Freedom initial invasion operation is excluded). In the 2010 Quadrennial Defense Review, the Obama Administration recommended a force capable of deploying 45 Active BCTs. Previous government force-sizing documents discuss Army force structure in terms of divisions and consistently advocate 10–11 divisions, which equates to roughly 37 Active BCTs.

Considering the varying recommendations of 35–45 BCTs and the actual experience of nearly 21 BCTs deployed per major

engagement, our assessment is that 42 BCTs would be needed to fight two MRCs.<sup>60</sup> Taking into account the need for a strategic reserve, the Army force should also include an additional 20 percent of the 42 BCTs.

Because of the investment the Army has made in National Guard readiness, this *Index* counts four additional ARNG BCTs in the Army's overall BCT count, giving them 35 (31 Regular Army and four ARNG), but 35 is still not enough to meet the two-MRC construct. The service's overall capacity score therefore remains unchanged from 2019.

- **Two-MRC Benchmark:** 50 brigade combat teams.
- **Actual projected 2020 Level:** 35 (31 Regular Army and four ARNG) brigade combat teams.

The Army’s current BCT capacity meets 70 percent of the two-MRC benchmark and is therefore scored as “weak.”

**Capability Score: Marginal**

The Army’s aggregate capability score remains “marginal.” This aggregate score is a result of “marginal” scores for “Age of Equipment,” “Size of Modernization Programs,” and “Health of Modernization Programs.” (More detail on these programs can be found in the equipment appendix following this section.) The Army scored “weak” for “Capability of Equipment.”

In spite of modest progress with the JLTV and AMPV, and in spite of promising developments in the form of announcements regarding Army Futures Command, CFTs, and the initiation of new Research, Development, Testing and Evaluation (RDTE) funded programs, new Army equipment programs remain in the development phase and in most cases are years from entering procurement phases. Therefore, they are not yet replacing legacy platforms and do not contribute to the Army’s current war-fighting capability. These planned procurements are highly sensitive to any turbulence or reduction in funding.

**Readiness Score: Very Strong**

The Army has said that it has 28 Total Army BCTs at the highest readiness levels. Four of those BCTs are likely National Guard Brigades, because the Army is focusing personnel, equipment, and training on those units, leaving an estimated 24 Regular Army BCTs out of 31 that are ready (77 percent). The Army’s internal requirement for Active BCT readiness is 66 percent, or 20.5 BCTs ready. Using the assessment methods of this *Index*, this results in a percentage-of-service requirement of 100 percent, or “very strong.”

**Overall U.S. Army Score: Marginal**

The Army’s overall score is calculated based on an unweighted average of its capacity, capability, and readiness scores. The unweighted average is 3.33; thus, the overall Army score is “marginal.” This was derived from the aggregate score for capacity (“weak”); capability (“marginal”); and readiness (“very strong”). This score is the same as the assessment of the 2019 *Index*, which also rated the Army as “marginal.”

**U.S. Military Power: Army**

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Capacity		✓			
Capability			✓		
Readiness					✓
<b>OVERALL</b>			✓		

# ARMY SCORES



Procurement and Spending ■ Through FY 2019 ■ Pending

## Main Battle Tank

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>M1A1/2 Abrams</b></p> <p>Inventory: <b>775/1611</b> Fleet age: <b>30.5/13.5</b> Date: <b>1985/1992</b></p> <p>The Abrams is the main battle tank used by the Army in its armored brigade combat teams (BCTs). Its main benefits are lethality, protection, and mobility. The Abrams went through a remanufacture program to extend its life to 2045.</p>	3	4	<p><b>Decisive Lethality Platform (DLP)</b></p> <p>The DLP program is intended to replace the Abrams tank. This program is part of the Next Generation Combat Vehicle (NGCV) program, which is number two among the Army's "Big Six" modernization priorities.</p>		

## Infantry Fighting Vehicle

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>M2 Bradley</b></p> <p>Inventory: <b>3,700</b> Fleet age: <b>19</b> Date: <b>1981</b></p> <p>The Bradley is a tracked vehicle meant to transport infantry and provide covering fire. The Bradley complements the Abrams tank in armored BCTs. Originally intended to be replaced by the Ground Combat Vehicle (GCV, now canceled), the Bradley underwent a remanufacture program to extend its life to 2045.</p>	3	3	<p><b>Optionally Manned Fighting Vehicle (OMFV)</b></p> <p>In March 2019, the Army issued a request for proposals to competitively build prototypes of the OMFV. The units are expected to be fielded by the end of FY2026. This program is part of the Next Generation Combat Vehicle (NGCV) program, which is number two among the Army's "Big Six" modernization priorities.</p>		

## Armored Fighting Vehicle

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>Stryker</b></p> <p>Inventory: <b>4,367</b> Fleet age: <b>9</b> Date: <b>2001</b></p> <p>The Stryker is a wheeled vehicle that is the main platform in Stryker BCTs. The program was considered an interim vehicle to serve until the arrival of the Future Combat System (FCS), but that program was cancelled due to technology and cost hurdles. The original Stryker is being replaced with a double-v hull configuration (DVH) to increase survivability and a 30mm gun to increase lethality. Its components allow for rapid acquisition and fielding. The Stryker is expected to remain in service for 30 years.</p>	4	4	None		

**NOTE:** See page 338 for details on fleet ages, dates, and procurement spending.

# ARMY SCORES



Procurement and Spending ■ Through FY 2019 ■ Pending

## Armored Personnel Carrier

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>M113 Armored Personnel Carrier</b></p> <p>Inventory: <b>5,000</b> Fleet age: <b>35</b> Date: <b>1960</b></p> <p>The tracked M113 is a supporting role for armored BCTs and in units above brigade level. The APC is being slowly replaced by the Armored Multi Purpose Vehicle (AMPV). Plans are to use the platform until 2045.</p>	2	2	<p><b>Armored Multi-Purpose Vehicle (AMPV)</b></p> <p>Timeline: <b>2018-TBD</b></p> <p>The AMPV will be adapted from an existing vehicle design which allowed the program to bypass the technology development phase. The fleet will consist of five variants. The first unit is set to be equipped at the end of 2021.</p>	2	4
			<p><b>PROCUREMENT</b></p>	<p><b>SPENDING (\$ millions)</b></p>	

## Light Wheeled Vehicle

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>HMMWV</b></p> <p>Inventory: <b>100,000</b> Fleet age: <b>17</b> Date: <b>1985</b></p> <p>The HMMWV is used to transport troops and for a variety of purposes, for example, as ambulances. The expected life span of the HMMWV is 15 years. Some HMMWVs will be replaced by the Joint Light Tactical Vehicle (JLTV).</p>	2	1	<p><b>Joint Light Tactical Vehicle (JLTV)</b></p> <p>Timeline: <b>2015-2036</b></p> <p>The JLTV vehicle program is meant to replace some of the Army's HMMWVs and provide improved protection, reliability, and survivability of vehicles. So far the program has experienced a one-year delay due to changes in vehicle requirements. This is a joint program with USMC. In June 2019, the Army approved the JLTV for full rate production.</p>	3	4
			<p><b>PROCUREMENT</b></p>	<p><b>SPENDING (\$ millions)</b></p>	

**NOTE:** See page 338 for details on fleet ages, dates, and procurement spending.



# ARMY SCORES



Procurement and Spending ■ Through FY 2019  
■ Pending

## Attack Helicopter

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>AH-64 D Apache</b></p> <p>Inventory: <b>464</b> Fleet age: <b>13.5</b> Date: <b>1997</b></p> <p>The Apache is found in Army Combat Aviation Brigades. It can destroy armor, personnel, and material targets. The expected life cycle is about 20 years.</p>	1	3	<p><b>AH-64E Reman</b></p> <p>Timeline: <b>2010–2027</b></p> <p>The AH-64E Reman is a program to remanufacture older Apache helicopters into the more advanced AH-64E version. The AH-64E will have more modern and interoperable systems and be able to carry modern munitions, including the JAGM missile.</p> <p><b>PROCUREMENT*</b> <b>SPENDING* (\$ millions)</b></p> <p>388 \$4,347</p>	3	5
<p><b>AH-64E</b></p> <p>Inventory: <b>250</b> Fleet age: <b>3.5</b> Date: <b>2012</b></p> <p>The AH-64E variant is a remanufactured version with substantial upgrades in power plant, avionics, communications, and weapons capabilities. The expected life cycle is about 20 years.</p>	5	5	<p><b>AH-64E New Build</b></p> <p>Timeline: <b>2010–2027</b></p> <p>The AH-64E New Build program produces new-build, not re-build, Apaches. The program is meant to modernize and sustain the current Apache inventory. The AH-64E has more modern and interoperable systems and is able to carry modern munitions, including the JAGM missile. FY2019 defense appropriation support increased procurement quantities to address National Guard shortfalls.</p> <p><b>PROCUREMENT*</b> <b>SPENDING* (\$ millions)</b></p> <p>74 \$2,417</p>	3	5

## Medium Lift

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>UH-60A Black Hawk</b></p> <p>Inventory: <b>250</b> Fleet age: <b>35.5</b> Date: <b>1978</b></p> <p>The UH-60A is a utility helicopter that provides air assault, aeromedical evacuation, and supports special operations. The expected life span is about 25 years. This variant of the Black Hawk is now being replaced by the newer UH-60M variant.</p>	1	2	<p><b>UH-60M Black Hawk</b></p> <p>Timeline: <b>2004–TBD</b></p> <p>The UH-60M, currently in production, is intended to modernize and replace current Black Hawk inventories. The newer M-variant will improve the Black Hawk's range and lift by upgrading the rotor blades, engine, and computers.</p> <p><b>PROCUREMENT*</b> <b>SPENDING* (\$ millions)</b></p> <p>1,049 \$18,815</p>	3	5
<p><b>UH-60M Black Hawk</b></p> <p>Inventory: <b>1,022</b> Fleet age: <b>7</b> Date: <b>2005</b></p> <p>The UH-60M is the follow-on helicopter to the UH-60A. As the UH-60A is retired, the M-variant will be the main medium-lift rotorcraft used by the Army. They are expected to remain in service until at least 2030.</p>	5	4			

\* Additional procurement expected.

**NOTE:** See page 338 for details on fleet ages, dates, and procurement spending.

# ARMY SCORES



Procurement and Spending ■ Through FY 2019 ■ Pending

## Heavy Lift

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>CH-47F Chinook</b> Inventory: <b>519</b> Fleet age: <b>8.5</b> Date: <b>2002</b></p> <p>The F-variant includes a new digital cockpit and monolithic airframe to reduce vibrations. It transports forces and equipment while providing other functions such as parachute drops and aircraft recovery. The expected life span is 35 years. The Army plans to use the CH-47F until the late 2030s.</p>	5	5	<p><b>CH-47F</b> Timeline: <b>2001-TBD</b></p> <p>Currently in production, the CH-47F program is intended to keep the fleet of heavy-lift rotorcraft healthy as older variants of the CH-47 are retired. The program includes both remanufactured and new builds of CH-47s. The F-variant has engine and airframe upgrades to lower the maintenance requirements. Total procurement numbers include the MH-47G configuration for U.S. Special Operations Command</p> <p><b>PROCUREMENT*</b> <b>SPENDING* (\$ millions)</b></p> <p>364 \$10,260</p>	3	5

## Intelligence, Surveillance, and Reconnaissance (ISR)

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>MQ-1C Gray Eagle</b> Inventory: <b>164</b> Fleet age: <b>4</b> Date: <b>2011</b></p> <p>The Gray Eagle is a medium-altitude long-endurance (MALE) unmanned aerial vehicle (UAV) used to conduct ISR missions. The use of MALE UAVs is a new capability for the Army. The Gray Eagle is currently in production.</p>	4	4	<p><b>MQ-1C Gray Eagle</b> Timeline: <b>2010-2022</b></p> <p>The MQ-1C UAV provides Army reconnaissance, surveillance, and target acquisition capabilities. The Army is continuing to procure MQ-1Cs to replace combat losses.</p> <p><b>PROCUREMENT</b> <b>SPENDING (\$ millions)</b></p> <p>221 12 \$3,775 \$108</p>	3	5

\* Additional procurement expected.

**NOTES:** See methodology for descriptions of scores. The Fleet age is the average between the first and last year of delivery. The date is the year of first delivery. The timeline is from the first year of procurement to the last year of delivery/procurement. Spending does not include advanced procurement or research development test and evaluation.

# U.S. Army Modernization Table Citations

## MAIN SOURCES

- Andrew Feickert, “The Army’s M-1 Abrams, M-2/M-3 Bradley, and M-1126 Stryker: Background and Issues for Congress,” Congressional Research Service *Report for Members and Committees of Congress*, April 5, 2016, <https://fas.org/sgp/crs/weapons/R44229.pdf> (accessed September 5, 2019).
- International Institute for Strategic Studies, *The Military Balance 2019: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2019).
- U.S. Department of the Army, *Department of the Army Procurement Programs, Committee Staff Procurement Backup Book, Fiscal Year 2011 Budget Estimate: Aircraft Procurement, Army*, February 2010, <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2011/base%20budget/justification%20book/aircraft.pdf> (accessed September 6, 2019).
- U.S. Department of the Army, *Department of Defense Fiscal Year (FY) 2020 Budget Estimates, Army, Justification Book of Aircraft Procurement, Army: FY2020 Aircraft Procurement, Army*, March 2019, <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2020/Base%20Budget/Procurement/01%20Aircraft%20Procurement%20Army.pdf> (accessed September 6, 2019).
- U.S. Department of the Army, *Department of Defense Fiscal Year (FY) 2020 Budget Estimates, Army, Justification Book of Other Procurement, Army: Tactical and Support Vehicles, Budget Activity 1*, March 2019, <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2020/Base%20Budget/Procurement/05%20Other%20Procurement%20-%20BA1%20-%20Tactical%20&%20Support%20Vehicles.pdf> (accessed September 6, 2019).
- U.S. Department of the Army, *Department of Defense Fiscal Year (FY) 2020 Budget Estimates, Army, Justification Book of Procurement of W&TCV, Army*, March 2019, <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2020/Base%20Budget/Procurement/03%20Procurement%20of%20Weapons%20and%20Tracked%20Combat%20Vehicles.pdf> (accessed September 6, 2019).

## MISC. SOURCES

### Abrams:

- Andrew Feickert, “The Army’s Optionally Manned Fighting Vehicle (OMFV) Program: Background and Issues for Congress,” Congressional Research Service *Report for Members and Committees of Congress*, updated June 21, 2019, <https://fas.org/sgp/crs/weapons/R45519.pdf> (accessed September 5, 2019).
- David Axe, “Here’s Your First Look at the Army’s New M1 Abrams Variant,” *Task & Purpose*, February 26, 2019, <https://taskandpurpose.com/m1-abrams-tank-m1a2c> (accessed September 5, 2019).
- U.S. Army Acquisition Support Center, “Abrams Tank Upgrade,” <https://asc.army.mil/web/portfolio-item/gcs-m1-abrams-main-battle-tank/> (accessed September 5, 2019).
- Zachary Keck, “Taiwan Wants American M1 Abrams Tanks. And the Reason Is China,” *The National Interest*, May 5, 2018, <https://nationalinterest.org/blog/the-buzz/taiwan-wants-american-m1-abrams-tanks-the-reason-china-25692> (accessed September 5, 2019).

### Bradley:

- Jen Judson, “Army Drops Request for Proposals to Build Next-Gen Combat Vehicle Prototypes,” *Defense News*, March 29, 2019, <https://www.defensenews.com/land/2019/03/29/armys-request-for-proposals-to-build-next-gen-combat-vehicle-prototypes-drops/> (accessed September 5, 2019).
- David Vergun, “Next Generation Combat Vehicles to Replace Bradley Starting Fiscal Year 2026,” U.S. Army, October 9, 2018, [https://www.army.mil/article/212190/next\\_generation\\_combat\\_vehicles\\_to\\_replace\\_bradley\\_starting\\_fiscal\\_year\\_2026](https://www.army.mil/article/212190/next_generation_combat_vehicles_to_replace_bradley_starting_fiscal_year_2026) (accessed September 5, 2019).

### Stryker:

- U.S. Army Acquisition Support Center, “Stryker Family of Vehicles,” <https://asc.army.mil/web/portfolio-item/gcs-stryker-family-of-vehicles/> (accessed September 5, 2019).

### M113 APC:

- Andrew Feickert, “The Army’s Armored Multi-Purpose Vehicle (AMPV): Background and Issues for Congress,” Congressional Research Service *Report for Members and Committees of Congress*, updated June 27, 2019, p. 1, <https://fas.org/sgp/crs/weapons/R43240.pdf> (accessed September 5, 2019).
- U.S. Army Acquisition Support Center, “Armored Multi-Purpose Vehicle (AMPV),” <https://asc.army.mil/web/portfolio-item/gcs-ampv/> (accessed September 5, 2019).

#### **HMMWV:**

- Andrew Feickert, “Joint Light Tactical Vehicle (JLTV): Background and Issues for Congress,” Congressional Research Service *Report for Members and Committees of Congress*, updated June 24, 2019, <https://fas.org/sgp/crs/weapons/RS22942.pdf> (accessed September 5, 2019).
- Dan Gouré, “7 Ways to Enhance the US Military’s Humvee Fleet [Commentary],” *Defense News*, October 5, 2017, <https://www.defensenews.com/opinion/commentary/2017/10/05/7-ways-to-enhance-the-us-militarys-humvee-fleet-commentary/> (accessed September 5, 2019).
- News release, “AM General Receives Order for 740 New HMMWVs to Support the United States Army’s Modernization Efforts,” AM General, October 23, 2018, <http://www.amgeneral.com/news-events/news/am-general-receives-order-for-740-new-hmmwvs-to-support-the-united-states-armys-modernization-efforts/> (accessed September 5, 2019).
- U.S. Army, Program Executive Office for Combat Support and Combat Service Support, “Army Approves JLTV Full-Rate Production,” June 21, 2019, [https://www.army.mil/article/223482/army\\_approves\\_jltv\\_full\\_rate\\_production](https://www.army.mil/article/223482/army_approves_jltv_full_rate_production) (accessed September 5, 2019).
- U.S. Department of the Army, *Department of Defense Fiscal Year (FY) 2015 Budget Estimates, Army, Justification Book: Other Procurement, Army, Tactical and Support Vehicles, Budget Activity 1*, March 2014, p. 22, <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2015/base%20budget/justification%20book/Other%20Procurement%20Army%201%20-%20Tactical%20and%20Support%20Vehicles.pdf> (accessed September 6, 2019).
- U.S. Army Acquisition Support Center, “Joint Light Tactical Vehicle (JLTV),” <https://asc.army.mil/web/portfolio-item/cs-css-joint-light-tactical-vehicle/> (accessed September 5, 2019).

#### **AH-64D Apache:**

- News release, “Boeing Delivers 100th AH-64D Apache Longbow to U.S. Army,” Boeing, December 9, 1999, <https://boeing.mediaroom.com/1999-12-09-Boeing-Delivers-100th-AH-64D-Apache-Longbow-to-U.S.-Army> (accessed September 5, 2019).
- Defense Contract Management Agency, “AH-64D Program Ended. Last One Delivered,” Helis.com, March 11, 2014, [https://www.helis.com/database/news/ah-64d\\_last/](https://www.helis.com/database/news/ah-64d_last/) (accessed September 5, 2019).
- U.S. Army Acquisition Support Center, “Apache Attack Helicopter AH-64D/E,” [https://asc.army.mil/web/portfolio-item/aviation\\_apache-ah-64e/](https://asc.army.mil/web/portfolio-item/aviation_apache-ah-64e/) (accessed September 5, 2019).

#### **UH-60A Black Hawk:**

- Ray D. Leoni, “Sikorsky Product History: S-70A (UH-60A Black Hawk, YEH-60B SOTAS, EH-60A Quick Fix),” Igor I. Sikorsky Historical Archives, last update May 27, 2015, [https://www.sikorskyarchives.com/S-70A%20\(UH-60A%20Black%20Hawk,%20YEH-60B%20SOTAS,%20EH-60A%20Quick%20Fix\).php](https://www.sikorskyarchives.com/S-70A%20(UH-60A%20Black%20Hawk,%20YEH-60B%20SOTAS,%20EH-60A%20Quick%20Fix).php) (accessed September 5, 2019).
- U.S. Department of the Army, *Department of the Army Procurement Programs, Committee Staff Procurement Backup Book, FY 2006/FY 2007 Budget Request: Aircraft Procurement, Army*, February 2005, p. 22, <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/20062007/base%20budget/justification%20book/aircraft.pdf> (accessed September 6, 2019).
- U.S. Army Acquisition Support Center, “Black Hawk Utility Helicopter—UH/HH-60,” <https://asc.army.mil/web/portfolio-item/black-hawk-uhhh-60/> (accessed September 5, 2019).

#### **UH-60M Black Hawk:**

- News release, “Sikorsky Delivers 500th ‘M’ Model Black Hawk Helicopter,” Lockheed Martin, July 18, 2012, <https://news.lockheedmartin.com/2012-07-18-Sikorsky-Delivers-500th-M-Model-BLACK-HAWK-Helicopter> (accessed September 5, 2019).

#### **CH-47D/F Chinook:**

- “CH-47D Chinook,” Deagel.com, [http://www.deagel.com/Support-Aircraft/CH-47D-Chinook\\_a000504001.aspx](http://www.deagel.com/Support-Aircraft/CH-47D-Chinook_a000504001.aspx) (accessed September 5, 2019).
- “News: Chinooks Modernized,” *Military Review*, Vol. LXIII, No. 9 (September 1983), p. 78, <http://cgsc.contentdm.oclc.org/cdm/singleitem/collection/p124201coll1/id/298/rec/1> (accessed September 6, 2019).
- News release, “Boeing Delivers First Production F-Model Chinook,” Boeing, July 22, 2004, <https://boeing.mediaroom.com/2004-07-22-Boeing-Delivers-First-Production-F-Model-Chinook> (accessed September 6, 2019).
- U.S. Department of the Army, *Department of the Army Procurement Programs, Committee Staff Procurement Backup Book, FY 2002 Amended Budget Submission: Aircraft Procurement, Army*, June 2001, p. 64, <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2002/base%20budget/justification%20book/aircraft.pdf> (accessed September 6, 2019).
- U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller)/ Chief Financial Officer, *United States Department of Defense Fiscal Year 2020 Budget Request: Program Cost by Weapon System*, March 2019, [https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/fy2020\\_Weapons.pdf](https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/fy2020_Weapons.pdf) (accessed September 6, 2019).
- U.S. Army Acquisition Support Center, “CH-47F Chinook,” [https://asc.army.mil/web/portfolio-item/aviation\\_ch47f-chinook/](https://asc.army.mil/web/portfolio-item/aviation_ch47f-chinook/) (accessed September 5, 2019).

*MQ-1C Gray Eagle:*

- U.S. Department of the Army, *Department of the Army Procurement Programs: Committee Staff Procurement Backup Book, Fiscal Year 2010 Budget Estimates: Aircraft Procurement, Army*, May 2009, p. 9, <https://www.asafm.army.mil/Portals/72/Documents/BudgetMaterial/2010/base%20budget/justification%20book/aircraft.pdf> (accessed September 5, 2019).

## Endnotes

1. Congressional Quarterly, "Senate Appropriations Subcommittee on Defense Holds Hearing on the Fiscal 2020 Budget Request for the Army," CQ Congressional Transcripts, March 27, 2019, <https://plus.cq.com/doc/congressionaltranscripts-5495230?10> (accessed June 15, 2019).
2. Ibid.
3. Major General Paul A. Chamberlain, Director, Army Budget, and Davis S. Welch, Deputy Director, Army Budget, *Army FY 2020 Budget Overview*, March 2019, p. 6, <https://www.asafm.army.mil/documents/BudgetMaterial/fy2020/Army%20FY%202020%20Budget%20Overview.pdf> (accessed June 15, 2019).
4. Katherine Blakeley, "Military Personnel: End Strength," Center for Strategic and Budgetary Assessments, August 15, 2017, <https://csbaonline.org/reports/military-personnel> (accessed June 15, 2019).
5. Michelle Tan, "Army Lays out Plan to Cut 40,000 Soldiers," *Army Times*, July 10, 2015, <http://www.armytimes.com/story/military/pentagon/2015/07/09/army-outlines-40000-cuts/29923339/> (accessed June 15, 2018).
6. Congressional Quarterly, "House Armed Services Subcommittee on Readiness Holds Hearing on Fiscal 2020 Budget Request for Military Readiness," CQ Congressional Transcripts, May 9, 2019, <https://plus.cq.com/doc/congressionaltranscripts-5534728?2> (accessed June 15, 2019).
7. The Honorable Mark T. Esper, Secretary of the Army, and General Mark A. Milley, Chief of Staff, United States Army, statement "On the Posture of the United States Army" before the Committee on Armed Services, U.S. House of Representatives, 116th Cong., 1st Sess., April 2, 2019, p. 3, [https://armedservices.house.gov/\\_cache/files/f/5/f5f4cac2-68c1-4105-a896-5dac8c6851f5/9C00D8D946DE1DF1401CD15D792BEEE5.hmtg-116-as00-wstate-esperm-20190402.pdf](https://armedservices.house.gov/_cache/files/f/5/f5f4cac2-68c1-4105-a896-5dac8c6851f5/9C00D8D946DE1DF1401CD15D792BEEE5.hmtg-116-as00-wstate-esperm-20190402.pdf) (accessed June 15, 2019).
8. U.S. Department of the Army, Field Manual 3-96, *Brigade Combat Team*, October 2015, [https://armypubs.army.mil/epubs/DR\\_pubs/DR\\_a/pdf/web/fm3\\_96.pdf](https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/fm3_96.pdf) (accessed June 15, 2019).
9. Chamberlain and Welch, *Army FY 2020 Budget Overview*, p. 8.
10. Meghann Myers, "Army Chief: Operational Units Will Be Manned to 105 Percent by Next Year," *Army Times*, January 16, 2019, <https://www.armytimes.com/news/your-army/2019/01/16/army-chief-operational-units-will-be-manned-to-105-percent-by-next-year/> (accessed June 15, 2019).
11. H.R. 3979, Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015, Public Law 113-291, 113th Cong., December 19, 2014, Title XVII, <https://www.congress.gov/bill/113th-congress/house-bill/3979/text> (accessed June 17, 2019).
12. National Commission on the Future of the Army, *Report to the President and the Congress of the United States*, January 28, 2016, p. 52, <https://fas.org/man/eprint/nca.pdf> (accessed June 15, 2017).
13. U.S. Army Public Affairs, "Army Announces Conversion of Two Brigade Combat Teams," September 20, 2018, [https://www.army.mil/article/211368/army\\_announces\\_conversion\\_of\\_two\\_brigade\\_combat\\_teams](https://www.army.mil/article/211368/army_announces_conversion_of_two_brigade_combat_teams) (accessed June 15, 2019).
14. U.S. Army, Field Manual 3-96, pp. 3-31 and 3-32.
15. Andrew Feickert, "Army Drawdown and Restructuring: Background and Issues for Congress," Congressional Research Service *Report for Members and Committees of Congress*, February 28, 2014, pp. 3 and 18, <https://www.fas.org/sgp/crs/natsec/R42493.pdf> (accessed June 16, 2019).
16. The 13 percent estimate is "based on a review of historical levels" as referenced in U.S. Government Accountability Office, *Army Planning: Comprehensive Risk Assessment Needed for Planned Changes to the Army's Force Structure*, GAO-16-327, April 2016, p. 12, <http://www.gao.gov/assets/680/676516.pdf> (accessed June 16, 2019).
17. C. Todd Lopez, "Security Force Assistance Brigades to Free Brigade Combat Teams from Advise, Assist Mission," U.S. Army, May 18, 2017, [https://www.army.mil/article/188004/security\\_force\\_assistance\\_brigades\\_to\\_free\\_brigade\\_combat\\_teams\\_from\\_advise\\_assist\\_mission](https://www.army.mil/article/188004/security_force_assistance_brigades_to_free_brigade_combat_teams_from_advise_assist_mission) (accessed June 16, 2019).
18. C. Todd Lopez, "Success of First SFAB in Afghanistan Proves 'Army Got It Right,' Commander Says," U.S. Central Command, May 9, 2019, <https://www.centcom.mil/MEDIA/NEWS-ARTICLES/News-Article-View/Article/1842769/success-of-first-sfab-in-afghanistan-proves-army-got-it-right-commander-says/> (accessed June 17, 2019).
19. Chamberlain and Welch, *Army FY 2020 Budget Overview*, p. 6.
20. Congressional Quarterly, "Senate Appropriations Subcommittee on Defense Holds Hearing on the U.S. Army Fiscal 2018 Budget," CQ Congressional Transcripts, June 7, 2017, <https://plus.cq.com/doc/congressionaltranscripts-5117288?3> (accessed June 16, 2019).
21. Congressional Quarterly, "Senate Appropriations Subcommittee on Defense Holds Hearing on the U.S. Army Fiscal 2020 Budget," March 27, 2019.

22. Meghann Myers, "Esper: The Ultimate Size of the Army Is a Moving Target," *Army Times*, April 17, 2019, <https://www.armytimes.com/news/your-army/2019/04/17/esper-the-ultimate-size-of-the-army-is-a-moving-target/> (accessed June 16, 2019).
23. National Defense Strategy Commission, *Providing for the Common Defense: The Assessment and Recommendations of the National Defense Strategy Commission*, released November 14, 2018, p. iii, <https://www.usip.org/sites/default/files/2018-11/providing-for-the-common-defense.pdf> (accessed June 16, 2019). See also S. 2943, National Defense Authorization Act for Fiscal Year 2017, Public Law 114-328, 114th Cong., December 23, 2016, Title IX, Subtitle E, § 942, <https://www.congress.gov/bill/114th-congress/senate-bill/2943/text> (accessed June 17, 2019).
24. National Defense Strategy Commission, *Providing for the Common Defense: The Assessment and Recommendations of the National Defense Strategy Commission*, pp. 35–36. Emphasis in original.
25. Boost Labs, "The U.S. Army: Then & Now," <https://www.boostlabs.com/portfolio/u-s-army-now/> (accessed June 16, 2019).
26. Meghann Myers, "With Retention Up and Recruiting Down, Here's How the Army Plans to Add 7,500 More Soldiers to the Ranks," *Army Times*, May 7, 2018, <https://www.armytimes.com/news/your-army/2018/05/08/with-retention-up-and-recruiting-down-heres-how-the-army-plans-to-add-7500-more-soldiers-to-the-ranks/> (accessed June 16, 2019).
27. See Andrew Gregory, "Maintaining a Deep Bench: Why Armored BCT Rotations in Europe and Korea Are Best for America's Global Security Requirements," Modern War Institute at West Point, July 31, 2017, <https://mwi.usma.edu/maintaining-deep-bench-armored-bct-rotations-europe-korea-best-americas-global-security-requirements/> (accessed June 16, 2019), and Daniel Kochis and Thomas Spoehr, "It's Time to Move US Forces Back to Europe," Heritage Foundation *Commentary*, September 15, 2017, <https://www.heritage.org/defense/commentary/its-time-move-us-forces-back-europe>.
28. Erich B. Smith, "Readiness Enhanced with Army National Guard 4.0 Initiative," U.S. Army, February 26, 2018, [https://www.army.mil/article/201131/readiness\\_enhanced\\_with\\_army\\_national\\_guard\\_40\\_initiative](https://www.army.mil/article/201131/readiness_enhanced_with_army_national_guard_40_initiative) (accessed June 16, 2019).
29. Chamberlain and Welch, *Army FY 2020 Budget Overview*, p. 9.
30. Kris Osborn, "Outranged: New Army Artillery Doubles Ranges—Outguns Russian Equivalent," *The National Interest*, December 12, 2018, <https://nationalinterest.org/blog/buzz/outranged-new-army-artillery-doubles-ranges-outguns-russian-equivalent-38587> (accessed June 16, 2019).
31. John Gordon IV, John Matsumura, Anthony Adler, Scott Boston, Matthew E. Boyer, Natasha Lander, and Todd Nichols, *Comparing U.S. Army Systems with Foreign Counterparts: Identifying Possible Capability Gaps and Insights from Other Armies*, RAND Corporation Research Report, 2015, pp. 19–22, [https://www.rand.org/content/dam/rand/pubs/research\\_reports/RR700/RR716/RAND\\_RR716.pdf](https://www.rand.org/content/dam/rand/pubs/research_reports/RR700/RR716/RAND_RR716.pdf) (accessed June 16, 2019).
32. Andrew Feickert, "The Army's M-1 Abrams, M-2/M-3 Bradley, and M-1126 Stryker: Background and Issues for Congress," Congressional Research Service *Report for Members and Committees of Congress*, April 5, 2016, p. 9, <https://www.fas.org/sgp/crs/weapons/R44229.pdf> (accessed June 16, 2019), and Ashley Givens, "Army Rolls Out Latest Version of Iconic Abrams Main Battle Tank," U.S. Army, October 9, 2017, [https://www.army.mil/article/194952/army\\_rolls\\_out\\_latest\\_version\\_of\\_iconic\\_abrams\\_main\\_battle\\_tank](https://www.army.mil/article/194952/army_rolls_out_latest_version_of_iconic_abrams_main_battle_tank) (accessed June 16, 2019).
33. Allen Cone, "BAE Delivers Armored Multi-Purpose Vehicles to Army for Testing," United Press International, April 4, 2018, <https://www.upi.com/BAE-delivers-Armored-Multi-Purpose-Vehicles-to-Army-for-testing/5181522850392/> (accessed June 16, 2019).
34. Kyle Rempfer, "New Upgunned Stryker Arrives in Europe," *Army Times*, December 19, 2017, <https://www.armytimes.com/news/2017/12/19/new-upgunned-stryker-arrives-in-europe/> (accessed June 16, 2019).
35. Jen Judson, "Army to Outfit Double V-Hull Strykers with 30mm Firepower," *Army Times*, May 1, 2019, <https://www.defensenews.com/land/2019/05/01/army-to-outfit-all-double-v-hull-strykers-with-30mm-firepower/> (accessed June 16, 2019).
36. U.S. Army, Assistant Secretary of the Army (Financial Management and Comptroller), *FY 2020 President's Budget Highlights*, March 2019, p. 29, <https://www.asafm.army.mil/documents/BudgetMaterial/fy2020/Army%20FY%202020%20Budget%20Highlights.pdf> (accessed June 16, 2019).
37. U.S. Army, Acquisition Support Center, "Ground Mobility Vehicle (GMV)," <https://asc.army.mil/web/portfolio-item/cs-css-gmv/> (accessed June 16, 2019).
38. Feickert, "The Army's M-1 Abrams, M-2/M-3 Bradley, and M-1126 Stryker," p. 1.
39. Exhibit P-40, "Budget Line Item Justification: PB 2019 Army," in U.S. Department of the Army, *Department of Defense Fiscal Year (FY) 2019 Budget Estimates, Army: Justification Book of Aircraft Procurement*, Army, February 2018, p. 73, <https://www.asafm.army.mil/documents/BudgetMaterial/FY2019/aircraft.pdf> (accessed June 16, 2019).
40. Chamberlain and Welch, *Army FY 2020 Budget Overview*, p. 13.
41. Congressional Quarterly, "Senate Armed Services Committee Holds Hearing on Fiscal 2020 Budget Request for the Army," CQ Congressional Transcripts, March 26, 2019, <https://plus.cq.com/doc/congressionaltranscripts-5493831?5> (accessed June 16, 2019).

42. Andrew Feickert, "Army Futures Command (AFC)," Congressional Research Service *Insight*, updated September 10, 2018, p. [1], <https://fas.org/sgp/crs/natsec/INI0889.pdf> (accessed June 16, 2019).
43. U.S. Army, Training and Doctrine Command, Army Capability Integration Center, "U.S. Army Modernization Strategy," U.S. Army STAND-TO!, June 6, 2018, [https://www.army.mil/standto/archive\\_2018-06-06](https://www.army.mil/standto/archive_2018-06-06) (accessed June 16, 2019).
44. Sebastien Roblin, "The U.S. Army's 'Big Six': How America Plans to Fight Russia or China (and Win)," *The National Interest*, May 18, 2019, <https://nationalinterest.org/blog/buzz/us-armys-big-six-how-america-plans-fight-russia-or-china-and-win-58172> (accessed June 16, 2019).
45. Exhibit P-40, "Budget Line Item Justification: PB 2019 Army," in U.S. Department of the Army, *Department of Defense Fiscal Year (FY) 2019 Budget Estimates, Army: Justification Book of Other Procurement, Army: Tactical and Support Vehicles, Budget Activity 1*, February 2018, p. 42, <https://www.asafm.army.mil/documents/BudgetMaterial/FY2019/opa1.pdf> (accessed June 16, 2019).
46. Paul McLeary, "Esper: Chinook & JLTV 'Designed for a Different Conflict,'" *Breaking Defense*, April 16, 2019, <https://breakingdefense.com/2019/04/esper-chinook-jltv-designed-for-a-different-conflict/> (accessed June 16, 2019).
47. Exhibit P-40, "Budget Line Item Justification: PB 2019 Army," in U.S. Department of the Army, *Department of Defense Fiscal Year (FY) 2020 Budget Estimates, Army: Justification Book of Other Procurement, Army: Tactical and Support Vehicles, Budget Activity 1*, p. 46.
48. Chamberlain and Welch, *Army FY 2020 Budget Overview*, p. 14.
49. Congressional Quarterly, "Senate Armed Services Committee Holds Hearing on Fiscal 2020 Budget Request for the Army," March 26, 2019.
50. Chamberlain and Welch, *Army FY 2020 Budget Overview*, p. 3.
51. G3/5/7, "OPTEMPO and Full-Spectrum Operations Training," U.S. Army STAND-TO!, January 26, 2011, [https://www.army.mil/article/50883/optempo\\_and\\_full\\_spectrum\\_operations\\_training](https://www.army.mil/article/50883/optempo_and_full_spectrum_operations_training) (accessed June 16, 2019).
52. U.S. Department of the Army, *Department of the Army Fiscal Year (FY) 2020 Budget Estimates, Volume 1, Operation and Maintenance, Army: Justification of Estimates*, March 2019, pp. 1–2, [https://www.asafm.army.mil/documents/BudgetMaterial/fy2020/oma\\_voll.pdf](https://www.asafm.army.mil/documents/BudgetMaterial/fy2020/oma_voll.pdf) (accessed June 16, 2019).
53. The Honorable Mark T. Esper, Secretary of the Army, and General Mark A. Milley, Chief of Staff, United States Army, statement "On the Posture of the United States Army" before the Committee on Armed Services, U.S. Senate, 116th Cong., 1st Sess., March 26, 2019, p. 3, [https://www.army.mil/e2/downloads/rv7/aps/aps\\_2019.pdf](https://www.army.mil/e2/downloads/rv7/aps/aps_2019.pdf) (accessed June 16, 2019).
54. Charlotte Carulli, "First Combat Training Capability Enhances Associated Units Pilot, Joint Relationships," U.S. Army, July 2, 2018, [https://www.army.mil/article/208021/first\\_combat\\_training\\_capability\\_enhances\\_associated\\_units\\_pilot\\_joint\\_relationships](https://www.army.mil/article/208021/first_combat_training_capability_enhances_associated_units_pilot_joint_relationships) (accessed June 16, 2019).
55. David Vergun, "Associated Units Concept Improving Readiness, Says MG Jarrard," U.S. Army, November 2, 2017, [https://www.army.mil/article/196318/associated\\_units\\_concept\\_improving\\_readiness\\_says\\_mg\\_jarrard](https://www.army.mil/article/196318/associated_units_concept_improving_readiness_says_mg_jarrard) (accessed June 16, 2019).
56. Army G-3/5/7, "Army Readiness Guidance," U.S. Army STAND-TO!, May 19, 2016, <https://www.army.mil/standto/2016-05-19> (accessed June 16, 2019).
57. U.S. Department of the Army, "Combat Training Center Program," Army Regulation 350–50, May 2, 2018, effective June 2, 2018, p. 2, [https://armypubs.army.mil/epubs/DR\\_pubs/DR\\_a/pdf/web/ARN8650\\_AR350\\_50\\_Final.pdf](https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN8650_AR350_50_Final.pdf) (accessed June 16, 2019).
58. Chamberlain and Welch, *Army FY 2020 Budget Overview*, p. 9.
59. Michelle Tan, "'Objective T': The Army's New Mission to Track Training," *Army Times*, October 11, 2016, <https://www.armytimes.com/articles/objective-t-the-armys-new-mission-to-track-training> (accessed June 16, 2019).
60. Note that the first figures derive from an average BCT size of 4,500 and an average division size of 15,000. The second set of numbers derives from the current average of around 3.5 BCTs per division and analysis of the structure of each Army division.



# U.S. Navy

In *A Design for Maintaining Maritime Superiority, Version 2.0*, then-Chief of Naval Operations Admiral John M. Richardson describes the U.S. Navy’s mission:

The United States Navy will be ready to conduct prompt and sustained combat incident to operations at sea. Our Navy will protect America from attack and preserve America’s strategic influence in key regions of the world. U.S. naval forces and operations—from the sea floor to space, from deep water to the littorals, and in the information domain—will deter aggression and enable peaceful resolution of crises on terms acceptable to the United States and our allies and partners. If deterrence fails, the Navy will conduct decisive combat operations to defeat any enemy.<sup>1</sup>

For much of the post–Cold War period, the Navy, Marine Corps, and Coast Guard (known collectively as the sea services) have enabled the U.S. to project power across the oceans, control activities on the seas when and where needed, provide for the security of coastlines and shipping in maritime areas of interest, and thereby enhance America’s deterrent capability without opposition from competitors. However, the ability of competitors to contest U.S. actions has improved, forcing the sea services to revisit their assumptions about gaining access to key regions.

Together, these functional areas—power projection, sea control, maritime security, deterrence, and domain access—constitute the basis for the Navy’s strategy. Achieving and sustaining the ability to excel in these functions drives Navy thinking and programmatic efforts.

As the U.S. military’s primary maritime arm, the Navy provides the enduring forward

global presence that enables the United States to respond quickly to crises around the world. Unlike ground or air forces, which operate from fixed, large support bases that require the consent of host nations, the U.S. Navy can operate freely at sea across the globe and shift its presence to wherever it is needed without any other nation’s permission. As a result, naval forces are often the first U.S. forces to respond to a crisis and, through their persistent forward deployments, continue to preserve U.S. security interests long after conflict formally ends. The Navy’s peacetime forward presence supports missions that include securing sea lines of communication for the free flow of goods and services, assuring U.S. allies and friends, deterring adversaries, and providing a timely response to crises short of war.

A few key documents inform the Navy’s day-to-day fleet requirements:

- The 2017 National Security Strategy;<sup>2</sup>
- The 2018 National Defense Strategy (NDS);<sup>3</sup>
- The Global Force Management Allocation Plan (GFMAP);<sup>4</sup> and
- The 2018 *Design for Maintaining Maritime Superiority, Version 2.0*.

The 2018 NDS, issued by the Secretary of Defense, describes 11 Department of Defense (DOD) objectives for the Navy and the other branches of the U.S. military including “defending the homeland from attack; sustaining

Joint Force military advantages, both globally and in key regions; deterring adversaries from aggression against our vital interests; and ensuring common domains remain open and free.”<sup>5</sup> The NDS also directs the building of a more lethal, resilient, and agile force to deter and defeat aggression by great-power competitors and adversaries in all warfare domains and across the spectrum of military operations.<sup>6</sup>

The U.S. Navy must also meet forward presence requirements laid out in the GFMAP, which specifies the force presence needed around the world as determined by the combatant commanders (CCDRs) and the Secretary of Defense. To meet the objectives of the NDS and GFMAP, according to the Navy’s fiscal year (FY) 2019 budget request, “the Navy and Marine Corps primary combat force contributors are two Carrier Strike Groups (CSG) and two Amphibious Ready Groups (ARG) forward [deployed] at all times, and keeping three additional CSGs and ARGs in a ready use or surge status (2+3) to deploy within 30 days.”<sup>7</sup>

The Navy did not cite this GFMAP in its FY 2020 budget documents or congressional testimony,<sup>8</sup> but there is no indication that this requirement has been reduced. When questioned during an appearance before a subcommittee of the House Armed Services Committee about the Navy’s ability to maintain two aircraft carriers deployed and an additional three aircraft carriers available to deploy “during potential times of conflict,” Vice Admiral William Merz, Deputy Chief of Naval Operations for Warfare Systems (OPNAV N9), responded that “those numbers are actually sensitive.”<sup>9</sup>

According to the Navy’s March 2019 report to Congress on its long-range plan for construction of naval vessels, “The *Navy Strategy* articulates the maritime implementation of the *National Defense Strategy* and includes three driving elements of readiness, capability and capacity, all of which must remain balanced and scalable in order to field credible naval power.”<sup>10</sup> This *Index* focuses on these elements as the primary means by which to measure U.S. naval strength.

- Capacity must be sufficient both to defeat adversaries in major combat operations and to provide a credible peacetime forward global presence to maintain freedom of the global shipping lanes and deter aggression.
- Naval ships, submarines, and aircraft must possess the most modern warfighting capabilities, including weapons, radar, and command and control systems, to maintain a competitive advantage over potential adversaries.
- Finally, these naval platforms must be properly maintained, and their sailors must be adequately trained to ensure that they are “ready to fight tonight.”

Failure in any one of these critical measures of performance drastically increases the risk that the U.S. Navy will not be able to succeed in its mission and ensure the security of the nation and its global interests. For example, if the fleet is sufficiently large but has out-of-date equipment and weapons, and if its sailors are not proficient at warfighting, the Navy will fail to deter adversaries and will be unable to succeed in battle.

## Capacity

The Navy measures capacity by the number of ships rather than the number of sailors, and it does not count all ships equally. For example, the capabilities and contribution to combat operations of an aircraft carrier and its associated air wing are significantly greater than those of a littoral combat ship (LCS). The Navy focuses mainly on the size of its “battle force,” which is composed of ships that it considers to be directly related to its combat missions.<sup>11</sup>

This *Index* employs a benchmark of 400 ships for the minimum battle force fleet required to handle two simultaneous or nearly simultaneous major regional contingencies (MRCs), with a 20 percent additional margin that serves as a strategic reserve, while also maintaining a peacetime global forward

## Carrier Strike Group

A Carrier Strike Group (CSG) is a principal element of U.S. power projection, conducting missions such as sea control, offensive strike, and air warfare.

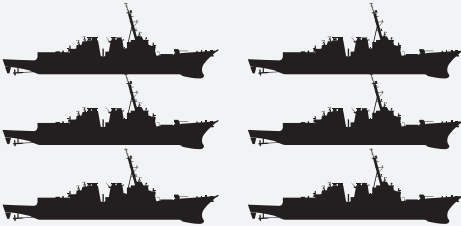


### Aircraft Carrier (CVN)

Capable of supporting combat operations for a carrier air wing of at least 70 aircraft, providing sea-based air combat and power projection capabilities that can be deployed anywhere in international waters.

### Guided Missile Destroyer (DDG)

Surface combatant capable of conducting integrated IAMD, AAW, ASuW, and ASW.



### Guided Missile Cruiser (CG)

Large surface combatant (LSC) capable of conducting integrated air and missile defense (IAMD), anti-air warfare (AAW), anti-surface warfare (ASuW), and anti-submarine warfare (ASW). CGs are the preferred platform for serving as the Air and Missile Defense Commander.



### Guided-Missile Frigate FFG(x)

Multi-mission small surface combatant (SSC) designed to complement the ASuW and ASW capabilities of the CSG as well as serve as a force multiplier for air defense capable DDGs.



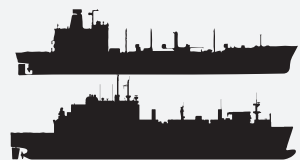
### Attack Submarine (SSN)

Multimission-capable submarines capable of performing ASW and ASuW in defense of the CSG.



### Logistics Ship

Provides fuel, dry stores, and ammunition in support of CSG operations.



## Expeditionary Strike Group

An Expeditionary Strike Group (ESG) is the primary element of U.S. amphibious warfare and expeditionary operations.



### Amphibious Assault Ship LHA or LHD

A landing helicopter assault ship (LHA) or landing helicopter dock (LHD). Capable of supporting short take-off vertical landing (STOVL) operations for embarked Marine strike aircraft squadron as well as tilt-rotor and helicopter squadrons. Some of these ships possess a well deck to launch landing craft to support ship to shore transport of Marines.

### Amphibious Transport Dock (LPD), and Amphibious Dock Landing Ship (LSD)

Embarked landing craft and amphibious assault vehicles (AAV) augmented by helicopters and tilt-rotor aircraft use LPDs and LSDs to transport and land Marines, and their equipment and supplies.



### Guided Missile Destroyer (DDG)

LSC capable of conducting integrated IAMD, AAW, ASuW, and ASW.



### Logistics Ship

Provides fuel, dry stores, and ammunition in support of CSG operations.



### Guided-Missile Frigate FFG(x)

Multimission small surface combatant (SSC) designed to complement the ASuW and ASW capabilities of the CSG as well as serve as a force multiplier for air defense capable DDGs.



presence to deter potential aggressors and assure our allies and maritime partners that the nation remains committed to defending its national security interests and alliances. The analysis that determined this minimum battle force fleet included an independent review of previous force structure assessments, historical naval combat operations, Navy and Marine Corps guidance on naval force composition, current and near-future maritime threats, U.S. naval strategy, and enduring naval missions.

This *Index* assesses that a minimum of 400 U.S. Navy battle force ships is required to provide:

- The 13 carrier strike groups and 15 expeditionary strike groups (ESGs) required to meet the simultaneous two-MRC construct;
- The historical steady-state demand of approximately 100 ships constantly forward deployed in key regions around the world; and
- Sufficient capacity to maintain the Navy's ships properly and ensure that its sailors are adequately trained to "fight tonight."

While this represents a significant increase from the language of the FY 2018 National Defense Authorization Act (NDAA), which specified an official U.S. policy of "not fewer than 355 battle force ships,"<sup>12</sup> and the Navy's own 2016 Force Structure Assessment (FSA),<sup>13</sup> both the Navy's recent fleet readiness issues and the 2018 NDS's focus on the "reemergence of long-term strategic competition"<sup>14</sup> point to the need for a much larger and more capable fleet.

The vast distances of the world's oceans and the relatively slow average transit speeds of naval warships (15 knots) require that the U.S. Navy maintain sufficient numbers of ships constantly forward deployed in key regions around the world to respond quickly to crises and deter potential aggression. This larger fleet includes not only additional small surface combatants (SSCs) to support the strike

groups, but also a significant increase in combat logistics force (CLF) ships to ensure that distributed forces deployed in peacetime and in combat operations can receive timely fuel, food, and ammunition resupply.

On average, four ships in the fleet are required to maintain one ship forward deployed. Most important, the fleet must be large enough to provide the requisite number of CSGs and ESGs when called upon as the primary elements of naval combat power during an MRC operation. Although a 400-ship fleet may be difficult to achieve based on current DOD fiscal constraints and the present capacity of the shipbuilding industrial base, this *Index* benchmark is budget agnostic and based strictly on assessed force-sizing requirements.

As of August 12, 2019, the Navy sailed 290 vessels as part of its battle force fleet,<sup>15</sup> up from 284 in 2018<sup>16</sup> but still well below both the Navy's goal of 355 ships and the 400-ship fleet required to fight and win two MRCs. The FY 2019 NDAA provides \$22.3 billion for the construction of 13 new ships, including (among others listed) three littoral combat ships (LCS); three Flight III *Arleigh Burke* guided missile destroyers (DDG); two fast replenishment oilers (T-AO); expeditionary fast transport (T-EPF); and one towing, salvage, and rescue ship (T-ATS).<sup>17</sup> The Navy has requested the procurement of 12 ships in FY 2020, marking the "largest shipbuilding budget request in over 20 years."<sup>18</sup>

On average, depending on the ship class, a ship is commissioned and joins the fleet three to five years after it is purchased by the Navy. The Navy plans to commission seven additional ships and submarines by the end of 2019 and 10 ships and submarines in FY 2020, including four *Arleigh Burke*-class DDGs, three *Virginia*-class nuclear attack submarines (SSNs), two LCSs, and one T-EPF.<sup>19</sup> The Navy will also retire five battle force ships in FY 2020: two *Los Angeles*-class SSNs and three mine countermeasure ships (MCMs).<sup>20</sup>

The number of ships decommissioned will increase significantly over the next five years as additional *Los Angeles*-class SSNs and MCMs reach the end of their service lives. The recent

Navy decision to retire eight *Ticonderoga*-class guided missile cruisers instead of conducting service life extensions (SLEs) will further slow the pace at which fleet size can grow.<sup>21</sup> The Navy completed a technical evaluation of the “feasibility of extending the service life of selected non-nuclear vessels” in 2018 and could decide to extend the life of ships from several classes from seven to 17 years depending on the funding available and shipyard capacity to achieve and maintain a 355-ship Navy more rapidly by reducing ships lost to decommissioning.<sup>22</sup>

The largest proportional shortfall in the Navy fleet assessed in the *2020 Index* is the same as in the past five editions: small surface combatants.<sup>23</sup> As of August 20, 2019, the Navy’s SSC inventory included 19 LCSs and 11 MCM ships for a total of 30 SSCs,<sup>24</sup> 22 below the objective requirement of 52 established by the Navy<sup>25</sup> and 41 less than the *Index* requirement of 71.<sup>26</sup>

The next-largest shortfall occurs in combat logistics force ships. As of August 20, 2019, the Navy’s CLF inventory was comprised of 12 *Lewis and Clark*-class dry cargo and ammunition ships (T-AKEs); 15 *Henry J. Kaiser*-class fleet replenishment oilers (T-AOs); and two *Supply*-class fast combat support ships (T-AOEs), for a total of 29 CLF ships.<sup>27</sup> This is three below the Navy requirement of 32 ships and 25 less than the *Index* requirement of 54.<sup>28</sup>

As of August 20, 2019, the Navy’s attack submarine inventory stood at 50 submarines, comprised of 30 *Los-Angeles*-class (SSN 688); three *Seawolf*-class (SSN 21); and 17 *Virginia*-class (SSN 774) submarines.<sup>29</sup> Although the attack submarine shortfall is not the largest in comparison to the Navy’s requirement of 66 submarines<sup>30</sup> or the Heritage requirement of 65 submarines,<sup>31</sup> several factors make this the most challenging and most important force level issue for the Navy.

- The growing anti-access/area denial (A2/AD) capabilities of great-power competitors like China and the ability of submarines to penetrate these long-range defenses have made attack submarines a

critical component of joint force missions such as power projection and sea control.

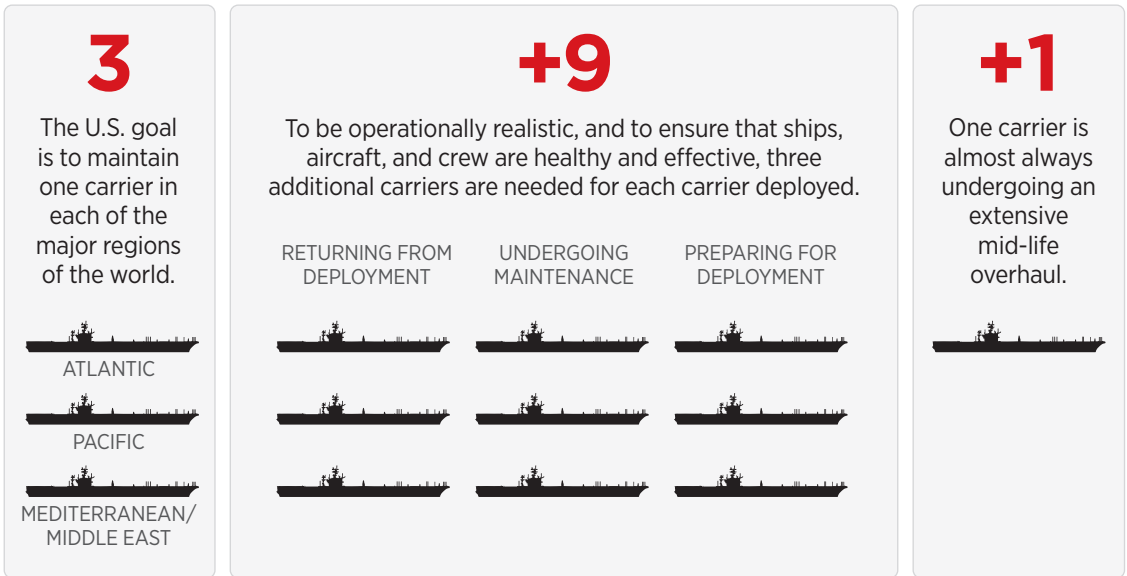
- Geographic combatant commanders have repeatedly expressed concerns that the Navy cannot meet their operational demands for attack submarines. Admiral Philip Davidson, Commander, U.S. Indo-Pacific Command, has stated that his Pacific forces receive only slightly more than 50 percent of their submarine mission requests.<sup>32</sup> The submarine force also gives the U.S. military its greatest competitive advantage against great-power competitors Russia and China.
- The submarine industrial base has very limited excess capacity over the next 30 years to accelerate the production of attack submarines. The Navy’s FY 2020 30-year shipbuilding plan identified opportunities to build only three additional *Virginia*-class submarines over the next six years and an additional nine next-generation SSNs between FY 2037 and FY 2049.<sup>33</sup>

The aircraft carrier force suffers a capacity shortfall of two hulls: As of August 20, 2019, 11 were in the fleet, and the two-MRC construct requires 13.<sup>34</sup> Current U.S. law requires the Navy to maintain a force of “not less than 11 operational aircraft carriers.”<sup>35</sup> The FY 2019 NDAA explicitly specifies “the sense of Congress that the United States should accelerate the production of aircraft carriers to rapidly achieve the Navy’s goal of having 12 operational aircraft carriers.”<sup>36</sup>

The Congressional Research Service (CRS) has assessed that “shifting carrier procurement to 3- or 3.5-year centers could achieve a 12-carrier fleet as soon as the 2030s, unless the service lives of one or more existing carriers were substantially extended.”<sup>37</sup> The Navy’s FY 2029 budget “supports 11 aircraft carriers and 33 large amphibious ships that serve as the foundation upon which our carrier strike groups and amphibious ready groups are based.”<sup>38</sup>

## The Case for 13 Carriers

The U.S. Navy carrier fleet is a critical element of U.S. power projection and supports a constant presence in regions of the world where permanent basing is limited. To handle this large mission properly, Heritage Foundation experts recommend a fleet of 13 carriers.



 heritage.org

The carrier force fell to 10 between December 2012 and July 2017. The USS *Gerald R. Ford* (CVN-78) was commissioned on July 22, 2017, returning the Navy’s carrier force to 11 ships. While the *Ford* is now part of the fleet battle force, however, it will not be ready for routine flight operations until 2020 and will not operationally deploy until 2022.<sup>39</sup> In addition, through 2037, one *Nimitz*-class carrier at a time will be in a four-year refueling and complex overhaul (RCOH) to modernize the ship and refuel the reactor to support its full 50-year service life. The carrier in RCOH will count as a battle force ship but will not be operationally deployable during this four-year period. The combination of these two factors means that only nine aircraft carriers will be operationally available until 2022.

The Navy’s FY 2020 budget request is notable for its apparent contradiction regarding the required size of its aircraft carrier fleet. On the one hand, the budget included a two-ship aircraft carrier procurement of CVN 80 and CVN 81 in FY 2020, realizing an estimated \$3.9 billion in savings over buying the ships separately.<sup>40</sup> The Navy simultaneously announced its decision to cancel the previously planned RCOH for USS *Harry S. Truman* (CVN 75), retiring the ship with over 24 years of service life remaining as well as deactivating one carrier air wing. The Navy’s FY 2020 30-year shipbuilding plan stated that this decision was “in concert with the Defense Department’s pursuit of a more lethal balance of high-end, survivable platforms (e.g. CVNs) and complementary capabilities from emerging technologies.”<sup>41</sup>

According to Vice Admiral Merz, the decision to retire USS *Truman* was “not a warfighting decision. It was more of an investment decision”<sup>42</sup>

Navy officials declared that canceling USS *Truman*’s refueling overhaul would save \$3.4 billion over the FY 2020–FY 2024 period and a total of \$5.6 billion. When factoring in the cost to retire and dismantle the aircraft carrier as well as funds already spent on the replacement reactor cores, the net estimated savings is closer to \$3.5 billion. The Navy’s FY 2020 budget redirected these savings to fund the development and fielding of new lethal technologies such as directed energy weapons, hypersonic missiles, artificial intelligence, and unmanned systems. Navy leadership also cited the more modern *Ford*-class aircraft carrier’s increased lethality and power generation, 33 percent higher sortie rate, a smaller crew with approximately 600 fewer sailors, two and a half times greater electrical power, and over \$4 billion in life-cycle cost savings over the *Nimitz*-class as additional reasons for prioritizing the two-carrier buy over refueling USS *Truman*.<sup>43</sup>

The decision to retire *Truman* engendered significant bipartisan opposition from Congress. The Administration subsequently reversed its decision to decommission *Truman*, and Vice President Mike Pence made an official announcement on April 30, 2019, onboard the carrier.<sup>44</sup> On May 7, 2019, Under Secretary of the Navy Thomas Modly stated “that it is still ‘TBD’ regarding what cuts would be made to pay for the RCOH over the next several years, but he added that the Navy and the Office of the Secretary of Defense are looking across all the services’ budgets for options.”<sup>45</sup>

According to the CRS, “the Navy states that the CVN-75 RCOH can no longer begin in FY2024, as planned prior to the Navy’s FY2020 budget submission, because the Navy spent the months prior to April 30 planning for the ship’s deactivation rather than for giving it an RCOH.”<sup>46</sup> Since *Truman*’s refueling overhaul will now begin in FY 2025, its proposed funding profile will commence in FY 2021. The Navy will only need an additional \$16.9 million

in its FY 2021 budget, but the required funding will increase to \$234.7 million in FY 2022 with an additional \$1.3 billion in FY 2023 and FY 2024.<sup>47</sup> Without increased funding beginning in FY 2021, the Navy will be forced either to make cuts in its shipbuilding plan or to curtail the development of the new lethal technologies for which the planned savings were earmarked.

In December 2016, the U.S. Navy released its latest study of forecasted fleet requirements. The Navy Force Structure Assessment was developed to determine the correct balance of existing forces for “the ever-evolving and increasingly complex maritime security threats the Navy is required to counter in the global maritime commons.”<sup>48</sup> The Navy concluded that a 653-ship force would be necessary to address all of the demands registered in the FY 2017 Global Force Management (GFM) system and that a fleet of 459 ships (200 fewer than the ideal fleet but thought still to be too expensive given current and projected limits on defense spending) would meet warfighting requirements but also accept risk in providing continual presence missions.<sup>49</sup>

The Navy’s final force objective of 355 ships as recommended by the FSA is based on a minimum force structure that “complies with current defense planning guidance,” “meets approved Day 0 and warfighting response timelines,” and “delivers future steady state and warfighting requirements...with an acceptable degree of risk.”<sup>50</sup> This is an increase of 47 in the minimum number of ships from the previous requirement of 308. The most significant increases are:

- Aircraft carriers, from 11 to 12;
- Large surface combatants (guided missile destroyers (DDGs) and cruisers (CGs)) from 88 to 104 “to deliver increased air defense and expeditionary BMD [ballistic missile defense] capacity and provide escorts for the additional Aircraft Carrier”;
- Attack submarines (SSNs), from 48 to 66 to “provide the global presence required



to support national tasking and prompt warfighting response”; and

- Amphibious ships, from 34 to 38.<sup>51</sup>

Section 1025 of the FY 2018 National Defense Authorization Act states in part that “[i]t shall be the policy of the United States to have available, as soon as practicable, not fewer than 355 battle force ships, comprised of the optimal mix of platforms, with funding subject to the availability of appropriations or other funds.”<sup>52</sup> According to the Navy’s long-range plan for construction of naval vessels:

In response to the latest *National Defense Strategy*, *Navy Strategy* and *CNO’s Design for Maintaining Maritime Superiority 2.0*, the Navy is on track to complete the next FSA by the end of 2019. Some of the key elements that will be reviewed include ongoing threat-based fleet architecture review, logistics in support of DMO [distributed maritime operations], surface ship mix with the inclusion of the new frigate, deterrence per the *National Defense Strategy*, and legacy capital investments versus the efficacy of next generation capabilities.<sup>53</sup>

Remarks by Navy leadership during congressional testimony have indicated that the new FSA will likely result in a force-level requirement of 355 ships or more. The mix of ship types is also expected to change to provide an increased number of small surface combatants (frigates) and logistics ships to support more dispersed maritime operations.<sup>54</sup>

The 2019 FSA may discuss unmanned ships and undersea vehicles but almost certainly will not establish an unmanned force size or replace manned ships with unmanned vessels. The FY 2020 30-year shipbuilding plan, however, does address unmanned and optionally manned systems and the battle force:

The physical challenges of extended operations at sea across the spectrum of

competition and conflict, the concepts of operations for these platforms, and the policy challenges associated with employing deadly force from autonomous vehicles must be well understood prior to replacing accountable battle force ships.<sup>55</sup>

The Navy’s FY 2020 30-year shipbuilding plan provides the foundation for building the Navy the nation needs and ultimately achieving the congressionally mandated requirement of 355 battle force ships. Specifically, it states that “[t]he PB2020 30-year shipbuilding plan includes procurement of 55 battle force ships within the FYDP” and that “[o]verall inventory will reach 314 ships by FY2024 and 355 ships in FY2034.”<sup>56</sup> The FY 2019 plan also buys 55 ships over the FY 2020–FY 2024 period but builds only 301 ships over the next 30 years.<sup>57</sup>

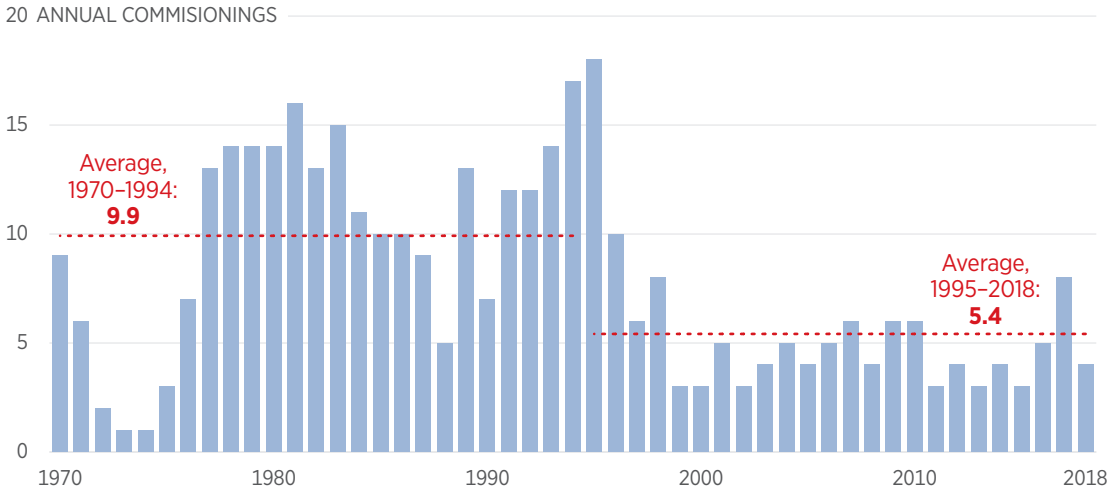
Although the FY 2020 plan achieves 355 ships by FY 2034, approximately 20 years earlier than would be the case under the FY 2019 plan, this is done primarily by extending the service lives of all *Arleigh Burke*-class DDGs to 45 years, not by increasing the numbers of new ships.<sup>58</sup> This 355-ship fleet will not possess the desired force mix as defined in the 2016 FSA. It will consist of significantly more large surface combatants than needed (i.e., destroyers and cruisers) but will have fewer aircraft carriers, attack submarines, and amphibious ships than required.<sup>59</sup>

The FY 2020 shipbuilding plan also includes several significant changes in the Navy’s shipbuilding profile over the next five years. It accelerates the acquisition of CVN-81 from FY 2023 to FY 2020 while adding an additional *Virginia*-class submarine and FFG(X) frigate. The plan also decreases the number of LPD-17 Flight II amphibious warships purchased over the next five years from four to two.<sup>60</sup>

The 30-year shipbuilding plan also includes service life extensions for qualified candidate vessels as a key tool with which to increase fleet size more rapidly. The Navy’s FY 2019 budget submission included SLEs for six *Ticonderoga*-class cruisers, four mine countermeasures ships, and “the first of potentially five” *Los*

## Rate of U.S. Navy Ship Commissionings Nearly Cut in Half

The U.S. Navy must commission an average of 14 ships annually to reach a 400-ship Navy by the late-2030s. Its current commissioning rate is about 5 ships annually.



**SOURCE:** Shipbuilding History, “Large Naval Ships and Submarines,” <http://www.shipbuildinghistory.com/navalships.htm> (accessed August 8, 2018).



*Angeles*-class attack submarines.<sup>61</sup> On April 12, 2018, Vice Admiral Merz informed the House Armed Services Seapower and Force Projection Subcommittee that the Navy will extend the entire *Arleigh Burke* destroyer class to a service life of 45 years.<sup>62</sup>

While the FY 2020 shipbuilding plan includes the DDG-51-class life extension and plans to refuel two *Los Angeles*-class attack submarines over the next five years, it also removes funding for the SLEs for the six oldest *Ticonderoga*-class cruisers “in favor of readiness and other lethality investments.”<sup>63</sup> In April 2019, Admiral Richardson stated that “[w]e’re going to continue to assess the cruisers...and study that to see if it is a good return on the taxpayer’s investment, given the war-fighting punch they bring.”<sup>64</sup> The cost of modernizing the combat systems and key equipment must be weighed against the increased lethality provided by the life extension as well as the fact that *Ticonderoga*-class cruisers have

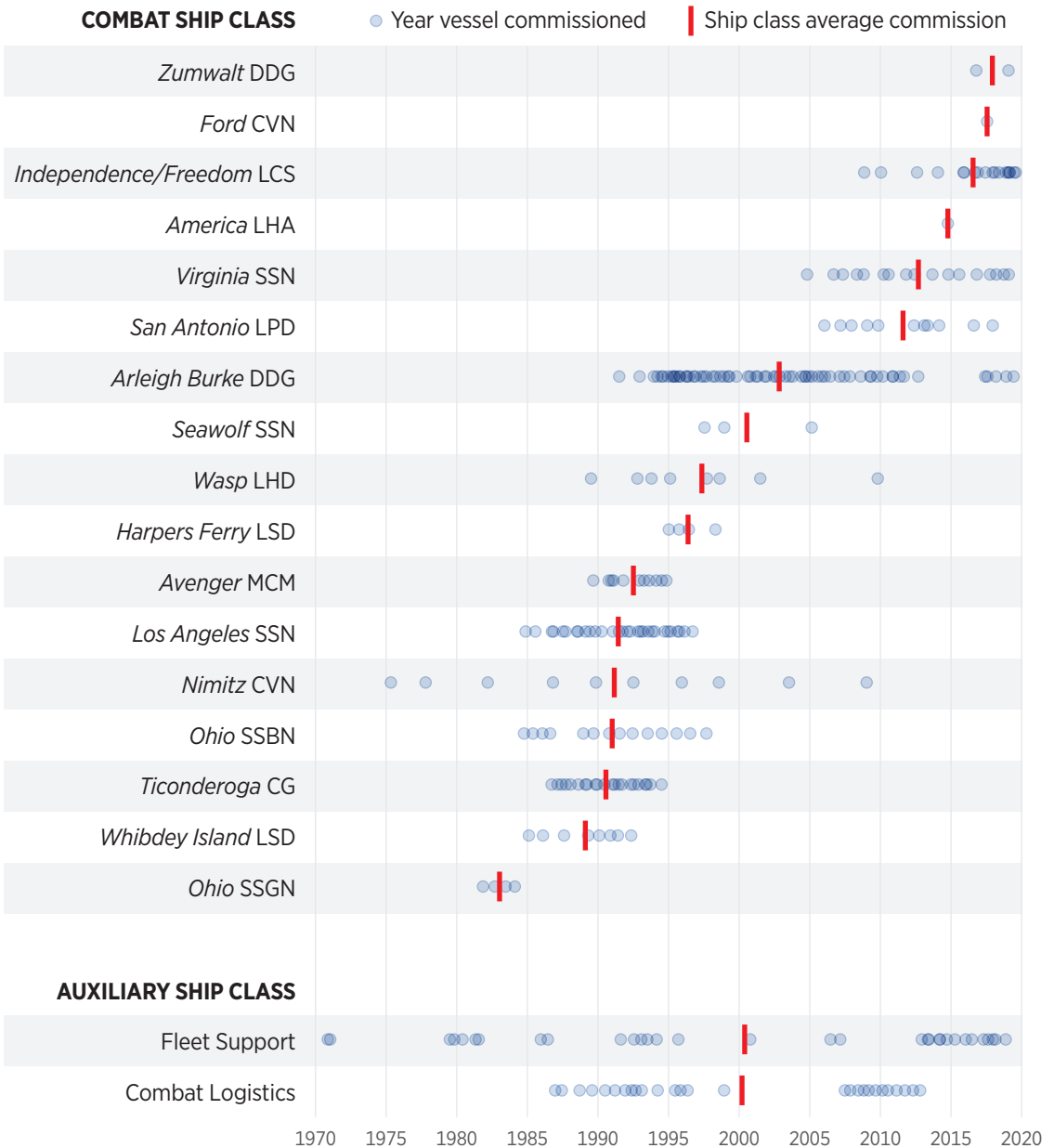
26–32 more vertical launch system (VLS) cells than *Arleigh Burke*-class destroyers have.

The FY 2020 plan also removes the planned life extensions for four MCM ships and accelerates the retirement of all *Avenger*-class MCMs by FY 2023.<sup>65</sup> The Navy states that its transition to “a broad-spectrum, cross-domain, expeditionary approach that includes dedicated LCS-based MCM ships, MCM modules for use aboard Vessels of Opportunity (VOO), small expeditionary MCM teams, and undersea vehicles” supports this accelerated transition from legacy MCM ships.<sup>66</sup>

The mine mission package aviation assets have been certified for operation on *Independence*-variant LCS ships, and certification of *Freedom*-variant ships should occur by the end of FY 2019. Certification of additional undersea MCM assets on *Independence* variants is expected by the end of FY 2019 and on *Freedom* variants by FY 2020. The complete mine mission packages will not reach initial

## Length of Service Since Commissioning

The number and types of ships commissioned by the U.S. Navy has decreased over the past 20 years. The procurement holiday of the 1990s and decreased emphasis on modernization in a time of fiscal constraints have resulted in a fleet of increasing age.



**NOTE:** Data are current as of September 13, 2019.

**SOURCE:** Naval Sea Systems Command, Naval Vessel Register, "Fleet Size," <http://www.nvr.navy.mil/NVRSHIPS/FLEETSIZE.HTML> (accessed September 13, 2019).

operating capability (IOC) until FY 2022 at the earliest.<sup>67</sup> Additional testing and certification delays could cause the Navy to lose a certified and fully operational MCM capability beginning in FY 2023.

Taken alone, total fleet size can be a misleading statistic; related factors must also be taken into account when considering numbers of ships. One such important factor is the number of ships that are forward deployed to meet operational demands. On average, the Navy maintains approximately 90–100 ships (one-third of the total fleet) deployed at any given time. The type or class of ship is also important. Operational commanders must have the proper mix of capabilities deployed to enable a timely and effective response to emergent crises.

Not all ships in the battle force are at sea at the same time. The majority of the fleet is based in the continental United States (CONUS) to undergo routine maintenance and training, as well as to limit deployment time for sailors. However, the CCDRs' requirements for naval power presence in each of their regions provide an impetus to have as many ships forward deployed as possible.

In November 2014, the Navy established an Optimized Fleet Response Plan (OFRP) “to ensure continuous availability of manned, maintained, equipped, and trained Navy forces capable of surging forward on short notice while also maintaining long-term sustainability of the force.”<sup>68</sup> The plan incorporates four phases of ship availability/maintenance that result in a basic ratio of 4:1 for CONUS-based force structure required for deployed platforms.

In 2019, the Navy had 104 ships deployed globally, including submarines.<sup>69</sup> This represented 36 percent of the total battle force fleet. As of August 9, 2019, the Navy had 76 “Deployed Battle Force Across the Fleet Including Forward Deployed Submarines.”<sup>70</sup> While the Navy remains committed to deploying roughly a third of its fleet at all times, capacity shortages have caused the current fleet to fall below the levels needed to fulfill the Navy’s stated forward presence requirements and below

the levels needed for a fleet that is capable of projecting power at the two-MRC level.

The Navy has attempted to increase forward presence by emphasizing non-rotational deployments (having a ship “homeported” overseas or keeping it forward stationed):<sup>71</sup>

- **Homeported:** The ships, crew, and their families are stationed at the port or based abroad.
- **Forward Stationed:** Only the ships are based abroad while crews are rotated out to the ship.<sup>72</sup> This deployment model is currently used for LCS and SSGNs manned with rotating blue and gold crews, effectively doubling the normal forward deployment time.

Both of these non-rotational deployment options require formal agreements and cooperation from friends and allies to permit the Navy’s use of their facilities, as well as U.S. investment in additional facilities abroad, but they also allow one ship to provide a greater level of presence than can be provided by four ships based in CONUS and in rotational deployment because they offset the time needed to deploy ships to distant theaters.<sup>73</sup> The Navy’s GFM planning assumptions assume a forward deployed presence rate of 19 percent for a CONUS-based ship compared to a 67 percent presence rate for an overseas-homeported ship.<sup>74</sup>

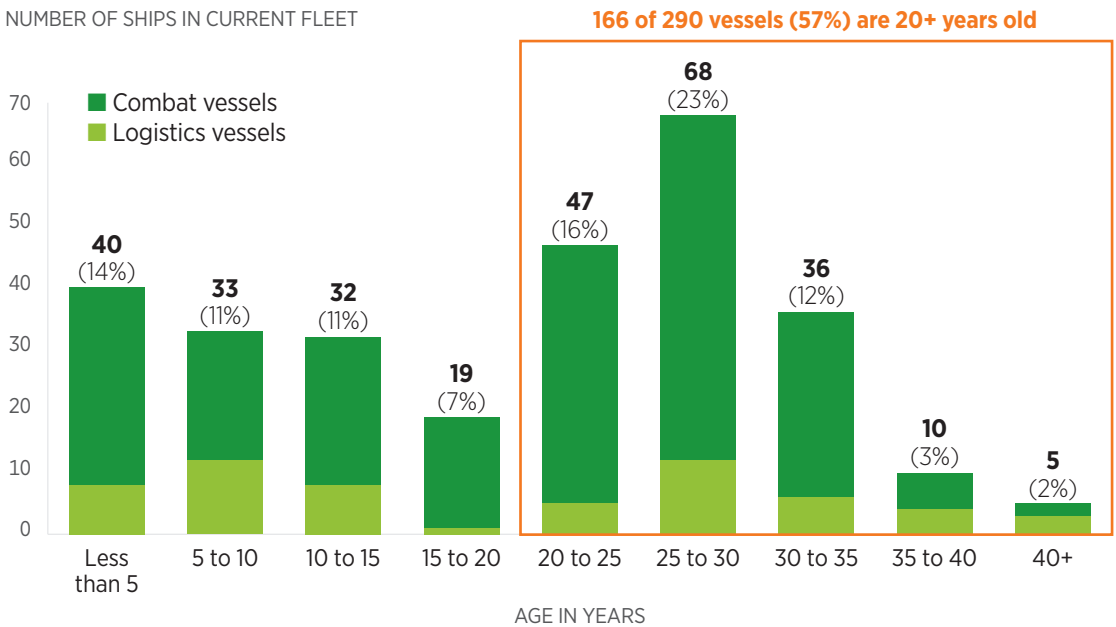
## Capability

Scoring the U.S. Navy’s overall ability to protect U.S. interests globally is not simply a matter of counting the fleet. The quality of the battle force is also important in determining naval strength.

A comprehensive measure of platform capability would involve a comparison of each ship and its weapons systems relative to the military capabilities of other nations. For example, a complete measure of naval capabilities would have to assess not only how U.S. platforms would match up against an enemy’s

## An Aging U.S. Navy

NUMBER OF SHIPS IN CURRENT FLEET



**NOTE:** Data are current as of September 13, 2019.

**SOURCE:** Naval Sea Systems Command, Naval Vessel Register, "Fleet Size,"

<http://www.nvr.navy.mil/NVRSHIPS/FLEETSIZE.HTML> (accessed September 13, 2019).

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weapons, but also whether formal operational concepts would be effective in a conflict, after which the assessment would be replicated for each potential conflict. This is a necessary exercise and one in which the military currently engages, but it is beyond the scope of this *Index* because such details and analysis are routinely classified.

Capability can be usefully assessed based on the age of ships, modernity of the platform, payloads and weapons systems carried by ships, and the ability of planned modernization programs to maintain the fleet's technological edge. The Navy has several classes of ships that are nearing the end of their life spans, and this will precipitate a consolidation of ship classes in the battle force.

Most of the Navy's battle force fleet consists of legacy platforms. Of the 20 classes of ships in the Navy's inventory, only eight are

currently in production. For example, 61 percent of the Navy's attack submarines are *Los Angeles*-class submarines, an older platform that is being replaced by the more modern and capable *Virginia*-class.<sup>75</sup>

The 30-year shipbuilding plan is not limited to programs of record and assumes procurement programs that have yet to materialize. Some of the Navy's ship designs in recent years, such as the *Gerald R. Ford*-class aircraft carrier, the *San Antonio*-class amphibious ship, and the littoral combat ship, have been substantially more expensive to build than the Navy originally estimated.<sup>76</sup> The first ship of any class is typically more expensive than early estimates project, which is not entirely surprising given the technology assumptions and cost estimates that must be made several years before actual construction begins. In fact, only two of the last 11 lead ships have come in below the

original cost estimate.<sup>77</sup> In addition, the Navy is acting to ensure that critical technologies are fully mature (T-AO 205 *John Lewis*-class fleet replenishment oiler) before incorporation into ship design and requiring greater design completion (83 percent for *Columbia* ballistic missile submarine) before actual production.<sup>78</sup>

The Navy retired its last *Oliver Hazard Perry*-class guided missile frigates in 2015 and since then has been without a multi-mission SSC that can perform anti-submarine warfare (ASW); surface warfare (SUW); and local air defense in support of CSGs and ESGs and as a logistic fleet escort. The littoral combat ship is the only current SSC in the fleet other than the MCM ships.<sup>79</sup>

The Navy recently awarded Raytheon the LCS's over-the-horizon anti-ship (OTH) weapon contract to provide an unspecified number of the Kongsberg-designed naval strike missiles.<sup>80</sup> This encapsulated anti-ship and land attack missile has a range of up to 100 nautical miles and will provide a significant increase in the LCS's offensive capabilities.<sup>81</sup>

Critics of the LCS program have continued to express concerns about “past cost growth, design and construction issues with the first LCSs”; “the survivability of LCSs (i.e., their ability to withstand battle damage)”; “whether LCSs are sufficiently armed and would be able to perform their stated missions effectively”; and “the development and testing of the modular mission packages for LCSs.”<sup>82</sup> The annual report from DOD's Director, Operational Test and Evaluation (DOT&E), has contained numerous comments, many of them extremely critical, regarding LCS operational performance and LCS mission modules.<sup>83</sup>

The LCS concept of operations (CONOPS) has been modified several times since its original design. The Navy's current plan calls for three divisions on each coast of the United States, each with four ships dedicated to a specific mission: ASW, SUW, or MCM.<sup>84</sup> One ship in each division will be dedicated to training, and the other three ships will conduct periodic operational deployments.<sup>85</sup> The non-training ships will be operated by dual crews, similar to

U.S. ballistic missile submarines. This enables the Navy to keep the ships forward deployed longer than the typical seven months without overtaxing their crews. The Navy predicts that by approximately FY 2023, 13 of the 24 ships in the six mission divisions will be maintained forward stationed for 24 months on a rotational basis: three in Singapore, three in Sasebo, Japan, or another Western Pacific location, and seven in Bahrain.<sup>86</sup>

The modular LCS design depends on mission packages (MPs) to provide warfighting capabilities in the SUW, ASW, and MCM mission areas. Until the MPs have reached IOC, LCS will not reach its full warfighting capability. The gun and maritime security mission modules of the SUW MP reached IOC in FY 2014 and FY 2015. The surface-to-surface mission module with the Longbow Hellfire missile reached IOC for the *Freedom*-variant ships in early FY 2019 and is expected to reach IOC for the *Independence* variant by late FY 2019. The ASW MP is scheduled to reach IOC in FY 2020, a delay from FY 2019 caused by Congress's decision to cut all funding for variable-depth sonar procurement in FY 2019.<sup>87</sup>

Originally planned as the first MP to reach IOC, the MCM MP will now be the last to reach IOC with all of its capabilities. The MCM MP aviation assets have been certified for operation on *Independence*-variant LCS ships; the *Freedom*-variant ships should be certified by the end of 2019. Additional undersea MCM assets certification should be complete by the end of 2019 for *Independence* variants and by the end of 2020 for *Freedom* variants. The complete mine mission packages will not reach initial operating capability until 2022 at the earliest.<sup>88</sup> While the LCS mission modules have had numerous technical problems and delays during their development, congressional cuts between FY 2015 and FY 2018 have only compounded the delays in delivering operational mission packages to the fleet.<sup>89</sup>

After not deploying any LCSs in FY 2018, Vice Admiral Richard Brown, Commander of Naval Surface Forces, announced that the Navy would deploy three LCSs in FY 2019.

The Independence-variant USS *Montgomery* (LCS-8) and USS *Gabrielle Giffords* (LCS-10) from the San Diego-based Littoral Combat Ship Squadron-1 (LCSRON-1) will deploy to the Western Pacific. The Navy did not state where the Freedom-variant USS *Detroit* (LCS-7) from Mayport-based LCSRON-2 would deploy. Based on the long-term plan to forward station seven LCSs in Bahrain, as well as the threat posed by Iranian fast attack craft (FAC) and fast inshore attack craft (FIAC), *Detroit* will likely deploy to Bahrain. All three LCSs will deploy with the SUW MP to address lower-threat missions and alleviate some of the operational demand on U.S. destroyers and cruisers. An additional LCSRON-2 LCS is scheduled to deploy early in FY 2020. Vice Admiral Brown also stated that these deployments will commence LCS persistent deployed forward presence as planned under the 2016 LCS operational plan.<sup>90</sup>

The FY 2019 NDAA included funding for three LCSs, two more than the Navy's FY 2019 budget request and three more than the Navy's 2016 FSA requirement of 32 ships. The Navy has not included any LCSs in its FY 2020 budget request because it will be awarding the initial FFG(X) contract in FY 2020. The Navy projects that the LCS battle force will reach 20 LCSs by the end of FY 2019 and 22 by the end of FY 2020.<sup>91</sup> Even when combined with the 11 remaining mine countermeasure vessels in the fleet, this is still well below the fleet size of 71 small surface combatants needed to fulfill the Navy's global responsibilities.

In July 2017, the Navy released a Request for Information (RFI) to the shipbuilding industry with the goal of building a new class of 20 ships, currently referred to as the future guided missile frigate (FFG(X)), beginning in FY 2010.<sup>92</sup> The Navy stated that:

The purpose of this type of ship is to (1) fully support Combatant and Fleet Commanders during conflict by supplementing the fleet's undersea and surface warfare capabilities, allow for independent operations in a contested environment,

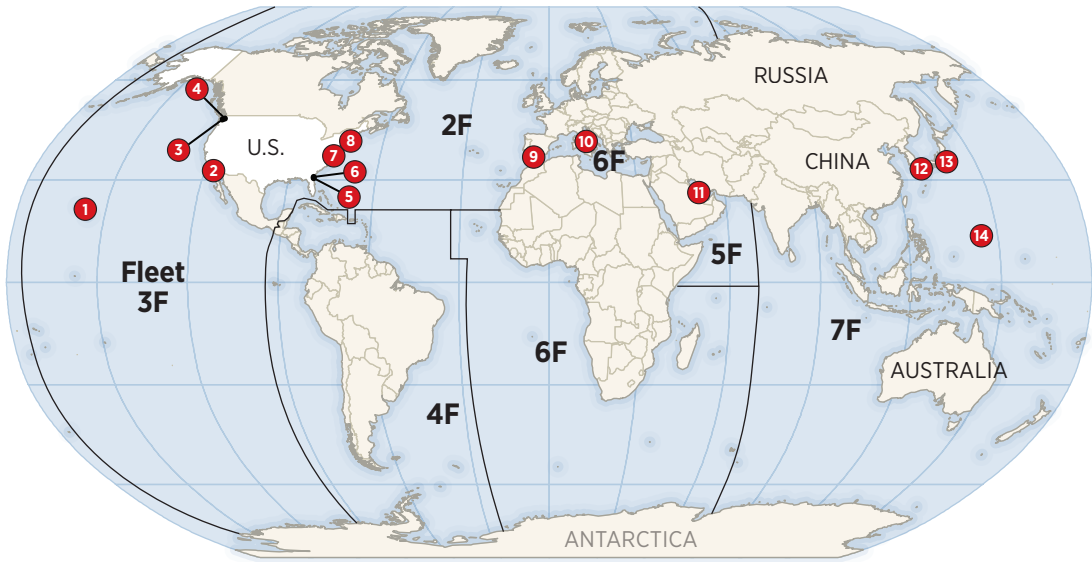
extend the fleet tactical grid, and host and control unmanned systems; and (2) relieve large surface combatants from stressing routine duties during operations other than war.<sup>93</sup>

The RFI further specified that:

- “[T]he FFG(X) will normally aggregate into strike groups and Large Surface Combatant led surface action groups but also possess the ability to robustly defend itself during conduct of independent operations while connected and contributing to the fleet tactical grid”;
- “Complement the surface warfare (SuW) capabilities of a Carrier Strike Group and Expeditionary Strike Group with capacity in aggregated operations (e.g., as a pack) to deter or defeat aggression by adversary warships with over-the-horizon anti-ship missiles”;
- “Perform anti-submarine warfare (ASW) scout and patrol missions that complement the capabilities of Strike Group and theater operations with enhanced active and passive undersea sensing capabilities”;
- “Support transoceanic logistics movements by serving as a force multiplier to area air defense capable destroyers.”<sup>94</sup>

The Navy's FY 2020 shipbuilding plan would procure the 20 frigates between FY 2020 and FY 2030. The Navy's desire to award the FFG(X) detailed design and construction contract in FY 2020 did not provide sufficient time for a completely new design, instead driving it to build FFG(X) based on an existing SSC ship design that can be modified to meet the FFG(X)'s specific capability requirements.<sup>95</sup> On February 16, 2018, the Navy awarded five FFG(X) conceptual design contracts to Austal USA; Huntington Ingalls Industry/Ingalls Shipbuilding (HII/Ingalls); Lockheed Martin;

## Key U.S. Naval Installations



- 1 Joint Base Pearl Harbor-Hickham, Hawaii**  
U.S. Pacific Fleet headquarters; homeport to CGs, DDGs, and SSNs
- 2 Naval Base San Diego and Naval Base Coronado, Calif.**  
U.S. Third Fleet headquarters; largest West Coast U.S. naval base; homeport to CVNs, CGs, DDGs, LCSs, SSNs, and amphibious ships
- 3 and 4 Naval Base Kitsap and Naval Station Everett, Wash.**  
Homeport to CVNs, SSNs, DDGs, and U.S. Pacific Fleet SSBNs and SSGNs
- 5 Naval Station Mayport, Fla.**  
U.S. Fourth Fleet headquarters; homeport to CGs, DDGs, amphibious ships, and LCSs
- 6 Naval Submarine Base King’s Bay, Ga.**  
Homeport to U.S. Fleet Forces Command SSBNs, and SSGNs
- 7 Naval Base Norfolk and Joint Expeditionary Base Little Creek, Va.**  
U.S. Fleet Forces Command and U.S. Second Fleet headquarters; largest naval base in the world; homeport to CVNs, CGs, DDGs, amphibious ships, and SSNs
- 8 Naval Submarine Base New London, Conn.**  
Homeport to SSNs
- 9 Naval Station Rota, Spain**  
Homeport to ballistic missile defense DDGs
- 10 Naval Support Activity Gaeta, Italy**  
U.S. Sixth Fleet headquarters; homeport to U.S. Sixth Fleet command ship
- 11 Naval Support Activity, Bahrain**  
U.S. Fifth Fleet headquarters; homeport for MCM ships; provides logistics support for ships forward deployed to U.S. Fifth Fleet
- 12 U.S. Fleet Activity Sasebo, Japan**  
Homeport to amphibious ships and MCM ships
- 13 U.S. Fleet Activity Yokosuka, Japan**  
Largest overseas U.S. naval base; U.S. Seventh Fleet headquarters; homeport to CVN, CGs, DDGs, and U.S. Seventh Fleet command ship; provides logistics support for ships forward deployed to U.S. Seventh Fleet
- 14 Naval Base Guam: Navy Expeditionary Force Command Pacific headquarters**  
Homeport to SSNs and submarine tenders; provides logistics support for SSNs forward deployed to U.S. Seventh Fleet

**NOTE:** Fleet boundaries are approximate.  
**SOURCE:** Heritage Foundation research.



Fincantieri/Marinette Marine (F/MM); and General Dynamics/Bath Iron Works (GD/BI-W).<sup>96</sup> The Navy will select one shipbuilder in FY 2020.<sup>97</sup>

As noted earlier, the Navy has been conducting an updated Force Structure Assessment that should be released before the end of 2019. Details are not yet available, but Navy officials have suggested that the proportion of SSCs (frigates) compared to LSCs (destroyers and cruisers) would likely increase as the Navy moves to a more distributed and dispersed CONOPS. A recent OPNAV N96 Surface Warfare directorate brief provides a glimpse into a future distributed surface force architecture with twice as many SSCs as LSCs.<sup>98</sup> If the Navy does pursue a much larger SSC force, it could expand the FFG(X) requirement and increase the build rate above two per year so that it can meet a new force goal more rapidly.

As of August 20, 2019, the Navy possessed 22 *Ticonderoga*-class (CG 47) cruisers.<sup>99</sup> To save operating expenses, it has been pursuing a plan to put half of this fleet into temporary layup status in order to extend this class's fleet service time into the 2030s—even though these ships are younger than their expected service lives (in other words, have been used less than planned). Under the FY 2015 National Defense Authorization Act:

Congress...directed the Navy to implement the so-called “2-4-6” program for modernizing the 11 youngest Aegis cruisers. Under the 2-4-6 program, no more than two of the cruisers are to enter the modernization program each year, none of the cruisers is to remain in reduced status for modernization for more than four years, and no more than six of the cruisers are to be in the program at any given time....<sup>100</sup>

The Navy's FY 2020 budget request removed funding for SLEs for the six oldest cruisers, added in the FY 2019 request, in exchange for increased readiness and lethality investments.<sup>101</sup> The retirement of the two

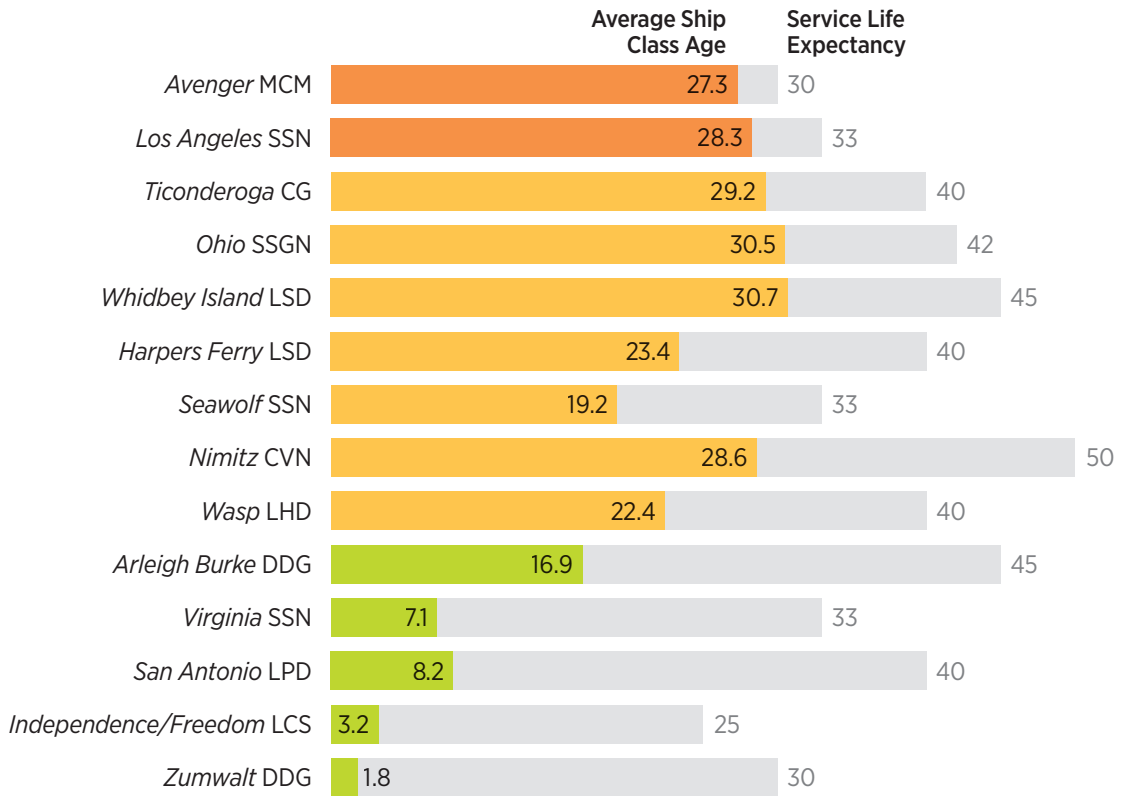
oldest cruisers, scheduled for FY 2020, has been deferred to FY 2021 so that the Navy can assess the cost versus increased lethality from modernizing these ships. The Navy will continue to execute the “2-4-6” plan in FY 2020. This “CG Modernization (Mod) Program...upgrades combat systems; command, control, communications, computers, and intelligence (C4I) systems; and hull, mechanical, and electrical (HM&E) systems to achieve an extended service life and pace the multi-mission threats.”<sup>102</sup> The Navy's FY 2020 budget request supports the continued modernization of the nine newest *Ticonderoga*-class cruisers (CG 65–CG 73).<sup>103</sup>

The Navy's FY 2020 budget request procures three DDG 51 Flight III destroyers as part of a 10-ship multi-year procurement, bringing the class size to 85 ships.<sup>104</sup> The Flight III provides a significant capability upgrade to the Navy's integrated air and missile defense with the incorporation of the air and missile defense radar. In addition, “PB-20 includes \$4 billion across the FYDP to modernize 19 guided missile destroyers. This includes critical upgrades to AEGIS Baseline 9, enabling them to simultaneously perform Integrated Air and Missile Defense (IAMD) and Ballistic Missile Defense (BMD) operations.”<sup>105</sup>

The DDG-1000 *Zumwalt*-class “is a multi-mission destroyer with an originally intended emphasis on naval surface fire support (NSFS) and operations in littoral (i.e., near-shore) waters.”<sup>106</sup> The *Zumwalt*-class has been plagued by cost overruns, schedule delays, and the exorbitant cost of the projectile for its advanced gun system. In July 2008, the Navy announced that it would end procurement of DDG-1000s after the initial three ships because it had “reevaluated the future operating environment and determined that its destroyer program must emphasize three missions: open-ocean antisubmarine warfare (ASW), countering anti-ship cruise missiles (ASCMs), and countering ballistic missiles.”<sup>107</sup> The stealthy DDG-1000 hull design cannot support the required ballistic missile defense capabilities without significant modifications.

## Combat Fleets Pushing Limits of Life Expectancy

AVERAGE SHIP CLASS AGE AS PERCENTAGE OF SERVICE LIFE EXPECTANCY: ■ <50% ■ 50%-75% ■ 75%+



**NOTE:** Average ship class age as of October 2019.

**SOURCE:** Heritage Foundation research based on data from U.S. Department of the Navy, U.S. Department of Defense, U.S. Government Publishing Office, and other sources.

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A core part of the *Zumwalt*-class’s original NSFS mission was its “two new-design 155mm guns called Advanced Gun Systems (AGS),” which “were to fire a new 155mm, gun-launched, rocket-assisted guided projectile called the Long-Range Land-Attack Projectile (LRLAP, pronounced LUR-lap).” When the DDG-1000 program was cut to three ships, the LRLAP’s cost per round skyrocketed to \$800,000, making the projectile’s cost prohibitive. The Navy has yet to announce a replacement projectile, and the AGSs are currently

non-operational as any replacement munition will require modifications to the AGS and its munition handling equipment.<sup>108</sup>

In December 2017, the Navy announced that because of changes in global security threats and resulting shifts in Navy mission requirements since the original DDG-1000’s missions were established in 1995, it was updating the DDG-1000’s primary mission to reflect the current needs of the Navy and the ship’s stealth and other advanced capabilities. The DDG-1000’s primary mission will shift

from an emphasis on naval gunfire support for Marines on shore to an emphasis on surface strike (the use of missiles to attack surface ships and possibly land targets).<sup>109</sup> This offensive strike conversion will incorporate integration of Raytheon's multi-mission SM-6 anti-air and anti-surface missile, as well as the Maritime Strike variant of the Tomahawk missile.<sup>110</sup> The Government Accountability Office (GAO) reports that "[a]ccording to Navy officials, the planned modifications to support the new mission will cost about \$1 billion...."<sup>111</sup>

With DDG-1000 still undergoing testing and certification, and given the need to determine the final concept of operations and capabilities required for the offensive strike mission, it will be several years before DDG-1000 is truly mission capable. With a class of only three ships, it will be difficult to maintain even one destroyer forward deployed at all times.

As part of his May 2019 announcement of the establishment of Surface Development Squadron One (SURFDEVRON 1), Vice Admiral Brown discussed a primary near-term role for the *Zumwalt* class. Initially, SURFDEVRON will focus on experimenting with the *Zumwalt's* unique capabilities and new warfighting concepts. After the Navy's new medium unmanned surface vessels (MUSVs) and large unmanned surface vessels (LUSVs) are delivered, the focus of experimentation will shift to integrating these unmanned vessels into the fleet.<sup>112</sup>

In March 2019, Marine Corps Commandant General David Berger, then serving as Deputy Commandant, Combat Development and Integration, and Commanding General, Marine Corps Development Command, reiterated the requirement for 38 amphibious warships: 12 amphibious assault ships (LHA/LHD); 13 amphibious transport dock (LPD-17) Flight I ships; and 13 dock landing (LSD/LPD-17) Flight II ships.<sup>113</sup> As of August 20, 2019, the U.S. Navy amphibious force consisted of 32 ships: nine LHA/LHD, 11 LPD-17 Flight I, and 12 LSD ships.<sup>114</sup> Navy leaders have also stated that "the future amphibious force and composition will be evaluated as part of the larger ongoing force

structure assessment."<sup>115</sup> New Marine Corps operational concepts, such as Littoral Operations in a Contested Environment and Expeditionary Advanced Base Operations (EABO), call for smaller and more dispersed Marine units conducting missions ranging from ISR to coastal defense to forward arming and refueling points (FARPs) for F-35B operations.<sup>116</sup> These dispersed expeditionary operations could require larger numbers of smaller amphibious ships than the current LHA and LPD programs, possibly ranging in size from an expeditionary fast transport ship (T-EPF) to an expeditionary sea base (ESB).<sup>117</sup>

The Navy's 12 landing ships, the *Whidbey Island*-class and *Harpers Ferry*-class amphibious vessels, are currently scheduled to reach the end of their 40-year service lives in 2025. The 13-ship LPD-17 Flight II program, previously known as the LX(R) program, will replace these legacy landing ships. The Flight II was designed to be a less costly and subsequently less capable alternative to the LPD-17 Flight I *San Antonio*-class design.<sup>118</sup> Although the first Flight II ship was planned for FY 2020, Congress directed the Navy to accelerate it to FY 2018.<sup>119</sup> Both Flight I and Flight II LPDs are multi-mission ships designed to embark, transport, and land elements of a Marine landing force by means of helicopters, tilt-rotor aircraft, landing craft, and amphibious vehicles.<sup>120</sup>

As of August 20, 2019, the Navy had nine amphibious assault ships in the fleet: eight *Wasp*-class LHDs and the *USS America* LHA-6.<sup>121</sup> The *America*-class amphibious assault ships (LHAs) are the largest amphibious ships and designed to replace the now-retired *Tarawa*-class LHA and the aging *Wasp*-class LHD; they resemble a small aircraft carrier and can conduct "Vertical/Short Take-Off and Landing (V/STOL), Short Take-Off Vertical Landing (STOVL), Vertical Take-Off and Landing (VTOL) tilt-rotor and Rotary Wing (RW) aircraft operations."<sup>122</sup> LHA Flight 0 (LHA-6 and 7) were built without a well deck to provide more space for Marine Corps aviation maintenance and storage as well as increased JP-5 fuel capacity. LHA Flight 1 (LHA-8 and beyond) will reincorporate a well

deck for increased mission flexibility. All LHA ships can accommodate the Marine Corps F-35 B V/STOL strike fighter, but only USS *Wasp* (LHD-1) and USS *Essex* (LHD-2) have been modified to support F-35B flight operations.<sup>123</sup> USS *America* is deploying to Japan in late FY 2019 to replace USS *Wasp* as the Forward Deployed Naval Force amphibious ship, and USS *Tripoli* (LHA-7) is scheduled to be commissioned and to join the fleet in late FY 2019.<sup>124</sup>

The Navy's 11-ship aircraft carrier force consists of 10 *Nimitz*-class nuclear-powered carriers and one *Ford*-class nuclear-powered carrier. The *Nimitz*-class carriers vary in age from 44 to 10 years and have an average age of 28.4 years. U.S. aircraft carriers have a service life of 50 years, with their most significant modernization occurring during their approximately 44-month midlife RCOH. This major depot maintenance not only refuels the reactor core to operate the remainder of the ship's 50-year service life, but also overhauls, repairs, and modernizes major ship and combat systems. This means that a 30-year-old carrier possesses more modern capabilities than a 20-year old carrier.

The USS *Ford*-class program is further modernizing the carrier force and will replace all of the *Nimitz*-class carriers over the next 40 years. The *Ford*-class incorporates several new technologies that promise to increase aircraft sortie rates, decrease the number of sailors needed to operate the ship, and reduce operating and sustainment costs by approximately \$4 billion over its 50-year life.<sup>125</sup>

Unfortunately, "the development of EMALS [Electromagnetic Aircraft Launch System], AAG [Advanced Arresting gear], AWE [Advanced Weapons Elevator], DBR [Dual Band Radar], and the Integrated Warfare System delayed the ship's first deployment to FY22."<sup>126</sup> Because of continued reliability issues related to system software, the Navy had accepted only two AWEs as of March 2019.<sup>127</sup> AWE testing delays and repairs to *Ford*'s main turbine generators caused completion of post-shakedown availability (PSA) to be delayed until October 2019.<sup>128</sup>

On May 29, 2019, Assistant Secretary of the Navy for Research, Development and Acquisition James Geurts announced that while USS *Ford* will complete its PSA in October 2019, only some of its AWEs will be operational when she goes back to sea.<sup>129</sup> In response to the Navy's statement, Senate Armed Services Committee Chairman Senator James Inhofe told *Breaking Defense* that:

[F]urther delays on the USS Gerald R. Ford advanced weapons elevators are disappointing—and present a dangerous readiness gap. This is a letdown for our fleet and for the taxpayer, and is why the FY20 NDAA includes stronger oversight for the key systems on the Ford, including the elevators and launch system. We need to get it fully operational as soon as possible.<sup>130</sup>

The Navy has not announced any delay in USS *Ford*'s first operational deployment, scheduled for FY 2022.

The sole mission of the Navy's nuclear ballistic missile submarine (SSBN) is strategic nuclear deterrence, for which it carries long-range submarine-launched ballistic missiles. They provide the most survivable leg of America's strategic nuclear deterrent force with 70 percent of the nation's accountable nuclear warheads and its only assured second-strike or retaliatory nuclear strike capability.<sup>131</sup> The Navy's force structure assessment and the DOD's 2018 *Nuclear Posture Review* established a requirement for a minimum of 12 *Columbia*-class nuclear ballistic missile submarines to replace the legacy *Ohio*-class SSBN.<sup>132</sup> The average acquisition cost of these submarines is \$7.1 billion, and their production will consume a significant portion of the Navy's shipbuilding funding if the overall budget is not increased.<sup>133</sup>

The Navy's FY 2013 budget deferred procurement of the lead boat from FY 2019 to FY 2021, with the result that the Navy's SSBN force will drop to "11 or 10 boats for the period FY2030–FY2041."<sup>134</sup> The Navy may have increased difficulty maintaining U.S. Strategic

Command's requirement for a minimum of 10 operational SSBNs as it strives to maintain the legacy *Ohio*-class SSBN fleet to the end of their 42-year service life. With little schedule margin until its first strategic deterrent patrol in FY 2031, it is easy to see why the *Columbia*-class SSBN remains "the Navy's number one acquisition priority."<sup>135</sup>

The *Columbia*-class design incorporates several new technologies to increase its stealth and operational availability. The submarine and its life-of-ship reactor core have been designed for a 42-year service life as opposed to the service life of the *Ohio*-class, which was extended from 30 years to 42 years.<sup>136</sup> The Navy needs 12 *Columbia*-class SSBNs "to meet the requirement for 10 operational boats because the midlife overhauls of *Columbia*-class boats, which will not include a nuclear refueling, will require less time (about two years) than the midlife refueling overhauls of *Ohio*-class boats...."<sup>137</sup> Additionally, the submarine's electric drive propulsion motor and other stealth technologies will ensure that the nation's SSBN force remains undetectable and survivable against evolving threats into the 2080s.

Significant defects in key equipment have eroded some of the *Columbia* program's schedule margin. In 2017, "[a] manufacturing defect that affected the system's first production-representative propulsion motor required extensive repair that consumed 9 months of schedule margin at the land-based test facility."<sup>138</sup> This was followed by the discovery in July 2018 that 12 common missile compartment missile tubes produced by a single vendor had significant welding defects because of inexperienced welders and inspectors.<sup>139</sup> "While the Navy and shipbuilder are still determining the cost and schedule impacts of the weld defects," according to the GAO, "program officials estimated that addressing this issue will consume up to 15 [months] of the 23-month schedule margin for these components."<sup>140</sup>

If additional technical or production issues arise during the construction, *Columbia*'s remaining schedule margin could quickly evaporate. On March 6, 2019, recognizing the critical

importance of the *Columbia* program and its FY 2028 delivery deadline, the U.S. Navy announced "the establishment of Program Executive Office Columbia (PEO CLB)," which "will focus on the design, build, and sustainment of the *Columbia* program and associated efforts that include interface with Strategic Systems Program and the United Kingdom for the Dreadnought Program."<sup>141</sup> Assistant Secretary Geurts stated that:

The evolution from initial funding to construction, development and testing to serial production of 12 SSBNs will be crucial to meeting the National Defense Strategy and building the Navy the nation needs. PEO Columbia will work directly with resource sponsors, stakeholders, foreign partners, shipbuilders and suppliers to meet national priorities and deliver and sustain lethal capacity our warfighters need.<sup>142</sup>

SSNs are multi-mission platforms whose primary peacetime and combat missions include covert intelligence collection, surveillance, ASW, anti-surface warfare (ASuW), special operations forces insertion/extraction, land attack strikes, and offensive mine warfare.<sup>143</sup> The *Virginia*-class SSN will replace the aging *Los Angeles*-class SSNs as the workhorse of the Navy's attack submariner force. The Navy's FY 2020 budget requests three *Virginia*-class SSNs, the first time in over 20 years the Navy has procured three SSNs in one fiscal year.<sup>144</sup> Since the advance procurement for the third *Virginia*-class SSN was not included in the Navy's FY 2019 budget, construction of this third submarine most likely will not commence until FY 2023.<sup>145</sup> Critical parts and equipment for this additional submarine above the planned 10-submarine block buy have not been purchased yet, and the shipyards (Electric Boat and Huntington Ingalls Industries/Newport News Shipbuilding) have not planned for this submarine in their *Virginia*-class construction plan.

The Virginia Payload Module (VPM) is an 84-foot-long, midbody section equipped with

four large-diameter, vertical launch tubes that can carry up to 28 additional Tomahawk missiles or other payloads. VPM is being added to Block V *Virginia*-class submarines to help offset the retirement of the four *Ohio*-class guided missile submarines, each of which can carry 54 Tomahawk cruise missiles, by FY 2028. The Block V submarines also include several acoustic and other technological improvements to maintain the *Virginia* class's undersea superiority over Russian and Chinese submarines.<sup>146</sup>

The Navy's FY 2019 shipbuilding plan called for nine of the 10 Block V *Virginia*-class submarines to include VPM. The Navy's FY 2020 budget and shipbuilding plan now call for eight of the now 11 Block V submarines to include VPM.<sup>147</sup> While the Navy's FY 2020 Block V *Virginia*-class submarine construction plan delivers one additional submarine, these 11 submarines will be able to carry 28 fewer Tomahawks than could be carried by the original 10 submarines.

The FY 2020 budget request includes \$806 million to accelerate the Navy's unmanned surface vessel (USV) and unmanned undersea vehicle (UUV) programs. The Navy had planned to pay for the bulk of these unmanned systems in FY 2020 and across the FYDP by canceling the USS *Truman*'s RCOH. With the reversal of this decision, if Congress does not provide additional funding in FY 2020 and beyond, these unmanned programs will be in jeopardy. The Navy is applying a family-of-systems approach to USVs and UUVs that incorporates unmanned platforms of various sizes to perform different missions.<sup>148</sup>

The Large USV (LUSV) program will purchase two prototype vessels based on the OSD Strategic Capabilities Office *Overlord* program in FY 2020 to provide distributed lethality and increased capacity.<sup>149</sup> The Navy also issued an RFP for a Medium USV (MUSV) in May 2019 that will leverage the ONR *Sea Hunter* program to provide distributed sensing and communications relays for surface forces. The Navy currently has one *Sea Hunter* prototype, and a second is scheduled for delivery by late FY

2020. The MCM USV is part of the LCS MCM MP and will enter low initial rate production (LRIP) in FY 2019.<sup>150</sup>

The Navy is purchasing 37 UUVs in FY 2020, including two *Orca* Extra Large UUVs (XLUUV); 27 Mk-18 *Knifefish* MCM UUVs; and eight *Razorback* medium UUVs. The Navy awarded Boeing a \$43 million contract in February 2019 to build four XLUUVs based on its *Echo Voyager* XLUUV. *Orca* will be pier-launched and long-range (up to 6,500 nm) and will provide a large undersea payload capacity to support a variety of missions.<sup>151</sup> *Knifefish* entered LRIP in FY 2019 and is part of the LCS MCM MP providing buried undersea mine detection.<sup>152</sup> *Razorback* provides a submarine-launched and recovered UUV for battlespace sensing. The dry dock shelter-launched version commenced delivery in FY 2019, and the torpedo tube-launched version is scheduled to begin delivery in FY 2020.<sup>153</sup> The Navy is also developing the *Snakehead* Large Diameter UUV (LDUUV) to provide a submarine or surface ship-launched UUV with increased payload and range. The program will deliver "an operationally relevant prototype in 2021" and issue an RFP for a more capable *Snakehead* UUV in FY 2020.<sup>154</sup>

These USV and UUV programs have the potential to provide greater dispersed maritime sensing and lethality, extending the fleet's reach and ISR capabilities. The Navy still has significant testing and CONOPS development to conduct before they become an integral part of the fleet. Getting these prototype platforms in the hands of Navy sailors will accelerate the learning and technological development of unmanned systems.

The Navy's long-range strike capability derives from its ability to launch various missiles and combat aircraft. As a class, naval aircraft are much more expensive and difficult to modernize than missiles are. Until the 1980s, the Navy operated several models of strike aircraft that included the F-14 Tomcat, A-6 Intruder, A-4 Skyhawk, and F/A-18 Hornet. The last of the A-6, A-4, and F-14 aircraft were retired, respectively, in 1997, 2003, and 2006.

Over the past 20 years, this variety has been winnowed to a single model: the F/A-18. The F/A-18A-D Legacy Hornet has served since 1983; it is out of production and currently flown by 13 Marine Corps squadrons, the Naval Aviation Warfighting Development Center, and the Blue Angels. The last Navy legacy Hornet squadron completed its final operational deployment in April 2018.<sup>155</sup> The last operational legacy Hornet squadron transitioned to more capable and modern F/A-18E/F Super Hornets in February 2019.<sup>156</sup>

The F/A-18E/F Super Hornet has longer range, greater weapons payload, and more survivability than the F/A-18A-D Legacy Hornet and “will be the numerically predominant aircraft in CVWs into the 2030s.”<sup>157</sup> The Navy’s FY 2020 budget request includes 24 F/A-18E/F Super Hornets and an additional 84 Block III Super Hornets over the next five years in an attempt to mitigate shortfalls in its strike aircraft inventory.<sup>158</sup> In April 2019, Rear Admiral Scott Conn, Director of Air Warfare (OPNAV N98), testified that the Navy’s strike fighter shortfall will reach its lowest point, 51 aircraft, in FY 2020 before decreasing to “single digits by FY ’24.”<sup>159</sup>

The EA-18G Growler is the U.S. Navy’s primary electronic attack aircraft and provides tactical jamming and suppression of enemy air defenses. The final EA-18G aircraft was delivered in FY 2018, bringing the total to 160 aircraft and fulfilling “current Navy requirements for Airborne Electronic Attack (AEA) for nine CVWs and five expeditionary squadrons plus one reserve squadron.” The FY 2020 budget continues to fund additional modernization to ensure that the “EA-18G maintains its edge in the electromagnetic spectrum by providing robust sensing and engagement capabilities.”<sup>160</sup>

The Navy has been addressing numerous incidents, or physiological episodes (PEs), of dizziness and blackouts by F/A-18 and T-45 aircrews over the past several years. Navy investigators have identified “multiple interrelated causal factors” and have instituted mitigation efforts that include “software modifications, personnel education, and equipment changes.”

The T-45 training aircraft have undergone a significant reduction in PE rate with only 14 events in over 100,000 hours flown since the aircraft returned to operation. Two events are still under investigation, and seven have been attributed to human factors. In addition to correcting the identified engine flow problem, the Navy is “integrating an Automatic Backup Oxygen System (ABOS) to improve oxygen generating system performance overall.”<sup>161</sup>

Implemented mitigation efforts are also improving F/A-18 PE rates. F/A-18 A-D PE rates have fallen by almost 50 percent, a reduction that is attributed primarily to implementation of AFB (Air Frame Bulletin) 821, which “places life limits on seven ECS high-time components with the purpose of inspecting and replacing components as necessary to improve and baseline system operation.” The F/A-18 Root Cause Corrective Action Team identified “premature component failure as a contributory factor in almost 300 PEs.” All of the identified parts are undergoing redesign, but only two redesigns will be implemented in FY 2019. A final major PE mitigation effort is the Navy’s ongoing development of a new “On Board Oxygen Generating System concentrator designed to replace the existing concentrator currently in the F/A-18 and EA-18 aircraft.”<sup>162</sup>

Even with the Navy’s focus on identifying and correcting the causes of these events, PEs continue to be a significant concern for the naval aviation community and have further reduced the operational availability of the Navy’s strike fighter and electronic attack aircraft.

The F-35C is the Navy’s largest aviation modernization program. This fifth-generation fighter (all F/A-18 variants are considered fourth-generation) has greater stealth capabilities and state-of-the-art electronic systems, allowing it to sense its tactical environment and communicate with multiple other platforms more effectively. The Department of the Navy plans to purchase 273 Navy F-35Cs and 67 Marine Corps F-35Cs.<sup>163</sup> The F-35 can accomplish a wide spectrum of missions including strike, close air support, counter air, escort, and suppression of enemy air defenses.<sup>164</sup> The

Navy's objective is to "attain a '2+2' mix of two F-35C squadrons and two F/A-18E/F Block III squadrons per CVW by the mid-2030s."<sup>165</sup>

The Navy declared initial operational capability (IOC) of the F-35C in February 2019, explaining that:

In order to declare IOC, the first operational squadron must be properly manned, trained and equipped to conduct assigned missions in support of fleet operations. This includes having 10 Block 3F, F-35C aircraft, requisite spare parts, support equipment, tools, technical publications, training programs and a functional Autonomic Logistic Information System (ALIS). Additionally, the ship that supports the first squadron must possess the proper infrastructure, qualifications and certifications.<sup>166</sup>

The F-35C IOC was postponed because of F-35 program development delays and the Navy's unique requirement for Block 3F-equipped F-35C aircraft.<sup>167</sup> The Marine Corps' F-35C reached IOC in 2015, and the Air Force declared the F-35A IOC in 2016.<sup>168</sup> The first operational F-35C deployment is scheduled for FY 2021 as part of Carrier Air Wing 2 onboard USS *Carl Vinson*.<sup>169</sup>

The E-2D Advanced Hawkeye is the Navy's carrier-based Airborne Early Warning and Battle Management Command and Control aircraft. The E-2D forms the hub of the Naval Integrated Control-Counter Air system and provides critical Theater Air Missile and Missile Defense capabilities.<sup>170</sup> The Navy's FY 2020 budget procures four aircraft with an additional 14 aircraft to be procured over the next three years.<sup>171</sup>

The MQ-4C *Triton* is a land-based, high-altitude, long-endurance UAV that fills a "vital role for the Joint Forces Maritime Component Commander by delivering persistent and netted maritime ISR and furthers our plan to retire legacy EP-3E aircraft..."<sup>172</sup> The Navy's FY 2020 budget requests two aircraft on the path to achieving IOC in FY 2021 and eventually

delivering five *Triton* orbits.<sup>173</sup> The Navy requirement is 68 *Triton* aircraft.<sup>174</sup> The planned initial deployment of two *Triton* UAVs to Guam in FY 2018 was delayed following the September 2018 MQ-4C crash-landing as a result of technical issues with the aircraft.<sup>175</sup>

The MQ-25 *Stingray* is a carrier-launched UAV with a primary mission as a carrier-based tanker to extend the range of CVW with a secondary mission to provide ISR for CSGs.<sup>176</sup> The FY 2020 budget requests \$671.3 million to procure three system demonstration test article aircraft and initiate assembly of four engineering development model (EDM) aircraft.<sup>177</sup>

The National Defense Strategy's focus on the return to great-power competition and building a more lethal force is manifested in the Navy's FY 2020 budget prioritization of "developing and fielding new capabilities in the areas of unmanned vehicles, directed energy [weapons], artificial intelligence, hypersonics, and other advanced weapons technology."<sup>178</sup>

The Navy's FY 2020 budget requests 90 Block V Tactical Tomahawk (TACTOM) cruise missiles; 156 Navigation/Communication upgrade kits to improve performance in A2/AD environments; and 20 Maritime Strike Tomahawk (MST) kits. It also purchases 48 Long Range Anti-Ship Missiles (LRASMs) that will provide the "ability to conduct anti-surface warfare (ASuW) operations against near/mid-term high-value surface combatants protected by Integrated Air Defense Systems with long-range Surface-to-Air-Missiles and deny adversaries sanctuary of maneuver."<sup>179</sup> The Navy's FY 2020 Unfunded Priorities List reflects that the LRASM inventory "is below the Total Munitions Requirement" and requests an additional seven LRASM missiles to "achieve industry's maximum production capacity in FY20."<sup>180</sup> The LRASM "is on-track to achieve EOC on the Navy's F/A-18E/F aircraft prior to the schedule objective of the fourth quarter of FY 2019."<sup>181</sup>

The Navy has been developing prototype high energy laser (HEL) weapons systems for several years and deployed the first operational HEL system, the Laser Weapons System



(LaWS), onboard the Afloat Forward Staging Base ship USS *Ponce* in the Persian Gulf from December 2014 to September 2017.<sup>182</sup> The Navy’s FY 2020 budget request includes \$101 million for the Navy Laser Family of Systems (NLFoS) “to provide near-term, ship-based laser weapon capabilities.”<sup>183</sup> The two primary programs in the NLFoS are:

- Solid State Laser Technology Maturation (SSL-TM), an Office of Naval Research program to “develop an advanced 150kW High Energy Laser (HEL) weapon demonstrator that will support future laser development with installation on an LPD17 class ship for at sea testing in FY 2020.”<sup>184</sup>
- Surface Navy Laser Weapon System (SNLWS), Increment 1, also known as the high-energy laser with integrated optical dazzler and surveillance (HELIOS), a rapid development effort to field an advanced integrated 60kW or greater laser weapon system with the ability to dazzle and destroy ISR UAVs, defeat fast inshore attack craft (FIAC) and provide combat identification and battle damage assessment.<sup>185</sup>

In March 2019, Rear Admiral Ron Boxall, Director of Navy Surface Warfare (OPNAV N96), announced that the Navy plans to install a HELIOS weapons system “aboard a West Coast Arleigh Burke-class Flight IIA destroyer” in 2021.<sup>186</sup> The HELIOS system would be a permanent integrated system.<sup>187</sup>

## Readiness

Admiral William Moran, Vice Chief of Naval Operations, testified before the Senate Armed Services Readiness Subcommittee in February 2018 that:

The readiness of Naval Forces is a function of three components; people, material and time. Buying all the people, ships and aircraft will not produce a ready Navy without the time to maintain hardware and time for our people to train and

operate. Too much time operating and not maintaining degrades our material and equipment readiness. Conversely, too much time for maintenance has a negative impact on meeting planned training and operational schedules, and the corresponding negative impact on the readiness of our Sailors to fight. This is a vicious cycle that Continuing Resolutions and insufficient funding create by disrupting the balance we need to maintain readiness, and our ability to grow capability and capacity.<sup>188</sup>

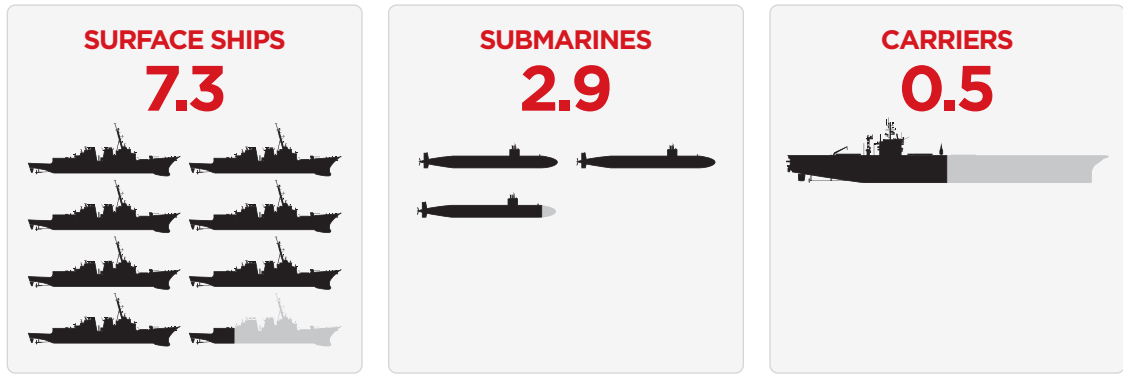
From FY 2009 to FY 2017, the Department of Defense endured eight straight years of Continuing Resolutions (CRs) that averaged 106 days per fiscal year; this was compounded by the 174-day CR in FY 2018. These CRs forced the Navy to operate under reduced spending levels and severely limited its ability to complete required ship and aircraft maintenance and training.<sup>189</sup> FY 2019 marked the first time in over a decade that the DOD and the Navy did not operate under a CR for at least part of the fiscal year. Having a full fiscal year to plan and execute maintenance and operations helped the Navy to continue its path to restoring fleet readiness. Admiral Richardson testified before the Senate Armed Services Committee in April 2018 that it would take until 2021 or 2022 to restore fleet readiness to an “acceptable” level but that the continued lack of “stable and adequate funding” would delay these efforts.<sup>190</sup>

Assessing the readiness of individual naval ships and their sailors can be extremely difficult. First, official readiness data on each Navy ship, submarine, or aircraft squadron are maintained and promulgated via the classified Defense Readiness Reporting Network–Navy. The readiness level of each ship and its crew will also vary significantly over the 36-month OFRP cycle as the ship conducts various maintenance, training, and certifications in preparation for its operational deployment.

Because the demands of material readiness and operational readiness are sometimes in opposition to each other, these two critical

## Ship Maintenance Delays Limit U.S. Navy

Maintenance delays have led to thousands of days in which ships were unavailable for training and operations, effectively diminishing the size of the Navy. Figures shown below are the average number of ships lost per year for 2012–2018 due to maintenance delays.



**SOURCE:** Heritage Foundation calculations based on data from U.S. Government Accountability Office, "Navy and Marine Corps: Rebuilding Ship, Submarine, and Aviation Readiness Will Require Time and Sustained Management Attention," December 12, 2018, <https://www.gao.gov/assets/700/695911.pdf> (accessed June 18, 2019). Figures shown are for fiscal years.

 heritage.org

readiness components may not always be in sync. For example, although the operational readiness of a ship’s crew just completing a seven-month overseas deployment will be very high, its material readiness could be lower because periodic maintenance and repairs could not be completed during deployment. While determining the readiness of individual ships can be problematic, overall fleet readiness can be assessed based on operational demand and reports on fleet training, maintenance, and fleet manning.

Like the other services, the Navy had to dedicate readiness funding to the immediate needs of various engagements around the globe for several years. As a result, maintenance and training for non-deployed ships and sailors were not prioritized. Deferral of ship and aircraft depot maintenance because funding is inadequate or public shipyards lack sufficient

capacity has had a ripple effect on the whole fleet. When ships and aircraft are finally able to begin depot maintenance, their material condition is worse than normal because of the delay and high operational tempo (OPTEMPO) of the past 15 years. This in turn causes maintenance to take longer than scheduled, which leads to further delays in fleet depot maintenance and increases the demands placed on ships and aircraft that are still operational. Correcting these maintenance backlogs will require a level of stable funding that is sufficient to defray the costs of ship maintenance and modernize the public shipyards.

These maintenance and readiness issues also affect the Navy’s capacity by significantly reducing the numbers of operational ships and aircraft available to support the combatant commanders. For example, between 2012 and 2018, ship maintenance delays resulted in the

loss of 1,207 aircraft carrier, 18,581 surface ship, and 7,321 submarine operational days.<sup>191</sup> This is the equivalent of losing 0.5 aircraft carriers, 7.3 surface ships, and 2.9 submarines from fleet operations each year. In FY 2018, even with additional readiness funding, maintenance delay days increased for aircraft carriers, surface ships, and submarines.<sup>192</sup> The almost six-month FY 2018 CR also helped to delay the start of new depot maintenance last year. The domino effect of cascading deferred maintenance has led to a \$763 million shortfall in surface ship and submarine depot maintenance funding in FY 2020.<sup>193</sup>

The USS *Boise* has become the poster child for excessive submarine maintenance backlogs. Her certification for submerged operations expired in 2016 when Norfolk Naval Shipyard was unable to commence *Boise's* scheduled depot maintenance for over three years.<sup>194</sup> No longer able to operate at sea, as of May 25, 2019, USS *Boise* has sat pierside for over 1,088 days (almost three years) awaiting commencement of her depot maintenance.

After awarding a contract to Huntington Ingalls/Newport News Shipbuilding (HII/NNS), USS *Boise* was scheduled to begin maintenance in January 2019.<sup>195</sup> Because of continued delays with overhauls of USS *Helena* and USS *Columbus*, however, USS *Boise* remains without an official start date for her maintenance.<sup>196</sup> During a May 9, 2019, readiness hearing, Admiral Moran informed Congress that the Navy had deferred *Boise's* depot maintenance until FY 2020 because of funding and shipyard capacity issues.<sup>197</sup>

Funding ship maintenance at the maximum executable capacity of both public and private shipyards in FY 2020 can address only 95 percent of the required maintenance, a decrease from a 96 percent execution in FY 2019.<sup>198</sup> Funding FY 2020 aviation maintenance at the maximum executable level of the depots can meet only 95 percent of the requirement, an increase from FY 2019's 92 percent execution rate.<sup>199</sup>

Since the Navy cannot meet its current maintenance demands, the maintenance

backlog will continue to grow until the capacities of the ship and aviation maintenance enterprise exceed the annual maintenance requirements. As the fleet grows to 355 ships over the next 15 years, the mounting maintenance needs will stress not only shipyard repair capacity, but also future Navy budgets. For example, the Navy's fleet sustainment costs (manpower, operations, and maintenance) will rise from approximately \$24 billion in FY 2020 to \$30 billion in FY 2024.<sup>200</sup>

The FY 2019 NDAA funded increasing the public shipyard workforce by 1,414 workers, and the Navy's FY 2020 budget requests an additional 1,223 workers.<sup>201</sup> Even with the hiring of additional shipyard workers over the past three years, the public (government-owned) shipyards can still not keep up with ship and submarine maintenance demands. Newly hired shipyard workers do not immediately translate into increased productivity. Since it can take up to five years to become fully trained and proficient, depending on the specific skill set of the new workers, the true impact of the larger shipyard workforce will not be felt for several years.

Recognizing the importance of the Navy's four public shipyards to fleet readiness and national defense, Naval Sea Systems Command (NAVSEA) completed its Shipyard Optimization and Recapitalization Plan in September 2018. This plan lays out the framework and investment plan to modernize the public shipyards through three primary focus areas: dry dock recapitalization (\$4 billion); facility layout and optimization (\$14 billion); and capital equipment modernization (\$3 billion).<sup>202</sup> The Navy commenced this \$21 billion, 20-year public shipyard optimization plan in FY 2019.

In response to NDS guidance and "requirements for sustaining the Navy the nation needs," the Navy developed its inaugural Naval Sea System Command Long-Range Plan for the Maintenance and Modernization of Naval Vessels for Fiscal Year 2020. The plan complements the Navy's annual 30-year shipbuilding plan and "describes the Navy's continued challenges with high-tempo operations that

[have] resulted in a maintenance backlog and reduced readiness rates for Navy ships.” It also captures key efforts across private and public shipyards, as well as the industrial base, to improve maintenance capacity and capabilities. Finally, it commits the Navy to the development of “long-range maintenance and modernization requirements based on technical analysis and condition assessment of the fleet driven by the number of ships in the FY 2020 Shipbuilding Plan.”<sup>203</sup>

This long-term maintenance and modernization plan will be critical to leveraging both public and private shipyard capacity most efficiently to reduce maintenance backlogs while supporting a growing fleet size. Providing private shipyards with several years to plan depot-level maintenance will enable more thorough maintenance planning and dry dock utilization, ultimately resulting in shorter and more cost-effective maintenance availabilities.

Ship and aircraft operations and training are just as critical to fleet readiness as maintenance is. The Navy’s FY 2020 budget supports the OFRP and forward deployed presence requirements by funding ship operations for deployed and non-deployed forces at a rate of 58 days and 24 days underway per quarter, respectively.<sup>204</sup> In addition, flight hours are funded to achieve a T-rating of 2.0 for nine Navy carrier air wings supporting the “requirements of deployed units, units training in preparation to deploy, and the maximum executable requirements of non-deployed units for sustainment and maintenance readiness levels.”<sup>205</sup> T-rating is measured on a scale of 1.0–4.0 and “describes a unit’s capability to execute its mission essential tasks (METs).” A T-rating of 2.0 means that a squadron or air wing is “able to complete 80 percent of its METs.”<sup>206</sup>

The Navy’s aviation readiness is also suffering because of deferred maintenance, delayed modernization, and high OPTEMPO. An April 2018 *Military Times* report revealed that over the past five years, naval aviation mishaps had increased 82 percent across the entire fleet but 108 percent for F/A-18E/F Super Hornets. Although analysis showed numerous causes

behind individual accidents, this abrupt rise began after 2013, the first year that Budget Control Act (BCA) sequestration limits took effect. The Navy made cuts in aviation maintenance and spare parts to meet budget caps while operational demand was simultaneously increasing. For example, F/A-18E/F Super Hornets “conducted 18,000 more flight hours in 2017 than in 2013.”<sup>207</sup>

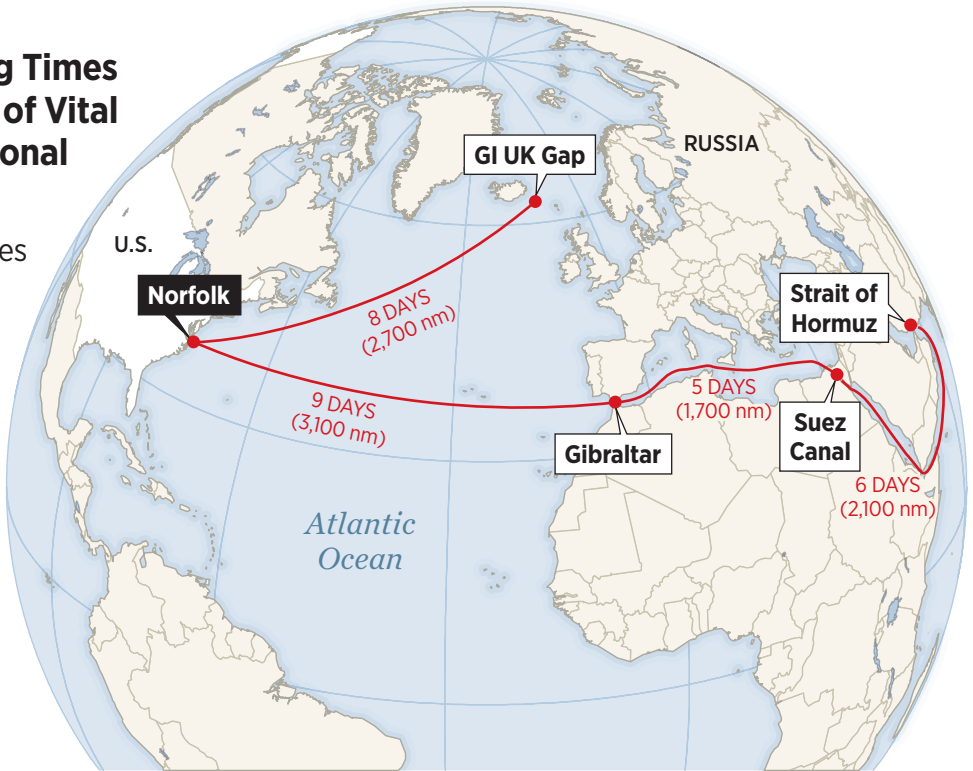
The naval aviation community made extreme efforts to gain every bit of readiness possible with the existing fleet, but even these efforts cannot solve the problems of too little money, too few usable assets, and too much work. Consistent with its policy of “supporting deployed and next to deploy forces,” the Navy was “forced to cannibalize aircraft, parts and people” to ensure that deploying squadrons had sufficient operational aircraft and personnel to operate safely and effectively. Moreover, “to properly man the required Carrier Air Wings either on deployment or on preparing to deploy at mandated levels of 95%, there are not enough Sailors left to fill the two remaining Air Wings in their maintenance phase.”<sup>208</sup>

On September 17, 2018, then-Secretary of Defense James Mattis issued a memorandum tasking the military service secretaries with “achieving a minimum of 80% mission capability rates for our FY 2019 Navy and Air Force F-35, F-22, F-16, and F-18 inventories—assets that form the backbone of our tactical air power—and reducing these platforms’ operating and maintenance costs every year, starting in FY 2019.”<sup>209</sup>

A Naval Air Forces spokesman informed USNI News that before the memo’s release, the “latest combined Super Hornet readiness number was 53.3 percent.”<sup>210</sup> In response to the Mattis memorandum, Navy leadership commenced working with the commercial airline industry to improve the efficiency of F/A-18 aviation maintenance and spare parts logistics.<sup>211</sup> These efforts have led to significant improvements both in the plane’s maintenance efficiency and in its Mission Capable rate. In April 2019, Rear Admiral Conn informed Congress that “we’ve reduced the planned

# Steaming Times to Areas of Vital U.S. National Interest

Steam times are based on an average speed of 15 knots.



SOURCE: Heritage Foundation research.

heritage.org

maintenance interval for Super Hornets from 120 to 60 days” and that the Super Hornet Mission Capable rate has been fluctuating between 63 and 76 percent.<sup>212</sup> Vice Admiral Mathias Winter, Joint Strike Fighter Program Director, testified that as of April 2019, the F-35C’s Mission Capable rate was 84 percent.<sup>213</sup>

During the summer of 2017, the U.S. Navy experienced the worst peacetime surface ship collisions in over 41 years when the USS *John S. McCain* (DDG 56) and USS *Fitzgerald* (DDG 62) collided with commercial vessels, claiming the lives of 17 sailors, during two unrelated routine “independent steaming” operations in the western Pacific Ocean. These tragic incidents, coupled with the USS *Antietam* (CG 54) grounding and the USS *Lake Champlain* (CG 57) collision earlier in 2017, raised significant concerns about the readiness and operational proficiency of the U.S. Navy’s surface fleet. Admiral Richardson responded by ordering a “service wide operational pause” to review practices throughout the fleet.<sup>214</sup> The Department of the Navy conducted two major reviews to examine root causes and recommended corrective actions both for the surface fleet and fleet-wide.

In October 2017, at the direction of the Vice Chief of Naval Operations, Admiral Phil Davidson, then Commander, Fleet Forces Command, completed a *Comprehensive Review of Recent Surface Force Incidents* to determine the improvements or changes needed to make the surface force safer and more effective. Admiral Davidson’s review addressed training and professional development; “operational and mission certification of deployed ships with particular emphasis on ships based in Japan”; “deployed operational employment and risk management”; “material readiness of electronic systems to include navigation equipment, surface search radars, propulsion and steering systems”; and “the practical utility and certification of current navigation and combat systems equipment including sensors, tracking systems, displays and internal communication systems.”<sup>215</sup> His report recommended 58 actions to correct

deficiencies across the “Doctrine, Organization, Training, Material, Leadership and Education, Personnel, and Facilities (DOTMLPF)” spectrum.<sup>216</sup>

The Secretary of the Navy directed a team of senior civilian executives and former senior military officers to conduct a *Strategic Readiness Review* examining issues of governance, accountability, operations, organizational structure, manning, and training over the past three-plus decades to identify trends and contributing factors that have compromised fleet performance and readiness. The report identifies four broad strategic recommendations that the Navy must address to arrest the erosion of readiness and reverse the “normalization-of-deviation” that led to a gradual degradation of standards:

- “The creation of combat ready forces must take equal footing with meeting the immediate demands of Combatant Commanders.”
- “The Navy must establish realistic limits regarding the number of ready ships and sailors and, short of combat, not acquiesce to emergent requirements with assets that are not fully ready.”
- “The Navy must realign and streamline its command and control structures to tightly align responsibility, authority, and accountability.”
- “Navy leadership at all levels must foster a culture of learning and create the structures and processes that fully embrace this commitment.”<sup>217</sup>

After more than a year of repairs, USS *Fitzgerald* finally left the dry dock at Ingalls Shipbuilding on April 16, 2019. *Fitzgerald* has been out of commission since its June 17, 2017, collision. Although the Navy has not released a projected date for the final completion of all repairs and her return to operations, a NAVSEA official did provide the following statement:

Since the ship's arrival in Pascagoula in January 2018, work has focused on restoring the integrity of the hull and topside structures that were damaged during a collision in 2017....

To restore the impacted spaces to full operations and functionality, various Hull, Mechanical and Electrical (HM&E), Combat System (CS) and Command, Control, Communications, Computers and Intelligence (C5I) repairs are being conducted. These repairs range from partial to complete refurbishment of impacted spaces to replacement of equipment such as the radar and electronic warfare suite. The ship is also receiving HM&E, Combat System and C5I modernization upgrades. Due to the extent and complexity of the restoration, both repair and new construction procedures are being used to accomplish the restoration and modernization efforts.<sup>218</sup>

USS *McCain* left the dry dock in Yokosuka in November 2018 after nine months and was still undergoing pierside repairs to return

her to operation as of May 2019. In addition to repairing damage from her collision, “[t]he ongoing availability also includes completing maintenance work that had previously been deferred....”<sup>219</sup> The Navy is taking advantage of these extended repair availabilities to conduct additional maintenance and modernization, but the fact that these two warships have been non-operational for almost two years still highlights how complex and time-consuming major repairs to modern warships can be. It is hoped that the Navy can learn from these repairs and develop plans for expedited repairs to battle force ships damaged in any future conflict.

Despite the fact that the Navy has implemented several maintenance and training reforms to improve fleet and aviation readiness, it will take several years of Navy leadership oversight and stable funding to ensure that the Navy's sailors and platforms are ready to compete and win against great-power competitors if called upon to do so. It is also worth noting again that the Navy's own readiness assessments are based on the ability to execute a strategy that assumes a force-sizing construct that is smaller than the one prescribed by this *Index*.

## Scoring the U.S. Navy

### Capacity Score: Weak

The Navy is unusual relative to the other services in that its capacity requirements must meet two separate objectives. First, during peacetime, the Navy must maintain a global forward presence both to deter potential aggressors from conflict and to assure our allies and maritime partners that the nation remains committed to defending its national security interests and alliances. This enduring peacetime requirement to maintain a sufficient quantity of ships constantly forward deployed around the world is the driving force behind ship force structure requirements: enough ships to ensure that the Navy can provide the necessary global presence.

On the other hand, the Navy also must be able to fight and win wars. In this case, the

expectation is to be able to fight and win two simultaneous or nearly simultaneous MRCs. When thinking about naval combat power in this way, the defining metric is not necessarily a total ship count, but rather the carrier strike groups, amphibious ships, and submarines deemed necessary to win both the naval component of a war and the larger war effort by means of strike missions inland or cutting off the enemy's maritime access to sources of supply. An accurate assessment of Navy capacity takes into account both sets of requirements and scores to the larger requirement.

It should be noted that the scoring in this *Index* includes the Navy's fleet of ballistic missile (SSBN) and fast attack submarines (SSN) to the extent that they contribute to the overall size of the battle fleet and with

TABLE 2

## Navy Force Structure Assessment

Ship Type/Class	Current Fleet	2016 Force Structure Assessment	2020 Index Recommendation
Ballistic Missile Submarines	14	12	12
Aircraft Carriers	11	12	13
Large Surface Combatants	89	104	105
Small Surface Combatants	30	52	71
Attack Submarines	50	66	65
Guided Missile Submarines	4	0	0
Amphibious Warships	32	38	45
Combat Logistics Force	29	32	54
Command and Support	31	39	35
<b>Total</b>	<b>290</b>	<b>355</b>	<b>400</b>

**SOURCE:** U.S. Department of Defense, U.S. Navy, Naval Vessel Register, “Fleet Size,” <http://www.nvr.navy.mil/NVRSHIPS/FLEETSIZ.HTML> (accessed September 11, 2019).

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general comment on the status of their respective modernization programs. Because of their unique characteristics and the missions they perform, their detailed readiness rates and actual use in peacetime and planned use in war are classified. Nevertheless, the various references consulted are fairly consistent, both with respect to the numbers recommended for the overall fleet and with respect to the Navy’s shipbuilding plan.

An SSBN’s sole mission is strategic nuclear deterrence, for which it carries long-range submarine-launched ballistic missiles. They provide the most survivable leg of America’s strategic nuclear deterrent force. In contrast, as noted, SSNs are multi-mission platforms whose primary peacetime and combat missions include covert intelligence collection, surveillance, ASW, ASuW, special operations forces insertion/extraction, land attack strikes, and offensive mine warfare.<sup>220</sup>

**Two-MRC Requirement.** This *Index* uses the fleet size required for the Navy “to meet a

simultaneous or nearly simultaneous two-war or two–major regional contingency (MRC)” as the benchmark against which to measure service capacity. This benchmark consists of the force necessary to “fight and win two MRCs and a 20 percent margin that serves as a strategic reserve.” A strategic reserve is necessary because deployment of 100 percent of the fleet at any one time is extremely improbable and risky. Enduring requirements like training and maintenance make such deployment of the entire fleet infeasible, and committing 100 percent of the battle force would leave the nation without any resources available to handle emergent crises.

The primary elements of naval combat power during an MRC operation derive from carrier strike groups (which include squadrons of strike and electronic warfare aircraft as well as support ships) and amphibious assault capacity. Since the Navy maintains a constantly deployed global peacetime presence, many of its fleet requirements are beyond the scope of



the two-MRC construct, but it is nevertheless important to observe the historical context of naval deployments during a major theater war.

**Thirteen Carrier Strike Groups.** The goal for the Navy’s aircraft carrier fleet is derived from analysis of the Joint Force wartime planning scenarios and meets the GFMAP goal for continuous 2.0 CSG forward presence and 3.0 CSG 30-day surge deployment capacity. The U.S. Navy has deployed an average of six aircraft carriers to support major U.S. military operations since the end of the Cold War; key examples include combat operations in Kuwait in 1991, Afghanistan in 2001, and Iraq in 2003.<sup>221</sup> As summarized by the Congressional Budget Office:

Maintaining a fleet of 11 carriers would usually allow 5 of them to be available within 30 days for a crisis or conflict (the rest would be undergoing scheduled maintenance or taking part in training exercises and would be unready for combat). Within 90 days, the Navy would generally have seven carriers available. A larger carrier force would be able to provide more ships for a conflict, and a smaller force fewer.<sup>222</sup>

This correlates with the recommendations of numerous force-sizing assessments, from the 1993 Bottom-Up Review (BUR)<sup>223</sup> to the Navy’s 2016 Force Structure Assessment,<sup>224</sup> each of which recommended at least 11 aircraft carriers.

Assuming that 11 aircraft carriers are required to engage simultaneously in two MRCs, and assuming that the Navy ideally should have a 20 percent strategic reserve in order to avoid having to commit 100 percent of its CSGs and to account for scheduled maintenance, the Navy should maintain 13 CSGs. Several Navy-specific metrics regarding fleet readiness and deployment cycles support a minimum of at least a 20 percent capacity margin above fleet operational requirements.<sup>225</sup>

The November 2017 Chief of Naval Operations Instruction 3501.316C, “Force

Composition of Afloat Navy and Naval Groups,” provides the most current guidance on CSG baseline capabilities and force mix:

- Five to seven air and missile defense-capable large surface combatant ships (guided missile cruiser (CG) or guided missile destroyer (DDG)) to conduct anti-ship missile and anti-air warfare defense;
- A naval integrated fire control, counter air-capable cruiser as the preferred ship for the air and missile defense commander;
- No fewer than three cruise missile land attack-capable (such as Tomahawk land attack missile or follow-on weapon) large surface combatant ships;
- No fewer than three surface warfare cruise missile-capable (such as Harpoon or follow-on weapon) large surface combatant ships;
- No fewer than four multi-functional tactical towed array systems; and
- One fast combat support (T-AOE) or equivalent pair of dry cargo and ammunition (T-AKE) and fleet replenishment oiler (T-AO) combat logistics force ships.<sup>226</sup>

Although not mentioned in this instruction, historically, at least one SSN was typically assigned to a CSG during the Cold War.<sup>227</sup>

Based on these requirements and the capabilities of current and planned ship classes, the nominal CSG force composition to possess the capacity needed to support a major regional conflict is:

- One nuclear-powered aircraft carrier;
- One carrier air wing (CVW);
- One guided missile cruiser;
- Four guided missile destroyers;

- Two guided missile frigates;
- Two nuclear-powered attack submarines;
- One fast combat support ship or pair of one dry cargo and ammunition and one fleet replenishment oiler; and
- Until the Navy's new FFG(X) becomes operational, a nominal CSG that consists of six instead of four DDGs.

**Thirteen Carrier Air Wings.** In the above-referenced examples,<sup>228</sup> each carrier deployed for combat operations was equipped with a carrier air wing, making five to six air wings necessary for each of the major contingencies listed. The strategic documents differ slightly in this regard because each document suggests that one less carrier air wing than the number of aircraft carriers is sufficient.

A carrier air wing customarily includes four strike fighter squadrons.<sup>229</sup> Twelve aircraft typically comprise one Navy strike fighter squadron, so at least 48 strike fighter aircraft are required for each carrier air wing. To support 13 carrier air wings, the Navy therefore needs a minimum of 624 strike fighter aircraft.<sup>230</sup>

**Fifteen Expeditionary Strike Groups.** The 1993 BUR recommended a fleet of 41 large amphibious vessels to support the operations of 2.5 Marine Expeditionary Brigades (MEBs).<sup>231</sup> Since then, the Marine Corps has expressed a need to be able to perform two MEB-level operations simultaneously, which would require a fleet of 38 amphibious vessels.<sup>232</sup>

The number of amphibious vessels required in combat operations has declined since the Korean War, which employed 34 amphibious vessels. For example, 26 were deployed in Vietnam; 21 were deployed for the Persian Gulf War; and only seven supported Operation Iraqi Freedom, which did not require as large a sea-based expeditionary force.<sup>233</sup> The Persian Gulf War is the most pertinent example for today because it was a two-MEB operation, the capabilities of this 1991 amphibious force are similar to present-day amphibious ships, and

the modern requirements for an MEB most closely resemble this engagement.<sup>234</sup>

The Marine Corps describes an MEB Amphibious Assault Task Force (AATF) as consisting of five amphibious transport dock ships (LPDs); five dock landing ships (LSDs); and five amphibious assault ships, either landing ship assault (LHA) or landing helicopter dock (LHD).<sup>235</sup> In conjunction with the Navy's Expeditionary Strike Group definition, five ESGs compose one MEB AATF.<sup>236</sup> The Navy also specifies that for an ESG, "other forces assigned" such as "surface combatants and auxiliary support vessels will be similar to those assigned to a CSG dependent on the threat and capabilities of the ships assigned."<sup>237</sup>

Based on these requirements and definitions, the nominal ESG engaged in an MRC would include:

- One landing ship assault or landing helicopter dock,
- One amphibious transport dock,
- One amphibious dock landing ship,
- Two guided missile destroyers,
- Two guided missile frigates, and
- One fast combat support ship or pair consisting of one dry cargo and ammunition and one fleet replenishment oiler.

Two simultaneous MEB-level operations therefore require a minimum of 10 ESGs or 30 operational amphibious warships. The 1996 and 2001 QDRs each recommended 12 amphibious ready groups. While the Marine Corps has consistently advocated a fleet of 38 amphibious vessels to execute its two-MEB strategy,<sup>238</sup> it is more prudent to field a fleet of at least 45 amphibious ships. This incorporates a more conservative assumption that 12 ESGs could be required in a two-MRC scenario against near-peer adversaries in addition to ensuring a strategic reserve of 20 percent.<sup>239</sup>

**Total Ship Requirement.** This *Index* assesses that a minimum of 400 U.S. Navy battle force ships is required to provide:

- The 13 carrier strike groups and 15 expeditionary strike groups required to meet the simultaneous two-MRC construct;
- The historical steady-state demand of approximately 100 ships constantly forward deployed in key regions around the world; and
- Sufficient capacity to maintain the Navy's ships properly and ensure that its sailors are adequately trained to "fight tonight."

The bulk of the Navy's battle force ships are not directly supporting a CSG or ESG during peacetime operations. Many surface vessels and attack submarines deploy independently, which is often why their requirements exceed those of a CSG. The same can be said of the ballistic missile submarine (nuclear missiles) and guided missile submarine (conventional cruise missiles), which operate independently of an aircraft carrier.

This *Index's* benchmark of 400 battle force ships is informed by previous naval force structure assessments and government reports as well as independent analysis incorporating the simultaneous two-MRC requirement, CSG and ESG composition, and other naval missions and requirements. Because they have not yet matured sufficiently to replace manned ships or submarines in the battle force, unmanned systems are not included in the recommended fleet composition. Ship classes that are not current programs of record also were not included in this assessment because notional ship designs do not have validated requirements, their capabilities are unknown, and they have no assurance of being built.<sup>240</sup>

The most significant differences between this updated total ship requirement and the Navy's 2016 FSA are in SSC and CLF ships. The increase in SSCs from the Navy requirement of 52 to 71 is driven primarily by the

assessed CSG and ESG compositions, which include two FFGs per strike group. The two-MRC ESG and CSG demand alone requires 56 FFGs in addition to the continued requirement for a combination of at least 15 MCM ships and MIW LCSs. Similarly, the CLF requirement of 54 ships is dependent on the logistics demands of the two-MRC requirement of 13 operational CSGs and 12 ESGs. Since the Navy possesses only two T-AOEs that can each support the fuel and ammunition needs of a strike group, a pair of single-purpose T-AOs and T-AKEs is required for each CSG and ESG.

While a 400-ship fleet is significantly larger than the Navy's current 355-ship requirement, it should be noted that the final 2016 FSA requirement of 355 ships was based on the previous Administration's "Defeat/Deny" Defense Planning Guidance and "delivers future steady state and warfighting requirements with an acceptable degree of risk."<sup>241</sup> The Navy's analysis determined that a 459-ship force was "needed to achieve the Navy's mission with reasonable expectations of success without incurring significant losses" but that it was "unreasonable... to assume we would have the resources to aspire to a force of this size with this mix of ships."<sup>242</sup> Finally, this FSA has not been updated to address the 2018 National Defense Strategy, which reestablished "[l]ong-term strategic competitions with China and Russia" as the DOD's "principal priorities."<sup>243</sup>

The numerical values used in the score column refer to the five-grade scale explained earlier in this section, where 1 is "very weak" and 5 is "very strong." Taking the *Index* requirement for Navy ships as the benchmark, the Navy's current battle forces fleet capacity of 289 ships, planned fleet of 296 ships by the end of FY 2019, and revised fleet size (implied by both the 2018 NDS, which highlights great-power competition, and analysis of the Navy's history of employment in major conflicts) result in a score of "weak," which is unchanged from the 2019 *Index*. Depending on the Navy's ability to fund more aggressive growth options and SLEs as identified in the FY 2020 30-year shipbuilding plan; the *Columbia*-class ballistic missile

submarine and *Ford*-class aircraft carrier programs that will consume a significant portion of the current shipbuilding budget per hull; and the growing number of ship and submarine retirements, the Navy's capacity score could fall further in the "weak" category in the near future.

### Capability Score: Marginal

The Navy's overall capability score remained "marginal." This was consistent across all four components of the capability score: "Age of Equipment," "Capability of Equipment," "Size of Modernization Program," and "Health of Modernization Programs." Given the number of programs, ship classes, and types of aircraft involved, the details that informed the capability assessment are presented more accessibly in a tabular format as shown in the Appendix.

### Readiness Score: Marginal

The Navy's readiness score also remained "marginal." This assessment combines two major elements of naval readiness: the ability to provide both the required levels of presence around the globe and surge capacity on a consistent basis. As elaborated below, the Navy's ability to maintain required presence in key regions is "strong," but its ability to surge to meet combat requirements ranges from "weak" to "very weak" depending on how one defines the requirement. In both cases—presence and surge—the Navy has sacrificed long-term readiness to meet current operational demands for many years.

Although the Navy has prioritized restoring readiness through increased maintenance and training since 2017, as Admiral Richardson has stated, it will take at least until 2022 for the Navy to restore its readiness to required levels.<sup>244</sup> To improve personnel readiness:

The FY 2020 Military Personnel, Navy budget request is 5,100 higher than the end strength in FY 2019 and supports Navy manpower, personnel, training, and education. To ensure success, the Navy

has made investments in special and incentive pays, critical to recruiting and retaining the very best people our nation has to offer.

Furthermore, the FY 2020 request increases funding and strength for phased increases in manpower for expeditionary and aviation operational units, re-establishment of U.S. Second Fleet, production recruiters to support increased accession mission capacity, DDG-51 *Arleigh Burke* class destroyer new construction crews and class manpower increases, helicopter maritime strike (MH-60R Seahawk) squadron new construction and manpower requirements, changes to CVN 79 *Gerald R. Ford* class aircraft carrier new construction crew resulting from updated crew phasing, increases to expeditionary mine countermeasures mission, and the necessary capabilities required for increased enlisted and officer accession capacity of 42,000 and 4,500 respectively.<sup>245</sup>

Although the Navy is working proactively to address manning shortfalls and anticipate the demands of a growing fleet, there are some challenges. In February 2019, Admiral Christopher Grady, Commander, United States Fleet Forces Command, informed Congress that the Navy is short about 6,200 sailors to meet at-sea manning requirements.<sup>246</sup> After insufficient crew manning was found to be a contributing factor in the *Fitzgerald* and *McCain* fatal collisions, the Navy reassessed and increased the required number of sailors on all ship classes. The increase in ship crew size from 4 percent to 14 percent across the fleet contributed to this manning shortfall. The average crew size of an *Arleigh Burke*-class destroyer has grown from 240 sailors in 2017 to 272 sailors in 2019 on the path to reaching the new requirement of 318 sailors in FY 2023.<sup>247</sup>

The Navy barely exceeded its FY 2018 recruiting goal of 39,000 new sailors by only 18 recruits.<sup>248</sup> The Navy has assessed that its total manpower will need to grow by approximately

35,000 sailors to support a 355-ship Navy. The Navy faces several challenges in meeting the growing fleet demand for sailors: A strong U.S. economy increases the competition to hire young adults; only approximately 29 percent of young adults qualify to join the military; and only 7 percent of young Americans are interested in enlisting in the Navy.

The Navy is taking proactive approaches to meet these challenges head on by increasing the number of recruiters; focusing 70 percent of its recruiting campaigns on digital platforms; reassessing some outdated recruiting policies; and offering targeted recruitment bonuses for critical Navy occupations such as nuclear power specialties, SEALs, and explosive ordnance disposal technicians.<sup>249</sup> These efforts should have a positive impact on the recruitment and retention of sailors, and Navy leadership must continue to prioritize and fund these initiatives not only to recruit, but also to retain more sailors as the fleet grows.

Though the Navy has been able to maintain approximately a third of its fleet globally deployed, and while the OFRP has improved readiness for individual hulls by restricting deployment increases, demand still exceeds the supply of ready ships needed to meet the operational demand of CCDRs sustainably. Admiral Moran expressed deep concern about the Navy's ability to meet the nation's needs in a time of conflict in this exchange with Senator Joni Ernst (R-IA) in 2016:

Senator Ernst: ...If our Navy had to answer to two or more of the so-called four-plus-one threats today, could we do that?

Admiral Moran: ...[W]e are at a point right now...that our ability to surge beyond our current force that's forward is very limited, which should give you a pretty good indication that it would be challenging to meet the current guidance to defeat and deny in two conflicts.<sup>250</sup>

Three surface ship collisions and one grounding that resulted in the loss of 17 sailors

in the Pacific during 2017 revealed how significant the Navy's and specifically its surface fleet's readiness crisis had become. The Chief of Naval Operations, Admiral Richardson, responded with a directive that "an operational pause be taken in all fleets around the world and that a comprehensive review be launched that examines the training and certification of forward-deployed forces as well as a wide span of factors that may have contributed to the recent costly incidents."<sup>251</sup>

The GAO also conducted its own readiness reviews. One of its most disturbing findings was a lack of formal dedicated training and deployment certification time for the Japan-based ships compared to the CONUS-based ships whose OFRP cycle ensures that all ships are properly trained and mission certified before being forward deployed. Since the Japan-based ships are in a permanently deployed status, and in an effort to meet the ever-increasing demand, these ships were not provided any dedicated training time, and by June 2017, 37 percent of their warfare certifications were expired. Pacific Fleet leadership had increasingly waived these expired certifications to deploy these ships, and the GAO discovered that these waivers increased fivefold between 2015 and 2017.<sup>252</sup>

Another critical finding was the lack of basic seamanship proficiency, not just among the crews of USS *John S. McCain* and USS *Fitzgerald*, but across the surface warfare community. Surface Warfare Officer School seamanship competency checks of 196 first sea tour Officer of the Deck-qualified junior officers during the spring of 2018 revealed that evaluations of almost 84 percent of these officers revealed "some concerns" or "significant concerns."<sup>253</sup>

The readiness reviews recommended several corrective actions to improve the material condition of Navy ships as well as the professional training and operational proficiency of their crews. For example:

- Cancellation of all risk-assessment mitigation plans (RAMPs) and waivers for expired mission certifications.<sup>254</sup>

- A new 24-month force generation plan for all Japan-based ships that includes 18 weeks of dedicated training time and seven months of maintenance time.<sup>255</sup>
- Ready for Sea Assessments on Japan-based “cruisers and destroyers, with the exception of those completing or in maintenance, in order to re-baseline existing afloat certifications.”<sup>256</sup>
- A redesigned Surface Warfare Officer (SWO) career path that increases professional and seamanship training, adds individual proficiency assessments, and increases at-sea time.<sup>257</sup>

In January 2018, Under Secretary of the Navy Thomas Modly established a Readiness Reform and Oversight Council (RROC) to “oversee and ensure the implementation of Strategic Readiness Review (SRR) and Comprehensive Review (CR) recommendations” as well as to “assess the overall health and effectiveness of DON efforts to reform and improve readiness.”<sup>258</sup> Admiral Moran, Vice Chief of Naval Operations, provided an annual update on the progress of the RROC in February 2019. Among the highlighted accomplishments:

- “91 of the remaining [111] recommendations of the Strategic Readiness Review (SRR) and Comprehensive Review (CR) have been implemented.”
- “[O]ur Force Generation strategy, the process by which we certify ships for sea, was completely restructured. Today, any operations outside the guidance established by the Surface Force Commander require[] notification of a Four-Star Fleet Commander to ensure visibility and accountability.”
- “Fleet Commanders conducted Ready-for-Sea Assessments to ensure appropriate manning levels, training certification, and equipment status for every operational

ship at sea. Fifteen of eighteen Forward Deployed Naval Force-Japan (FDFNF-J) ships were assessed as ready for sea. The three remaining ships were immediately sidelined for additional training and maintenance prior to getting underway.”

- “FDFNF manning requirements were formally assigned higher priority than Continental United States (CONUS) requirements for sea and shore billets, respectively.... Currently across FDFNF, at-sea billets are filled at 100% in the aggregate, compared to the Navy-wide average of 95%.”
- “The revised SWO career path will increase time at sea during an officer’s first sea tour (48 total months).... The Mariner Skills Training Program (MSTP) takes a holistic view of the career path, delivering improved Junior Officer of the Deck training (May 2019) [and] Officer of the Deck courses (May 2021).... In July 2018, Surface Warfare Officers School (SWOS) trainees were recertified as U.S. Coast Guard Standards of Training, Certification, & Watchkeeping (SCTW) compliant.... SWOs will have proficiency measured via ten Career Milestone assessments.”<sup>259</sup>

In his FY 2020 Posture Statement, Admiral Richardson stated that:

PB-20 assigns the highest funding priority to CR/SRR-related investments—\$346 million in FY-20 and \$1.1 billion over the FYDP... Additionally, we remain committed to assessing our ships and crews, understanding the impact of fatigue and other human factors, filling personnel gaps for ships on deployment or in sustainment, and dedicating time to maintain our forward-deployed Fleet.<sup>260</sup>

Admiral Richardson’s statement and the RROC’s accomplishments to date demonstrate that Navy leadership has taken the tragedies

of 2017 to heart and is committed to restoring surface warfare proficiency and readiness. Unfortunately, it will take several years to implement all corrective actions and even longer for these efforts to translate into satisfactory material and training readiness across the entire surface fleet.

The Navy's readiness as it pertains to providing global presence is rated "marginal." The level of CCDR demand for naval presence and the fleet's ability to meet that demand are similar to those found in the *2019 Index* but are still challenged by the range of funding problems noted in this section. The Navy maintains its ability to forward deploy approximately one-third of its fleet and has been able to stave off immediate readiness challenges through the OFRP.

The Navy's readiness corrective actions, coupled with an inadequate fleet size, have reduced its ability to respond to CCDR requirements for sustained presence, crisis support, and surge response in the event of a major conflict. Since CCDR demand signals have become insatiable in recent years, recent actions by the Navy to prioritize maintenance and training over peacetime deployments have created a more realistic and sustainable OP-TEMPO for missions short of major conflict. The Navy's actions to improve training and efficiency for the fleet and specifically for the surface warfare community will help to correct the systemic issues that led to severely degraded operational proficiency, but it will be several years before they can fully change the culture and raise the level of the fleet's overall professional knowledge and experience.

Even with prioritized investments in ship and aircraft maintenance at the maximum executable levels of the Navy's ship and aircraft depots, the Navy still cannot meet the maintenance requirement for FY 2020. Without increased and sustained funding to meet the Navy's fleet recapitalization requirements and improvements in shipyard maintenance capacity, the readiness of the Navy's fleet will remain compromised.

Although the Navy has made strides in arresting its readiness decline since Admiral Moran expressed his concerns about the Navy's ability to handle two major crises more than a year ago, the gains have not been sufficient to justify an assumption that his concerns do not still hold true today. The escalating depot maintenance demands of a growing fleet, coupled with several attack submarine refueling overhauls in the near future, could amplify ship maintenance backlogs before the effects of shipyard modernization and a larger maintenance workforce are felt. The short-term readiness gains made in the Navy's strike fighter inventory must be sustained and applied across the entire naval aviation enterprise.

### **Overall U.S. Navy Score: Marginal**

The Navy's overall score for the *2020 Index* is "marginal," the same as it was in the *2019 Index*. This was derived by aggregating the scores for capacity ("weak"); capability ("marginal"); and readiness ("marginal").

The Navy has prioritized restoring material and warfighting readiness, and this has been matched by increased funding since 2017. However, despite some incremental improvements, the competing effects of growing maintenance demands versus the extended timeline to increase public shipyard capacity and efficiency could mitigate or reverse these gains. Similarly, the Navy's FY 2020 shipbuilding plan and modernization plans forecast a larger and more lethal fleet, but funding limitations will make it extremely difficult for the Navy to increase capacity and field new lethal capabilities in the near term.

Unless Defense Department leadership and Congress can provide a sustained increase in procurement and research and development funding, the plans to build a bigger and better Navy will be curtailed. This could result in future degradation of the Navy's capacity and capability scores.

## U.S. Military Power: Navy

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Capacity		✓			
Capability			✓		
Readiness			✓		
<b>OVERALL</b>			✓		



# NAVY SCORES



Procurement and Spending ■ Through FY 2019 ■ Pending

## Aircraft Carrier

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b><i>Nimitz-Class Aircraft Carrier (CVN-68)</i></b> Inventory: <b>10</b> Fleet age: <b>28</b> Date: <b>1975</b></p> <p>The <i>Nimitz</i>-class is a nuclear powered multipurpose carrier. The aircraft carrier and its embarked carrier air wing can perform a variety of missions including maritime security operations and power projection. Its planned service life is 50 years. The class will start retiring in FY 2025 and will be replaced by the <i>Ford</i>-class carriers.</p>	3	3	<p><b><i>Ford-Class Aircraft Carrier (CVN-78)</i></b> Timeline: <b>2017-2032</b></p> <p>Currently in production, the <i>Ford</i>-class will replace the current <i>Nimitz</i>-class aircraft carriers. The <i>Ford</i>-class design uses the basic <i>Nimitz</i>-class hull form but incorporates several improvements: 33 percent higher sortie rate; a smaller crew with approximately 600 fewer sailors; two and a half times greater electrical power, and over \$4 billion in life cycle cost savings over the <i>Nimitz</i>-class.</p>	2	2
<p><b><i>Ford-Class Aircraft Carrier (CVN-78)</i></b> Inventory: <b>1</b> Fleet age: <b>2</b> Date: <b>2017</b></p> <p>The <i>Ford</i>-class incorporates new technologies that will increase aircraft sortie rates, reduce manning, provide greater electrical power for future weapons systems, and decrease operating costs. Its planned service life is 50 years.</p>	5	4	<p><b>PROCUREMENT</b></p> <p><b>SPENDING (\$ millions)</b></p>		

**NOTE:** See page 392 for details on fleet ages, dates, and procurement spending.

# NAVY SCORES



Procurement and Spending ■ Through FY 2019 ■ Pending

## Large Surface Combatant

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score				
<p><b><i>Ticonderoga-Class Cruiser (CG-47)</i></b> Inventory: <b>22</b> Fleet age: <b>29</b> Date: <b>1983</b></p> <p>The <i>Ticonderoga</i>-Class is a multi-mission battle force ship equipped with the Aegis Weapons System. While it can perform strike, anti-surface warfare and anti-submarine warfare, its primary focus is air and missile defense. Between FY 2021 and 2024, the Navy plans to retire eight of the 22 CGs, given their life expectancy of 40 years.</p>	2	3	<p><b><i>Zumwalt-Class Destroyer (DDG-1000)</i></b> Timeline: <b>2016–2022</b></p> <p>The DDG-1000 was designed to be a new-generation destroyer capable of handling more advanced weapon systems with modern gun systems and a hull design aimed to reduce radar detectability for its primary mission of naval surface fire support (NSFS). The DDG-1000 program was intended to produce a total of 32 ships, but this number was reduced to 3. The first DDG-1000 was commissioned in October 2016.</p> <p><b>PROCUREMENT</b> <b>SPENDING (\$ millions)</b></p> <table border="1"> <tr> <td>PROCUREMENT</td> <td>3</td> </tr> <tr> <td>SPENDING (\$ millions)</td> <td>\$12,987</td> </tr> </table>	PROCUREMENT	3	SPENDING (\$ millions)	\$12,987	1	1
PROCUREMENT	3								
SPENDING (\$ millions)	\$12,987								
<p><b><i>Zumwalt-Class Destroyer (DDG-100)</i></b> Inventory: <b>1</b> Fleet age: <b>3</b> Date: <b>2016</b></p> <p>The <i>Zumwalt</i>-Class is a multi-mission destroyer that incorporates several technological improvements, such as a stealthy hull design and integrated electric-drive propulsion system. Although it has passed sea trials, it continues to experience problems with its combat systems. The third and final ship of the class is expected to be commissioned in late FY 2019.</p>	5	2							
<p><b><i>Arleigh Burke-Class Destroyer (DDG-51)</i></b> Inventory: <b>67</b> Fleet age: <b>17</b> Date: <b>1991</b></p> <p>The <i>Arleigh Burke</i>-Class is a multi-mission guided missile destroyer featuring the Aegis Weapons System with a primary mission of air defense. The Navy plans to extend the service life of the entire class to 45 years from its original life expectancy of 35-40 years.</p>	4	4	<p><b><i>Arleigh Burke-Class Destroyer (DDG-51)</i></b> Timeline: <b>1991–2029</b></p> <p>DDG-51 production was restarted in FY 2013 to make up for the reduction in DDG-1000 acquisitions. Beginning in FY 2017, all DDG-51s procured will be the Flight III design, which includes the Advanced Missile Defense Radar (AMDR), a more capable missile defense radar.</p> <p><b>PROCUREMENT</b> <b>SPENDING (\$ millions)</b></p> <table border="1"> <tr> <td>PROCUREMENT</td> <td>82</td> </tr> <tr> <td>SPENDING (\$ millions)</td> <td>\$89,948</td> </tr> </table>	PROCUREMENT	82	SPENDING (\$ millions)	\$89,948	4	4
PROCUREMENT	82								
SPENDING (\$ millions)	\$89,948								

NOTE: See page 392 for details on fleet ages, dates, and procurement spending.

# NAVY SCORES



Procurement and Spending ■ Through FY 2019  
■ Pending

## Small Surface Combatant

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>Littoral Combat Ship (LCS)</b> Inventory: <b>17</b> Fleet age: <b>3</b> Date: <b>2008</b></p> <p>The Littoral Combat Ship includes two classes: the <i>Independence</i>-class and the <i>Freedom</i>-class. The modular LCS design depends on mission packages (MP) to provide warfighting capabilities in the SUW, ASW, and MCM mission areas. The ship has an expected service life of 25 years.</p>	5		<p><b>Littoral Combat Ship (LCS)</b> Timeline: <b>2009–2019</b></p> <p>The LCS is intended to fulfill the mine countermeasure, antisubmarine warfare, and surface warfare roles for the Navy. It will be the only small surface combatant in the fleet once the Navy's MCM ships retire. A new program called the FFG(X) will fill out the remaining 20-ship small surface combatant requirement.</p>	2	2
<p><b>Avenger-Class Mine Counter Measure (MCM-1)</b> Inventory: <b>11</b> Fleet age: <b>27</b> Date: <b>1989</b></p> <p><i>Avenger</i>-class ships are designed as mine sweepers/hunter-killers capable of finding, classifying, and destroying moored and bottom mines. The class has an expected 30-year service life. The remaining MCMs are expected to be decommissioned throughout the 2020s. While there is no direct replacement single mission MCM ship in production, the Navy plans to fill its mine countermeasure role with the LCS and its MCM MP.</p>			<p><b>PROCUREMENT</b></p> <p>33</p> <p><b>SPENDING (\$ millions)</b></p> <p>\$16,719 \$80</p>		

## SSGN Cruise Missile Submarine

PLATFORM	Age Score	Capability Score	MODERNIZATION PROGRAM	Size Score	Health Score
<p><b>Ohio-Class (SSGN-726)</b> Inventory: <b>4</b> Fleet age: <b>36.5</b> Date: <b>1981</b></p> <p>The SSGNs provide the Navy with a large stealthy strike and special operations mission capabilities. From 2002–2007, the four oldest <i>Ohio</i>-class ballistic missile submarines were converted to guided missile submarines. Each SSGN is capable of carrying up to 154 Tomahawk land-attack cruise missiles and up to 66 special operations forces for clandestine insertion and retrieval. All four SSGNs will retire between FY 2026–2028. The Navy has tentative plans to replace the SSGNs with a new Large Payload Submarine beginning in FY 2036.</p>	2	4	None		

**NOTE:** See page 392 for details on fleet ages, dates, and procurement spending.

# NAVY SCORES



Procurement and Spending ■ Through FY 2019 ■ Pending

## Attack Submarines

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score				
<p><b>Seawolf-Class (SSN-21)</b> Inventory: <b>3</b> Fleet age: <b>19</b> Date: <b>1997</b></p> <p>The <i>Seawolf</i>-class is exceptionally quiet, fast, well-armed, and equipped with advanced sensors. Though lacking a vertical launch system, the <i>Seawolf</i>-class has eight torpedo tubes and can hold up to 50 weapons in its torpedo room. Although the Navy planned to build 29 submarines, the program was cut to three submarines. The <i>Seawolf</i>-class has a 33-year expected service life. They have been succeeded by the <i>Virginia</i>-class attack submarine.</p>	3	4	<p><b>Virginia-Class (SSN-774)</b> Timeline: <b>2004–2019</b></p> <p>The Virginia Payload Module (VPM) will be incorporated into eight of the 11 planned Block V submarines beginning in FY 2019. VPM includes four large-diameter, vertical launch tubes that can carry up to 28 additional Tomahawk missiles or other payloads.</p>	2	3				
<p><b>Los Angeles-Class (SSN-688)</b> Inventory: <b>31</b> Fleet age: <b>28</b> Date: <b>1976</b></p> <p>The <i>Los Angeles</i>-class comprises the largest portion of the Navy's attack submarine fleet. They are multi-mission submarines that can perform covert intelligence collection, surveillance, ASW, ASuW, and land attack strike. The <i>Los Angeles</i>-class has a 33-year expected service life. The last <i>Los Angeles</i>-class submarine is expected to retire in the late 2020s and is being replaced by the <i>Virginia</i>-class.</p>	1	3	<p><b>PROCUREMENT</b>                      <b>SPENDING (\$ millions)</b></p> <table border="1"> <tr> <td>30</td> <td>28</td> <td>\$79,794</td> <td>\$68,285</td> </tr> </table>			30	28	\$79,794	\$68,285
30	28	\$79,794	\$68,285						
<p><b>Virginia-Class (SSN-774)</b> Inventory: <b>17</b> Fleet age: <b>7</b> Date: <b>2004</b></p> <p>The <i>Virginia</i>-class is the U.S. Navy's next-generation attack submarine. The <i>Virginia</i>-class includes several improvements over previous attack submarine classes that provide increased acoustic stealth, improved SOF support, greater strike payload capacity, and reduced operating costs. The planned service life of the <i>Virginia</i>-class is 33 years. The <i>Virginia</i>-class is in production and will replace the <i>Los Angeles</i>-class and <i>Seawolf</i>-class attack submarines as they are decommissioned.</p>	4	4							

**NOTE:** See page 392 for details on fleet ages, dates, and procurement spending.

# NAVY SCORES



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## SSBN Ballistic Missile Submarine

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>Ohio-Class (SSBN)</b></p> <p>Inventory: <b>14</b> Fleet age: <b>28.5</b> Date: <b>1981</b></p> <p>The <i>Ohio</i>-class SSBN is the most survivable leg of the U.S. military's strategic nuclear triad. The <i>Ohio</i> SSBN's sole mission is strategic nuclear deterrence, for which it carries long-range submarine-launched ballistic missiles. The <i>Ohio</i>-class's expected service life is 42 years. The <i>Ohio</i>-class fleet will begin retiring in 2027 at an estimated rate of one submarine per year until 2039. The <i>Ohio</i>-class is being replaced by the <i>Columbia</i>-class SSBN</p>	2	4	<p><b>Columbia-Class (SSBN-826)</b></p> <p>The <i>Columbia</i>-class SSBN is the Navy's highest priority program. The 12 boats in the program will replace the current fleet of 14 <i>Ohio</i>-class ballistic missile submarines, with acquisition of the first boat to occur in FY 2021. The program will extend through the mid-2030s.</p>		

## Amphibious Warfare Ship

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>Wasp-Class Amphibious Assault Ship (LHD-1)</b></p> <p>Inventory: <b>8</b> Fleet age: <b>22</b> Date: <b>1989</b></p> <p>The <i>Wasp</i>-class can support amphibious landing operations with Marine Corps landing craft via its well deck. It can also support a Marine Air Combat Element operations with helicopters, tilt-rotor aircraft and Vertical/Short Take-Off and Landing (V/STOL). This ship has a planned 40-year service life.</p>	3	3	<p><b>America-Class (LHA-6)</b></p> <p>Timeline: <b>2004-TBD</b></p> <p>LHA Flight 0 (LHA-6 and 7) were built without a well deck to provide more space for Marine Corp aviation maintenance and storage as well as increased JP-5 fuel capacity. LHA Flight 1 (LHA-8 and beyond) will reincorporate a well deck for increased mission flexibility. The America-class is in production with three LHA-6s already fully procured. Advance procurement for LHA 9 will begin in FY 2023.</p>	3	3
<p><b>America-Class Amphibious Assault Ship (LHA-6)</b></p> <p>Inventory: <b>1</b> Fleet age: <b>5</b> Date: <b>2014</b></p> <p>This new class of large-deck amphibious assault ships is meant to replace the retiring <i>Wasp</i>-Class LHD. LHAs are the largest of all amphibious warfare ships, resembling a small aircraft carrier. The America-class is designed to accommodate the Marine Corps' F-35Bs.</p>	5	4	<p><b>PROCUREMENT</b></p> <p><b>SPENDING (\$ millions)</b></p>		

NOTE: See page 392 for details on fleet ages, dates, and procurement spending.

# NAVY SCORES



Procurement and Spending ■ Through FY 2019 ■ Pending

## Amphibious Warfare Ship

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>San Antonio-Class Amphibious Transport Dock (LPD-17)</b></p> <p>Inventory: <b>11</b> Fleet age: <b>8</b> Date: <b>2006</b></p> <p>The LPDs have well decks that allow the USMC to conduct amphibious operations with its landing craft. The LPD can also carry 4 CH-46s or 2 MV-22s. 11 of the planned 13 Flight I LPD-17-class ships are operational with the remaining two under construction. The class has a 40-year planned service life.</p>	5		<p><b>San Antonio-Class Amphibious Transport Dock (LPD-17)</b></p> <p>Timeline: <b>2006–2017</b></p> <p>The LPD-17s are replacements for the <i>San Antonio</i>-class LPDs. All 13 LPD-17s have been procured. Both Flight I and Flight II LPDs are multi-mission ships designed to embark, transport, and land elements of a Marine landing force by helicopters, tilt-rotor aircraft, landing craft, and amphibious vehicles.</p> <p><b>PROCUREMENT</b> <b>SPENDING (\$ millions)</b></p> <p>13 \$21,309 \$63</p>	5	4
<p><b>Whidbey Island-Class Dock Landing Ship (LSD-41)</b></p> <p>Inventory: <b>8</b> Fleet age: <b>30</b> Date: <b>1985</b></p> <p>LSD-41 <i>Whidbey Island</i>-class ships were designed specifically to transport and launch four Marine Corps Landing Craft Air Cushion vehicles. They have an expected service life of 40 years. All eight ships in the class will retire between FY 2026–2033. LSD-41-class will be replaced by LPD-17 Flight II program, which began procurement in FY 2018.</p>	2	3	<p><b>LPD-17 Flight II</b></p> <p>Timeline: <b>2025–TBD</b></p> <p>Previously known as LX(R), the LPD-17 Flight II program will procure 13 ships to replace the Navy's LSD-type ships. The Navy originally planned to procure the first Flight II ship in FY 2020, however accelerated procurement funding enabled procurement of the first LPD-17 Flight II in FY 2018. The Navy delayed the second ship planned for FY 2020 until FY 2021.</p> <p><b>PROCUREMENT</b> <b>SPENDING (\$ millions)</b></p> <p>1 8 \$2,164 \$3,577</p>	5	4
<p><b>Harpers Ferry-Class Dock Landing Ships (LSD-49)</b></p> <p>Inventory: <b>4</b> Fleet age: <b>23</b> Date: <b>1994</b></p> <p>The <i>Harpers Ferry</i>-class reduced LCAC capacity to two while increasing cargo capacity. It has an expected service life of 40 years and all ships will be retired by FY 2038. The LSD-49 will be replaced by the LPD-17 Flight II, which began procurement in FY 2018.</p>		3			

**NOTE:** See page 392 for details on fleet ages, dates, and procurement spending.

# NAVY SCORES



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## Airborne Early Warning

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>E-2C Hawkeye</b></p> <p>Inventory: <b>28</b> Fleet age: <b>36</b> Date: <b>1973</b></p> <p>The E-2C Hawkeye is a battle management and airborne early warning aircraft. The E-2C fleet received a series of upgrades to mechanical and computer systems around the year 2000. While still operational, the E-2C is nearing the end of its service life and is being replaced by the E-2D Advanced Hawkeye.</p>	1	3	<p><b>E-2D Advanced Hawkeye</b></p> <p>Timeline: <b>2014–2022</b></p> <p>The E-2D Advanced Hawkeye replaces the legacy E-2C and is in production. The Navy received approval for a five year multi-year procurement plan beginning in FY 2019 for 24 aircraft to complete the program of record.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>PROCUREMENT</b></p> </div> <div style="text-align: center;"> <p><b>SPENDING (\$ millions)</b></p> </div> </div>	4	4
<p><b>E-2D Advanced Hawkeye</b></p> <p>Inventory: <b>12</b> Fleet age: <b>3</b> Date: <b>2014</b></p> <p>The E-2D program is the next generation, carrier-based early warning, command, and control aircraft that provides improved battle space detection, supports theater air missile defense, and offers improved operational availability.</p>	5	4			

## Electronic Attack Aircraft

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>EA-18G Growler</b></p> <p>Inventory: <b>75</b> Fleet age: <b>6</b> Date: <b>2009</b></p> <p>The EA-18G Growler is the U.S. Navy's primary electronic attack aircraft, providing tactical jamming and suppression of enemy air defenses. The final EA-18G aircraft was delivered in FY 2018, bringing the total to 160 aircraft and fulfilling the Navy's requirement. It replaced the legacy EA-6B Prowlers.</p>	5	4	None		

**NOTE:** See page 392 for details on fleet ages, dates, and procurement spending.

# NAVY SCORES



Procurement and Spending ■ Through FY 2019 ■ Pending

## Fighter/Attack Aircraft

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score		
<p><b>F/A-18E/F Super Hornet</b> Inventory: <b>546</b> Fleet age: <b>15</b> Date: <b>2001</b></p> <p>The F/A-18E/F Super Hornet has longer range, greater weapons payload, and increased survivability when compared with the F/A-18A-D Legacy Hornet. The Navy plans to achieve a 50/50 mix of two F-35C squadrons and two F/A-18E/F Block III squadrons per carrier air wing by the mid-2030s. The ongoing service life extension program will extend the life of all Super Hornets to 9,000 flight hours.</p>	3	3	<p><b>F-35C Joint Strike Fighter</b> Timeline: <b>2019-TBD</b></p> <p>The C-variant is the Navy's 5th generation aircraft, bringing radar-evading technology to the carrier deck for the first time. The F-35C performs a variety of missions to include air-to-air combat, air-to-ground strikes, and ISR missions.</p>	2	3		
<p><b>F-35C Joint Strike Fighter</b> Inventory: <b>30</b> Fleet age: <b>1</b> Date: <b>2019</b></p> <p>The F-35C is the Navy's variant of the Joint Strike Fighter.</p>	5	4	<p><b>PROCUREMENT</b>                      <b>SPENDING (\$ millions)</b></p> <table border="0"> <tr> <td style="text-align: center;"> <p>98                      271</p> </td> <td style="text-align: center;"> <p>\$19,549                      \$35,727</p> </td> </tr> </table>			<p>98                      271</p>	<p>\$19,549                      \$35,727</p>
<p>98                      271</p>	<p>\$19,549                      \$35,727</p>						

**NOTES:** See Methodology for descriptions of scores. Fleet age is the average of platform since commissioning. The date for ships is the year of commissioning. Inventory for aircraft is estimated based on the number of squadrons. The date for aircraft is the year of initial operational capability. The timeline for ships is from the year of first commissioning to the year of last delivery. The timeline for aircraft is from the year of first year of delivery to the last year of delivery. Spending does not include advanced procurement or research development test and evaluation. The total program dollar value reflects the full F-35 joint program, including engine procurement. The Navy is also procuring 67 F-35Cs for the Marine Corps. Age of fleet is calculated from date of commissioning to January 2016.



# U.S. Navy Modernization Table Citations

## MAIN SOURCES

- U.S. Department of Defense, Office of Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare System Requirements–OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, March 2019, [https://www.navy.mil/strategic/PB20\\_Shipbuilding\\_Plan.pdf](https://www.navy.mil/strategic/PB20_Shipbuilding_Plan.pdf) (accessed September 5, 2019).
- U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, *United States Department of Defense Fiscal Year 2020 Budget Request: Program Acquisition Cost by Weapon System*, March 2019, [https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/fy2020\\_Weapons.pdf](https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/fy2020_Weapons.pdf) (accessed September 5, 2019).
- U.S. Navy, Naval Sea Systems Command, Naval Vessel Register, “Ship Battle Forces,” <https://www.nvr.navy.mil/NVRSHIPS/SHIPBATTLEFORCE.HTML> (accessed September 5, 2019).
- U.S. Department of the Navy, “United States Navy *Fact File*,” <https://www.navy.mil/navydata/fact.asp> (accessed September 5, 2019).
- U.S. Department of the Navy, *Department of Defense Fiscal Year (FY) 2020 President’s Budget Estimate Submission, Navy, Justification Book Volume 1 of 1: Shipbuilding and Conversion, Navy*, March 2019, [https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/SCN\\_Book.pdf](https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/SCN_Book.pdf) (accessed September 5, 2019).
- U.S. Department of the Navy, *Department of Defense Fiscal Year (FY) 2020 Budget Estimates, Navy, Justification Book Volume 1 of 3: Aircraft Procurement, Navy, Budget Activities 01–04*, March 2019, [https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/APN\\_BA1-4\\_BOOK.pdf](https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/APN_BA1-4_BOOK.pdf) (accessed September 5, 2019).
- U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, 2019, <https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/Budget%20Highlights%20Book.pdf> (accessed September 5, 2019).

## MISC. SOURCES

### *Ford-Class Aircraft Carrier (CVN-78):*

- Ben Werner, “Congress Unhappy with Ford-Class Inability to Deploy with F-35 Fighters,” U.S. Naval Institute News, June 3, 2019, <https://news.usni.org/2019/06/03/congress-unhappy-with-ford-class-inability-to-deploy-with-f-35-fighters> (accessed September 5, 2019).
- Ben Werner, “Nimitz and Ford Carriers Need Upgrades to Deploy with F-35Cs,” U.S. Naval Institute News, updated June 7, 2019, <https://news.usni.org/2019/06/06/nimitz-and-ford-carriers-need-upgrades-to-deploy-with-f-35cs> (accessed September 5, 2019).

### *Zumwalt-Class Destroyer:*

- U.S. Navy, “Upcoming US Navy Commissionings,” last data update August 3, 2019, <https://www.navycommissionings.org/> (accessed September 5, 2019).

### *Arleigh Burke-Class Destroyer (DDG-51):*

- Ronald O’Rourke, “Navy DDG-51 and DDG-1000 Destroyer Programs: Background and Issues for Congress,” Congressional Research Service *Report for Members and Committees of Congress*, updated June 18, 2019, <https://fas.org/sgp/crs/weapons/RL32109.pdf> (accessed September 5, 2019).

### *Virginia-Class (SSN-774):*

- Ronald O’Rourke, “Navy Virginia (SSN-774) Class Attack Submarine Procurement: Background and Issues for Congress,” Congressional Research Service *Report for Members and Committees of Congress*, updated June 24, 2019, <https://fas.org/sgp/crs/weapons/R41129.pdf> (accessed September 5, 2019).

### *Ohio-Class (SSBN):*

- Ronald O’Rourke, “Navy Columbia (SSBN-826) Class Ballistic Missile Submarine Program: Background and Issues for Congress,” Congressional Research Service *Report for Members and Committees of Congress*, updated June 24, 2019, <https://fas.org/sgp/crs/weapons/R41129.pdf> (accessed September 5, 2019).

### *F/A-18 Super Hornet:*

- David Axe, “Bringing the Sting: The U.S. Navy Is Getting New F/A-18E/F Super Hornets,” *The National Interest*, March 22, 2019, <https://nationalinterest.org/blog/buzz/bringing-sting-us-navy-getting-new-fa-18ef-super-hornets-48562> (accessed September 5, 2019).
- David B. Larter, “The U.S. Navy’s Fight to Fix Its Worn-Out Super Hornet Fleet Is Making Way,” *Defense News*, August 16, 2018, <https://www.defensenews.com/naval/2018/08/16/the-us-navys-fight-to-fix-its-worn-out-super-hornet-fleet-is-making-way/> (accessed September 5, 2019).
- Sydney J. Freedberg Jr., “Navy, Boeing Tout Block III Super Hornet as Partner for F-35,” *Breaking Defense*, May 23, 2018, <https://breakingdefense.com/2018/05/navy-boeing-tout-block-iii-super-hornet-as-partner-for-f-35/> (accessed September 5, 2019).

*F-35C Joint Strike Fighter:*

- Megan Eckstein, "Navy Declares Initial Operational Capability for F-35C Joint Strike Fighter," U.S. Naval Institute News, February 28, 2019, <https://news.usni.org/2019/02/28/navy-declares-initial-operational-capability-for-f-35c-joint-strike-fighter> (accessed September 5, 2019).

## Endnotes

1. Admiral John M. Richardson, *A Design for Maintaining Maritime Superiority, Version 2.0*, U.S. Navy, Office of the Chief of Naval Operations, December 2018, p. 1, [https://www.navy.mil/navydata/people/cno/Richardson/Resource/Design\\_2.0.pdf](https://www.navy.mil/navydata/people/cno/Richardson/Resource/Design_2.0.pdf) (accessed July 1, 2019).
2. *National Security Strategy of the United States of America*, The White House, December 2017, <https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf> (accessed July 1, 2019).
3. James Mattis, U.S. Secretary of Defense, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge*, U.S. Department of Defense, <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf> (accessed July 1, 2019).
4. The Global Force Management Allocation Plan (GFMAP) is a classified document that specifies the forces to be provided by the services for use by operational commanders. It is an extension of a reference manual maintained by the Joint Staff, *Global Force Management Allocation Policies and Procedures* (CJCSM 3130.06B), which is also a classified publication. See Enclosure B, "CJCS Family of Documents," in U.S. Department of Defense, Joint Chiefs of Staff, "Adaptive Planning and Execution Overview and Policy Framework," Chairman of the Joint Chiefs of Staff Guide 3130, March 5, 2019, pp. B-2 and B-4, <https://www.jcs.mil/Portals/36/Documents/Library/Handbooks/CJCS%20GUIDE%203130.pdf?ver=2019-03-18-122038-003> (accessed July 1, 2019).
5. Mattis, *Summary of the 2018 National Defense Strategy of the United States of America*, p. 4.
6. *Ibid.*, pp. 4–7.
7. U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2019 Budget*, 2018, pp. 1-1 and 1-2, [http://www.secnav.navy.mil/fmc/fmb/Documents/19pres/Highlights\\_book.pdf](http://www.secnav.navy.mil/fmc/fmb/Documents/19pres/Highlights_book.pdf) (accessed August 20, 2019).
8. The Navy's FY 2020 budget request specifies that "the Navy and Marine Corps provide forward postured sea-based forces" that include "over 49,000 Sailors and over 40,000 Marines deployed or forward ashore on 94 ships, two Carrier Strike Groups, and two Amphibious Ready Groups around the world." U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, 2019, p. 1-4, <https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/Budget%20Highlights%20Book.pdf> (accessed July 2, 2019).
9. Testimony of Vice Admiral William Merz, Deputy Chief of Naval Operations for Warfare Systems (OPNAV N9), in Congressional Quarterly, "House Armed Services Subcommittee on Seapower and Projection Forces Holds Hearing on Fiscal 2020 Defense Authorization for Seapower and Projection Forces," CQ Congressional Transcripts, March 26, 2019, <https://plus.cq.com/doc/congressionaltranscripts-5495621?2> (accessed July 2, 2019).
10. U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare System Requirements–OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, March 2019, p. 5, <https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/PB20%2030-year%20Shipbuilding%20Plan%20Final.pdf> (accessed July 2, 2019). Emphasis in original.
11. U.S. Department of Defense, Department of the Navy, Office of the Secretary, "General Guidance for the Classification of Naval Vessels and Battle Force Ship Counting Procedures," SECNAV Instruction 5030.8C, June 14, 2016, pp. 1–2, <http://www.nvr.navy.mil/5030.8C.pdf> (accessed July 2, 2019).
12. Ronald O'Rourke, "Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress," Congressional Research Service *Report for Members and Committees of Congress*, July 24, 2019, p. 3, <https://crsreports.congress.gov/product/pdf/RL/RL32665> (accessed July 2, 2019).
13. U.S. Navy, "Executive Summary: 2016 Navy Force Structure Assessment (FSA)," December 14, 2016, p. 1, [https://news.usni.org/wp-content/uploads/2016/12/FSA\\_Executive-Summary.pdf](https://news.usni.org/wp-content/uploads/2016/12/FSA_Executive-Summary.pdf) (accessed August 5, 2019). The full FSA was not released to the public.
14. Mattis, *Summary of the 2018 National Defense Strategy of the United States of America*, pp. 1 and 2.
15. U.S. Department of Defense, Naval Vessel Register, "Fleet Size," last updated August 12, 2019, <http://www.nvr.navy.mil/NVRSHIPS/FLEETSIZ.HTML> (accessed August 20, 2019).
16. *2019 Index of U.S. Military Strength*, ed. Dakota L. Wood (Washington: The Heritage Foundation, 2019), p. 346, [https://www.heritage.org/sites/default/files/2018-09/2019\\_IndexOfUSMilitaryStrength\\_WEB.pdf](https://www.heritage.org/sites/default/files/2018-09/2019_IndexOfUSMilitaryStrength_WEB.pdf).
17. Figure 4.2, "Shipbuilding Procurement Quantities and Total Funding," in U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, p. 4-2.

18. The Honorable James F. Geurts, Assistant Secretary of the Navy for Research, Development and Acquisition ASN(RD&A); Vice Admiral William R. Merz, Deputy Chief of Naval Operations for Warfare Systems (OPNAV N9); and Lieutenant General David H. Berger, Deputy Commandant, Combat Development and Integration, and Commanding General, Marine Corps Combat Development Command, statement on “The Department of the Navy Fiscal Year 2020 Budget Request for Seapower and Projection Forces” before the Subcommittee on Seapower and Projection Forces, Committee on Armed Services, U.S. House of Representatives, March 26, 2019, p. 3, [https://armedservices.house.gov/\\_cache/files/9/1/919f5faa-95da-41d8-88b9-395b063c36ee/C72CB2C30F9989D64E8C8BF8F1A18801.hrrg-116-as28-wstate-geurtsj-20190326.pdf](https://armedservices.house.gov/_cache/files/9/1/919f5faa-95da-41d8-88b9-395b063c36ee/C72CB2C30F9989D64E8C8BF8F1A18801.hrrg-116-as28-wstate-geurtsj-20190326.pdf) (accessed August 20, 2019).
19. Navy League of the United States, “Upcoming US Navy Commissionings,” last data update August 12, 2019, <https://www.navycommissionings.org/> (accessed August 14, 2019), and U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, p. 3-2.
20. U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, p. 3-2.
21. Table A6-1, “Ships Planned to Be Placed Out of Service During the FYDP,” in U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare System Requirements–OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, pp. 21–22.
22. U.S. Department of the Navy, Naval Sea Systems Command, memorandum from Commander, Naval Sea Systems Command, to Deputy Chief of Naval Operations, Warfare Systems (OPNAV N9), on “Surface Ship Life Extensions,” April 25, 2018, <https://2.bp.blogspot.com/-B3as-Uf3EuM/WwK9IEVRthI/AAAAAAAAANBI/aOx4hOANKB4EN5tVyYufTHDHGsnxyiGACLcBGAs/s1600/shiplife.jpeg> (accessed August 5, 2019).
23. See *2015 Index of U.S. Military Strength*, ed. Dakota L. Wood (Washington: The Heritage Foundation, 2015), p. 247, [https://ims-2015.s3.amazonaws.com/2015\\_Index\\_of\\_US\\_Military\\_Strength\\_FINAL.pdf](https://ims-2015.s3.amazonaws.com/2015_Index_of_US_Military_Strength_FINAL.pdf); *2016 Index of U.S. Military Strength*, ed. Dakota L. Wood (Washington: The Heritage Foundation, 2015), p. 236, [https://s3.amazonaws.com/ims-2016/PDF/2016\\_Index\\_of\\_US\\_Military\\_Strength\\_FULL.pdf](https://s3.amazonaws.com/ims-2016/PDF/2016_Index_of_US_Military_Strength_FULL.pdf); *2017 Index of U.S. Military Strength*, ed. Dakota L. Wood (Washington: The Heritage Foundation, 2016), p. 292, [http://ims-2017.s3.amazonaws.com/2017\\_Index\\_of\\_Military\\_Strength\\_WEB.pdf](http://ims-2017.s3.amazonaws.com/2017_Index_of_Military_Strength_WEB.pdf); *2018 Index of U.S. Military Strength*, ed. Dakota L. Wood (Washington: The Heritage Foundation, 2018), p. 334, [https://www.heritage.org/sites/default/files/2017-10/2018\\_IndexOfUSMilitaryStrength-2.pdf](https://www.heritage.org/sites/default/files/2017-10/2018_IndexOfUSMilitaryStrength-2.pdf); and *2019 Index of Military Strength*, p. 346.
24. U.S. Department of Defense, Naval Vessel Register, “Ship Battle Forces,” <http://www.nvr.navy.mil/NVRSHIPS/SHIPBATTLEFORCE.HTML> (accessed August 20, 2019).
25. U.S. Navy, “Executive Summary: 2016 Navy Force Structure Assessment (FSA),” p. 3.
26. Thomas Callender, “The Nation Needs a 400-Ship Navy,” Heritage Foundation *Special Report* No. 205, October 26, 2018, pp. 17–18, <https://www.heritage.org/sites/default/files/2018-10/SR205.pdf>. The SSC requirement is 71 ships, which includes 56 FFGs and 15 mine warfare (MIW) LCS.
27. U.S. Department of Defense, Naval Vessel Register, “Ship Battle Forces.”
28. Callender, “The Nation Needs a 400-Ship Navy,” pp. 18–19. The CLF requirement of 56 ships includes two T-AOE, 26 T-AKE, and 26 T-AO.
29. U.S. Department of Defense, Naval Vessel Register, “Ship Battle Forces.”
30. U.S. Navy, “Executive Summary: 2016 Navy Force Structure Assessment (FSA),” pp. 3 and 4.
31. Callender, “The Nation Needs a 400-Ship Navy,” pp. 3 and 21.
32. Ben Werner, “Indo-Pacom Commander Says Only Half of Sub Requests Are Met,” U.S. Naval Institute News, March 27, 2019, <https://news.usni.org/2019/03/27/42212> (accessed August 5, 2019).
33. Figure A2-2, “Procurement Profile,” in U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare System Requirements–OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, p. 14.
34. U.S. Department of Defense, Naval Vessel Register, “Ship Battle Forces.”
35. U.S. Code, Title 10, § 5062(b), <https://www.gpo.gov/fdsys/pkg/USCODE-2010-title10/pdf/USCODE-2010-title10-subtitleC-partI-chap507-sec5062.pdf> (accessed August 5, 2019).
36. Section 123, “Sense of Congress on Accelerated Production of Aircraft Carriers,” in H.R. 5515, John S. McCain National Defense Authorization Act for Fiscal Year 2019, Public Law 115-232, 115th Cong., August 13, 2018, <https://www.congress.gov/bill/115th-congress/house-bill/5515/text> (accessed August 5, 2019).
37. Ronald O’Rourke, “Navy Ford (CVN-78) Class Aircraft Carrier Program: Background and Issues for Congress,” Congressional Research Service *Report for Members and Committees of Congress*, updated July 24, 2019, p. 14, <https://fas.org/sgp/crs/weapons/RS20643.pdf> (accessed August 5, 2019). See also *ibid.*, p. 2.

38. U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2019 Budget*, pp. 3-3 and 1-2.
39. Mike Fabey, "The U.S. Navy's Most Advanced Aircraft Carrier Will Soon Face Its Greatest Challenge," *The National Interest*, June 27, 2017, <http://nationalinterest.org/blog/the-buzz/the-us-navys-most-advanced-aircraft-carrier-will-soon-face-21336> (accessed August 5, 2019).
40. O'Rourke, "Navy Ford (CVN-78) Class Aircraft Carrier Program," p. 6.
41. U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare System Requirements–OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, p. 6.
42. Testimony of Vice Admiral William Merz in Congressional Quarterly, "House Armed Services Subcommittee on Seapower and Projection Forces Holds Hearing on Fiscal 2020 Defense Authorization for Seapower and Projection Forces," March 26, 2019.
43. Admiral John M. Richardson, Chief of Naval Operations, statement on "Fiscal Year 2020 Navy Budget" before the Committee on Armed Services, U.S. House of Representatives, April 10, 2019, p. 9, [https://armedservices.house.gov/\\_cache/files/2/3/23a32790-b768-48de-83ac-6c6f12058d9a/2CCA8924047BDE7C56C85669AF88F236.fy20-cno-hasc-written-posture-statement-final-docx.pdf](https://armedservices.house.gov/_cache/files/2/3/23a32790-b768-48de-83ac-6c6f12058d9a/2CCA8924047BDE7C56C85669AF88F236.fy20-cno-hasc-written-posture-statement-final-docx.pdf) (accessed July 2, 2019), and Geurts, Merz, and Berger, statement on "The Department of the Navy Fiscal Year 2020 Budget Request for Seapower and Projection Forces," March 26, 2019, p. 7.
44. Ben Werner, "Pence: No Early Retirement for USS Harry S. Truman," U.S. Naval Institute News, updated May 2, 2019, <https://news.usni.org/2019/04/30/pence-no-early-retirement-for-uss-harry-s-truman> (accessed July 3, 2019).
45. Megan Eckstein, "Navy, Pentagon Looking Across Services' Budgets for Truman Refueling Funding," U.S. Naval Institute News, May 7, 2019, <https://news.usni.org/2019/05/07/navy-pentagon-looking-across-services-budgets-for-truman-refueling-funding> (accessed August 1, 2019).
46. O'Rourke, "Navy Ford (CVN-78) Class Aircraft Carrier Program," p. 41.
47. *Ibid.*, pp. 33–34.
48. U.S. Navy, "Executive Summary: 2016 Navy Force Structure Assessment (FSA)," p. 1.
49. *Ibid.*, p. 2.
50. *Ibid.*, pp. 2–3.
51. *Ibid.*, pp. 3–4.
52. O'Rourke, "Navy Force Structure and Shipbuilding Plans," p. 3.
53. U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare System Requirements–OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, p. 4.
54. Testimony of Vice Admiral William Merz in Congressional Quarterly, "House Armed Services Subcommittee on Seapower and Projection Forces Holds Hearing on Fiscal 2020 Defense Authorization for Seapower and Projection Forces," March 26, 2019.
55. U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare System Requirements–OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, p. 4.
56. *Ibid.*, p. 5. See also Table A2-1, "Long-Range Procurement Profile," in *ibid.*, p. 13.
57. Table A3-1, "Long-Range Naval Battle Force Construction Plan," in U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare Systems) (N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2019*, February 2018, p. 12, [https://www.secnav.navy.mil/fmc/fmb/Documents/19pres/LONGRANGE\\_SHIP\\_PLAN.pdf](https://www.secnav.navy.mil/fmc/fmb/Documents/19pres/LONGRANGE_SHIP_PLAN.pdf) (accessed August 5, 2019).
58. U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare System Requirements–OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, pp. 5–6.
59. Table A2-4, "Battle Force Inventory," in *ibid.*, p. 13.
60. *Ibid.*, p. 6.
61. U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare Systems) (N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2019*, p. 5.
62. Megan Eckstein, "Navy Will Extend All DDGs to a 45-Year Service Life; 'No Destroyer Left Behind' Officials Say," U.S. Naval Institute News, updated April 12, 2018, <https://news.usni.org/2018/04/12/navy-will-extend-ddgs-45-year-service-life-no-destroyer-left-behind-officials-say> (accessed August 1, 2019).
63. U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare System Requirements–OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, p. 6.

64. Testimony of Admiral John Richardson, Chief of Naval Operations, in Congressional Quarterly, “House Armed Services Committee Holds Hearing on the Navy Fiscal Year 2020 Defense Authorization Request,” CQ Congressional Transcripts, April 10, 2019, <https://plus.cq.com/doc/congressionaltranscripts-5511018?2> (accessed August 5, 2019).
65. U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare System Requirements–OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, p. 7, and Table A6-1, “Ships Planned to Be Placed Out of Service During the FYDP,” in *ibid.*, p. 21.
66. U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare System Requirements–OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, p. 7.
67. Megan Eckstein, “LCS Mission Package Office Focused on Test, Fielding; IOC Dates Continue to Slip,” U.S. Naval Institute News, updated January 25, 2019, <https://news.usni.org/2019/01/25/lcs-mission-package-office-focused-on-test-fielding-ioc-dates-continue-to-slip> (accessed August 1, 2019).
68. U.S. Department of Defense, Department of the Navy, Office of the Chief of Naval Operations, “Optimized Fleet Response Plan,” OPNAV Instruction 3000.15A, November 10, 2014, p. [1], <https://www.secnav.navy.mil/doni/Directives/03000%20Naval%20Operations%20and%20Readiness/03-00%20General%20Operations%20and%20Readiness%20Support/3000.15A.pdf> (accessed August 11, 2019).
69. U.S. Naval Institute News, “USNI News Fleet and Marine Tracker, May 20, 2019,” <https://news.usni.org/2019/05/20/usni-news-fleet-and-marine-tracker-may-20-2019> (accessed August 11, 2019).
70. U.S. Department of the Navy, “Status of the Navy” as of August 9, 2019, [https://www.navy.mil/navydata/nav\\_legacy.asp?id=146](https://www.navy.mil/navydata/nav_legacy.asp?id=146) (accessed August 11, 2019).
71. Rotational deployments involve a ship sailing to a location for a set amount of time and returning to the United States, usually to be replaced by another ship although not always providing an overlapping or unbroken presence.
72. U.S. Navy, U.S. Marine Corps, and U.S. Coast Guard, *Naval Operations Concept 2010: Implementing the Maritime Strategy*, p. 26, <https://fas.org/irp/doddir/navy/noc2010.pdf> (accessed August 11, 2019).
73. On average, rotational deployments require four ships for one ship to be forward deployed. This is necessary because one ship is sailing out to a designated location, one is at location, one is sailing back to the CONUS, and one is in the CONUS for maintenance.
74. Figure 4, “Comparison of Forward-Presence Rates Provided on an Annual Basis for Ships Homeported in the United States and Overseas,” in U.S. Government Accountability Office, *Navy Force Structure: Sustainable Plan and Comprehensive Assessment Needed to Mitigate Long-Term Risks to Ships Assigned to Overseas Homeports*, GAO-15-329, May 2015, p. 13, <https://www.gao.gov/assets/680/670534.pdf> (accessed August 5, 2019).
75. This is based on a calculation of the total number of attack submarines (which includes three different classes), which was 51 as of publication, and the number of *Los Angeles*-class submarines, which was 31 as of publication.
76. Stephen J. Illeris, “Build Strategic Fast Attack Submarines,” U.S. Naval Institute *Proceedings*, Vol. 142/10/1,364 (October 2016), <https://www.usni.org/magazines/proceedings/2016-10/build-strategic-fast-attack-submarines> (accessed August 11, 2019).
77. Figure 1, “Navy Lead Ships Consistently Cost More Than Initially Budgeted,” in U.S. Government Accountability Office, *Navy Shipbuilding: Past Performance Provides Valuable Lessons for Future Investments*, GAO-18-238SP, June 2018, p. 8, <https://www.gao.gov/assets/700/692331.pdf> (accessed August 5, 2019).
78. “Q&A with Rear Adm. [David] Goggins,” *Undersea Warfare Magazine*, Issue No. 64 (Winter 2018), pp. 10–12, [http://www.public.navy.mil/subfor/underseawarfaremagazine/Issues/PDF/USW\\_Winter\\_2018.pdf](http://www.public.navy.mil/subfor/underseawarfaremagazine/Issues/PDF/USW_Winter_2018.pdf) (accessed August 11, 2019).
79. U.S. Department of Defense, Naval Vessel Register, “Ship Battle Forces.”
80. Sam LaGrone, “Raytheon Awarded LCS Over-the-Horizon Anti-Surface Weapon Contract; Deal Could be Worth \$848M,” U.S. Naval Institute News, updated May 31, 2018, <https://news.usni.org/2018/05/31/raytheon-awarded-lcs-horizon-anti-surface-weapon-contract-deal-worth-848m> (accessed August 11, 2019).
81. Raytheon, “Naval Strike Missile: 5th Gen Over-the-Horizon Tech. Ready Now,” <https://www.raytheon.com/capabilities/products/naval-strike-missile-over-the-horizon-solution> (accessed August 11, 2019).
82. Ronald O’Rourke, “Navy Littoral Combat Ship (LCS) Program: Background and Issues for Congress,” Congressional Research Service *Report for Members and Committees of Congress*, updated June 18, 2019, p. 3, <https://fas.org/sgp/crs/weapons/RL33741.pdf> (accessed August 11, 2019).
83. U.S. Department of Defense, Office of the Secretary of Defense, Director, Operational Test and Evaluation, *FY 2017 Annual Report*, January 2018, pp. 187–191, <http://www.dote.osd.mil/pub/reports/FY2017/pdf/other/2017DOTEAnnualReport.pdf> (accessed August 11, 2019).

84. Ronald O'Rourke, "Navy Littoral Combat Ship (LCS) Program," p. 14.
85. U.S. Department of Defense, Assistant Secretary of the Navy, Research, Development, and Acquisition, *Report to Congress for the Littoral Combat Ship Mission Modules Program: Annual Report with President's Budget Fiscal Year 2019*, attached to letters from James F. Geurts, Assistant Secretary of the Navy (Research, Development and Acquisition), to The Honorable William M. "Mac" Thornberry, Chairman, Committee on Armed Services, U.S. House of Representatives; The Honorable Rodney P. Frelinghuysen, Chairman, Committee on Appropriations, U.S. House of Representatives; The Honorable Thad Cochran, Chairman, Committee on Appropriations, U.S. Senate; and The Honorable John McCain, Chairman, Committee on Armed Services, U.S. Senate, February 12, 2018, p. 3, <https://news.usni.org/2018/04/03/littoral-combat-ship-mission-package-annual-report> (accessed August 12, 2019).
86. O'Rourke, "Navy Littoral Combat Ship (LCS) Program," p. 14.
87. Eckstein, "LCS Mission Package Office Focused on Test, Fielding."
88. *Ibid.*
89. David B. Larter, "Congress to Buy 3 More LCS than the Navy Needs, but Gut Funding for Sensors that Make Them Valuable," *Defense News*, September 18, 2018, <https://www.defensenews.com/naval/2018/09/18/congress-to-buy-3-more-lcs-than-the-navy-needs-but-gut-funding-for-sensors-that-makes-them-valuable/> (accessed July 3, 2019).
90. Megan Eckstein, "Navy Set to Restart LCS Deployments this Year, Despite Challenges in Manning, Training," U.S. Naval Institute News, January 14, 2019, <https://news.usni.org/2019/01/14/navy-confident-in-lcs-deployments-this-year-despite-challenges-in-manning-training> (accessed August 1, 2019).
91. Figure 3-2, "DON Battle Force Ship Inventory," in U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, p. 3-2.
92. Megan Eckstein, "Navy Slowing Frigate Procurement to Allow Careful Requirements Talks; Contract Award Set for FY2020," U.S. Naval Institute News, May 3, 2017, <https://news.usni.org/2017/05/03/navy-slowing-frigate-procurement-to-allow-careful-requirements-talks-contract-award-set-for-fy2020> (accessed August 1, 2019).
93. U.S. Department of the Navy, Naval Sea Systems Command, "RFI: FFG(X)—U.S. Navy Guided Missile Frigate Replacement Program," Solicitation Number N0002418R2300, July 10, 2017, <https://www.fbo.gov/index?s=opportunity&mode=form&id=cdf24447b8015337e910d330a87518c6&tab=core&tabmode=list&> (accessed August 10, 2019).
94. *Ibid.*
95. *Ibid.*
96. David B. Larter, "Navy Awards Design Contracts for Future Frigate," *Defense News*, February 16, 2018, <https://www.defensenews.com/naval/2018/02/16/navy-awards-design-contracts-for-for-future-frigate/> (accessed August 10, 2019).
97. Lee Hudson, "Navy to Downselect to One Vendor for Future Frigate Competition," *Inside Defense*, January 9, 2018, <https://insidedefense.com/daily-news/navy-downselect-one-vendor-future-frigate-competition> (accessed August 10, 2019).
98. Figure 1, "Navy Briefing Slide on Surface Combatant Force Architecture," in O'Rourke, "Navy Force Structure and Shipbuilding Plans," p. 6.
99. U.S. Department of Defense, Naval Vessel Register, "Ship Battle Forces."
100. Ronald O'Rourke, "Navy Aegis Ballistic Missile Defense (BMD) Program: Background and Issues for Congress," Congressional Research Service *Report for Members and Committees of Congress*, October 25, 2016, p. 1, [https://www.history.navy.mil/content/dam/nhhc/research/library/online-reading-room/technology/bmd/navyaegis\\_ballistic.pdf](https://www.history.navy.mil/content/dam/nhhc/research/library/online-reading-room/technology/bmd/navyaegis_ballistic.pdf) (accessed August 12, 2019).
101. U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare System Requirements—OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, p. 6.
102. Exhibit P-40, "Budget Line Item Justification: PB 20 Navy," in U.S. Department of the Navy, *Department of Defense Fiscal Year (FY) 2020 Budget Estimates, Navy, Justification Book Volume 1 of 5: Other Procurement, Navy, BA 01*, March 2019, Volume 1-489, [https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/OPN\\_BA1\\_BOOK.pdf](https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/OPN_BA1_BOOK.pdf) (accessed August 12, 2019).
103. *Ibid.*
104. Ronald O'Rourke, "Navy DDG-51 and DDG-1000 Destroyer Programs: Background and Issues for Congress," Congressional Research Service *Report for Members and Committees of Congress*, updated June 18, 2019, "Summary," <https://fas.org/sgp/crs/weapons/RL32109.pdf> (accessed August 12, 2019).
105. Admiral John M. Richardson, Chief of Naval Operations, written statement on "Fiscal Year 2020 Navy Budget" before the Subcommittee on Defense, Committee on Appropriations, U.S. Senate, May 1, 2019, p. 8, <https://www.appropriations.senate.gov/imo/media/doc/05.01.19--Richardson%20Testimony.pdf> (accessed August 20, 2019).

106. O'Rourke, "Navy DDG-51 and DDG-1000 Destroyer Programs," p. 4. See also *ibid.*, p. 14.
107. *Ibid.*, p. 18.
108. *Ibid.*, p. 4
109. Megan Eckstein, "New Requirements for DDG-1000 Focus on Surface Strike," U.S. Naval Institute News, December 4, 2017, <https://news.usni.org/2017/12/04/navy-refocus-ddg-1000-surface-strike> (accessed August 1, 2019).
110. David B. Larter, "The Navy's Stealth Destroyers to Get New Weapons and a New Mission: Killing Ships," *Defense News*, February 15, 2018, <https://www.defensenews.com/naval/2018/02/15/its-official-the-navys-new-stealth-destroyers-will-be-ship-killers/> (accessed August 12, 2019).
111. U.S. Government Accountability Office, *Weapon Systems Annual Assessment: Limited Use of Knowledge-Based Practices Continues to Undercut DOD's Investments*, GAO-19-336SP, May 2019, p. 106, <https://www.gao.gov/assets/700/698933.pdf> (accessed August 5, 2019).
112. Megan Eckstein, "Navy Stands Up Surface Development Squadron for DDG-1000 Unmanned Experimentation," U.S. Naval Institute News, updated May 22, 2019, <https://news.usni.org/2019/05/22/navy-stands-up-surface-development-squadron-for-ddg-1000-unmanned-experimentation> (accessed August 1, 2019).
113. Testimony of Lieutenant General David H. Berger, Deputy Commandant, Combat Development and Integration, and Commanding General, Marine Corps Combat Development Command, in Congressional Quarterly, "House Armed Services Subcommittee on Seapower and Projection Forces Holds Hearing on Fiscal 2020 Defense Authorization for Seapower and Projection Forces," March 26, 2019.
114. U.S. Department of Defense, Naval Vessel Register, "Ship Battle Forces."
115. Geurts, Merz, and Berger, statement on "The Department of the Navy Fiscal Year 2020 Budget Request for Seapower and Projection Forces," March 26, 2019, p. 11.
116. U.S. Marine Corps, "U.S. Marine Corps Concepts and Programs: EABO," <https://www.candp.marines.mil/Concepts/Subordinate-Operating-Concepts/Expeditionary-Advanced-Base-Operations/> (accessed August 6, 2019).
117. U.S. Navy, "Expeditionary Fast Transport (EFT)," U.S. Navy *Fact File*, last update April 29, 2010, [https://www.navy.mil/navydata/fact\\_display.asp?cid=4200&tid=1100&ct=4](https://www.navy.mil/navydata/fact_display.asp?cid=4200&tid=1100&ct=4) (accessed August 6, 2019), and U.S. Navy, "Expeditionary Transfer Dock (ESD)/ Expeditionary Sea Base (ESB)," U.S. Navy *Fact File*, last update January 28, 2019, [https://www.navy.mil/navydata/fact\\_display.asp?cid=4600&tid=675&ct=4](https://www.navy.mil/navydata/fact_display.asp?cid=4600&tid=675&ct=4) (accessed August 6, 2019).
118. Ronald O'Rourke, "Navy LPD-17 Flight II (LX[R]) Amphibious Ship Program: Background and Issues for Congress," Congressional Research Service *Report for Members and Committees of Congress*, updated July 24, 2019, pp. 4–5, <https://fas.org/sgp/crs/weapons/R43543.pdf> (accessed August 6, 2019).
119. *Ibid.*, p. 1.
120. Geurts, Merz, and Berger, statement on "The Department of the Navy Fiscal Year 2020 Budget Request for Seapower and Projection Forces," March 26, 2019, p. 10.
121. U.S. Department of Defense, Naval Vessel Register, "Ship Battle Forces."
122. U.S. Navy, "Amphibious Assault Ships—LHD/LHA®," U.S. Navy *Fact File*, last update January 16, 2019, [https://www.navy.mil/navydata/fact\\_display.asp?cid=4200&tid=400&ct=4](https://www.navy.mil/navydata/fact_display.asp?cid=4200&tid=400&ct=4) (accessed August 6, 2019).
123. Megan Eckstein, "USS America Will Head to Japan to Serve as Next Forward-Deployed Amphibious Flagship," U.S. Naval Institute News, January 17, 2019, <https://news.usni.org/2019/01/17/uss-america-to-japan> (accessed August 1, 2019).
124. *Ibid.* and U.S. Navy, "United States Navy Fact File: Amphibious Assault Ships—LHD/LHA(R)," last update January 16, 2019, [https://www.navy.mil/navydata/fact\\_display.asp?cid=4200&tid=400&ct=4](https://www.navy.mil/navydata/fact_display.asp?cid=4200&tid=400&ct=4) (accessed August 1, 2019).
125. Ronald O'Rourke, "Navy Ford (CVN-78) Class Aircraft Carrier Program: Background and Issues for Congress," Congressional Research Service *Report for Members and Committees of Congress*, updated July 24, 2019, p. 4, <https://fas.org/sgp/crs/weapons/RS20643.pdf> (accessed August 6, 2019).
126. *Ibid.*, p. 21.
127. U.S. Navy, "USS Gerald R. Ford Accepts Second Advanced Weapons Elevator," March 6, 2019, [https://www.navy.mil/submit/display.asp?story\\_id=108809](https://www.navy.mil/submit/display.asp?story_id=108809) (accessed August 6, 2019).
128. Ben Werner and Sam LaGrone, "USS Gerald. R. Ford Weapons Elevator Certifications Will Extend Past October," U.S. Naval Institute News, May 29, 2019, <https://news.usni.org/2019/05/29/uss-gerald-r-ford-weapons-elevator-certifications-will-extend-past-october> (accessed August 6, 2019).



129. Paul McCleary, "Will Trump Fire SecNav? Super Carrier USS Ford Suffers New Setback," *Breaking Defense*, May 29, 2019, <https://breakingdefense.com/2019/05/will-trump-fire-secnav-super-carrier-uss-ford-suffers-new-setback/> (accessed August 6, 2019).
130. Paul McCleary, "Inhofe: Any Ford Delay Would Present 'a Dangerous Readiness Gap,'" *Breaking Defense*, May 30, 2019, [https://breakingdefense.com/2019/05/inhofe-any-ford-delay-would-present-a-dangerous-readiness-gap/?utm\\_source=Sailthru&utm\\_medium=email&utm\\_campaign=ebb%2005.31.19&utm\\_term=Editorial%20-%20Early%20Bird%20Brief](https://breakingdefense.com/2019/05/inhofe-any-ford-delay-would-present-a-dangerous-readiness-gap/?utm_source=Sailthru&utm_medium=email&utm_campaign=ebb%2005.31.19&utm_term=Editorial%20-%20Early%20Bird%20Brief) (accessed August 6, 2019).
131. Hans M. Kristensen, "New Data Shows Detail About Final Phase of US New START Treaty Reductions," Federation of American Scientists, January 13, 2018, <https://fas.org/blogs/security/2018/01/new-start-full-data/> (accessed May 22, 2019).
132. U.S. Navy, "Executive Summary: 2016 Navy Force Structure Assessment (FSA)," p. 3, and U.S. Department of Defense, *Nuclear Posture Review 2018*, February 2018, p. 49, <https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF> (accessed August 5, 2019).
133. Ronald O'Rourke, "Navy Columbia (SSBN-826) Class Ballistic Missile Submarine Program: Background and Issues for Congress," Congressional Research Service *Report for Members and Committees of Congress*, updated June 4, 2019, p. 12, <https://fas.org/sgp/crs/weapons/R41129.pdf> (accessed August 5, 2019).
134. *Ibid.*, p. 6.
135. *Ibid.*, p. 21.
136. *Ibid.*, pp. 36 and 2.
137. *Ibid.*, p. 5.
138. U.S. Government Accountability Office, *Columbia Class Submarine: Overly Optimistic Cost Estimate Will Likely Lead to Budget Increases*, GAO-19-497, April 2019, p. 19, <https://www.gao.gov/assets/700/698320.pdf> (accessed August 5, 2019).
139. Ben Werner, "'Substantial' Columbia-class Missile Tube Weld Fix Will Cost \$27 Million, Take a Year," U.S. Naval Institute News, November 7, 2018, <https://news.usni.org/2018/11/07/columbia-class-missile-tube-weld-issues-to-cost-27-million-take-year-to-fix> (accessed August 6, 2019).
140. U.S. Government Accountability Office, *Columbia Class Submarine: Overly Optimistic Cost Estimate Will Likely Lead to Budget Increases*, p. 20.
141. U.S. Navy, "Navy Establishes New PEO Columbia," March 6, 2019, [https://www.navy.mil/submit/display.asp?story\\_id=108814](https://www.navy.mil/submit/display.asp?story_id=108814) (accessed August 6, 2019).
142. *Ibid.*
143. Ronald O'Rourke, "Navy Virginia (SSN-774) Class Attack Submarine Procurement: Background and Issues for Congress," Congressional Research Service *Report for Members and Committees of Congress*, June 24, 2019, pp. 1-2, <https://fas.org/sgp/crs/weapons/RL32418.pdf> (accessed August 9, 2019).
144. U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, p. 4-4.
145. U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare System Requirements-OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, p. 6.
146. O'Rourke, "Navy Virginia (SSN-774) Class Attack Submarine Procurement," pp. 7 and 8.
147. David B. Larter, "The US Navy, Seeking Savings, Shakes up Its Plans for More Lethal Attack Submarines," *Defense News*, April 3, 2019, <https://www.defensenews.com/naval/2019/04/04/the-us-navy-seeking-savings-shakes-up-its-plans-for-more-lethal-attack-submarines/> (accessed August 9, 2019).
148. Captain Pete Small, Program Manager, Unmanned Maritime Systems (PMS 406), "Unmanned Maritime Systems Update for Sea-Air-Space," Program Executive Office Unmanned and Small Combatants, May 6, 2019, p. 6, <https://www.navsea.navy.mil/Portals/103/Documents/Exhibits/SAS2019/Capt%20Small-SAS-05062019.pdf?ver=2019-05-06-200405-520> (accessed August 9, 2019).
149. U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, p. 5-3, and Small, "Unmanned Maritime Systems Update for Sea-Air-Space," p. 3.
150. Megan Eckstein, "Sea Hunter Unmanned Ship Continues Autonomy Testing as NAVSEA Moves Forward with Draft RFP," U.S. Naval Institute News, April 29, 2019, <https://news.usni.org/2019/04/29/sea-hunter-unmanned-ship-continues-autonomy-testing-as-navsea-moves-forward-with-draft-rfp> (accessed August 1, 2019).
151. Ben Werner, "Navy Awards Boeing \$43 Million to Build Four Orca XLUVs," U.S. Naval Institute News, February 13, 2019, <https://news.usni.org/2019/02/13/41119> (accessed August 12, 2019).
152. Small, "Unmanned Maritime Systems Update for Sea-Air-Space," p. 4.

153. Ibid.
154. Ibid.
155. Tyler Rogoway, "Navy F/A-18 Legacy Hornets Have Taken Their Last Cruise Aboard a U.S. Aircraft Carrier," *The War Zone*, April 14, 2018, <http://www.thedrive.com/the-war-zone/20119/navy-f-a-18-legacy-hornets-have-taken-their-last-cruise-aboard-a-u-s-aircraft-carrier> (accessed August 12, 2019).
156. Megan Eckstein, "Navy's Last F-18 Hornet Squadron Holds Sundowns Ahead of Transition to Super Hornet," *U.S. Naval Institute News*, February 4, 2019, <https://news.usni.org/2019/02/04/navys-last-f-18-hornet-squadron-holds-sundown-ceremony-will-transition-to-super-hornet> (accessed August 1, 2019).
157. Daniel L. Nega, Deputy Assistant Secretary of the Navy, Air Programs; Lieutenant General Steven Rudder, Deputy Commandant for Aviation; and Rear Admiral Scott Conn, Director, Air Warfare, statement on "Department of the Navy Aviation Programs" before the Subcommittee on Tactical Air and Land Forces, Committee on Armed Services, U.S. House of Representatives, April 4, 2019, p.4, [https://armedservices.house.gov/\\_cache/files/7/4/7489a8f6-0498-4fe2-8121-62c4073fe7aa/142D16B3BD63F0EC49F88AE9AAF0E4E7.hhrg-116-as25-wstate-rudders-20190404.pdf](https://armedservices.house.gov/_cache/files/7/4/7489a8f6-0498-4fe2-8121-62c4073fe7aa/142D16B3BD63F0EC49F88AE9AAF0E4E7.hhrg-116-as25-wstate-rudders-20190404.pdf) (accessed August 1, 2019).
158. Figure 4.3, "Aircraft Procurement Quantities and Total Funding," in U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, p. 4-5.
159. Sydney J. Freedberg Jr., "F-35C Readiness Rises, Navy Fighter Shortfall Fades," *Breaking Defense*, April 10, 2019, <https://breakingdefense.com/2019/04/navy-aviation-optimism-f-35c-readiness-rises-fighter-shortfall-fades/> (accessed August 12, 2019).
160. Nega, Rudder, and Conn, statement on "Department of the Navy's Aviation Programs," April 4, 2019, p. 6.
161. Ibid., pp. 6 and 22.
162. Ibid., pp. 22 and 23.
163. Jeremiah Gertler, "F-35 Joint Strike Fighter (JSF) Program," Congressional Research Service *Report for Members and Committees of Congress*, April 23, 2018, pp. 4 and 14, <https://fas.org/sgp/crs/weapons/RL30563.pdf> (accessed August 6, 2019).
164. Nega, Rudder, and Conn, statement on "Department of the Navy's Aviation Programs," April 4, 2019, p. 3.
165. U.S. Department of Defense, *Annual Aviation Inventory and Funding Plan Fiscal Years (FY) 2019–2048*, March 2018, p. 10, <https://apps.dtic.mil/docs/citations/AD1062648> (accessed August 6, 2019).
166. Megan Eckstein, "Navy Declares Initial Operational Capability for F-35C Joint Strike Fighter," *U.S. Naval Institute News*, February 28, 2019, <https://news.usni.org/2019/02/28/navy-declares-initial-operational-capability-for-f-35c-joint-strike-fighter> (accessed August 1, 2019).
167. U.S. Department of Defense, *Annual Aviation Inventory and Funding Plan Fiscal Years (FY) 2019–2048*, p. 8.
168. Eckstein, "Navy Declares Initial Operational Capability for F-35C Joint Strike Fighter."
169. Megan Eckstein, "Navy Deactivates VFA-101 Grim Reapers, Consolidates F-35Cs at NAS Lemoore," *U.S. Naval Institute News*, May 23, 2019, <https://news.usni.org/2019/05/23/navy-deactivates-vfa-101-grim-reapers-consolidates-f-35cs-at-nas-lemoore> (accessed August 1, 2019).
170. Nega, Rudder, and Conn, statement on "Department of the Navy's Aviation Programs," April 4, 2019, p. 7.
171. Figure 4-3, "Aircraft Procurement Quantities and Total Funding," in U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, p. 4-5.
172. Geurts, Merz, and Berger, statement on "The Department of the Navy Fiscal Year 2020 Budget Request for Seapower and Projection Forces," March 26, 2019, p. 19.
173. Ibid., pp. 19–20, and U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, pp. 4-5 and 4-7.
174. Northrop Grumman, "MQ-4C Triton," <https://www.northropgrumman.com/Capabilities/Triton/Pages/default.aspx> (accessed August 8, 2019).
175. Megan Eckstein, "Navy Stand-Down of Triton Drones Will Continue Until Crash Investigation Concludes," *U.S. Naval Institute News*, September 21, 2018, <https://news.usni.org/2018/09/21/navy-stand-triton-operations-will-continue-mishap-investigation-wraps> (accessed August 1, 2019).
176. U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, p. 5-5.
177. Ibid., p. 5-6, and Geurts, Merz, and Berger, statement on "The Department of the Navy Fiscal Year 2020 Budget Request for Seapower and Projection Forces," March 26, 2019, p. 20.

178. U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, p. 1-5.
179. Nega, Rudder, and Conn, statement on “Department of the Navy’s Aviation Programs,” April 4, 2019, pp. 17 and 18.
180. U.S. Department of the Navy, Chief of Naval Operations, “Navy Fiscal Year 2020 Unfunded Priorities List Descriptions” attached to letters from Admiral John M. Richardson, Chief of Naval Operations, to The Honorable James M. Inhofe, Chairman, Committee on Armed Services, U.S. Senate, and The Honorable Adam Smith, Chairman, Committee on Armed Services, U.S. House of Representatives, March 22, 2109, p. 2, [https://www.defensedaily.com/wp-content/uploads/post\\_attachment/239633.pdf](https://www.defensedaily.com/wp-content/uploads/post_attachment/239633.pdf) (accessed August 8, 2019).
181. Megan Eckstein, “Navy Investing in Researching Next-Generation Missiles, Enhancing Current Ones,” U.S. Naval Institute News, April 15, 2019, <https://news.usni.org/2019/04/15/navy-investing-in-researching-next-generation-missiles-enhancing-current-ones> (accessed August 8, 2019).
182. Ron O’Rourke, “Navy Lasers, Railgun, and Gun-Launched Guided Projectile: Background and Issues for Congress,” Congressional Research Service *Report for Members and Committees of Congress*, updated June 19, 2019, pp. 4–5, <https://fas.org/sgp/crs/weapons/R44175.pdf> (accessed August 8, 2019).
183. U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, p. 5-6.
184. *Ibid.*
185. *Ibid.* and O’Rourke, “Navy Lasers, Railgun, and Gun-Launched Guided Projectile,” p. 9.
186. Sam LaGrone, “Navy Ready to ‘Burn the Boats’ with 2021 Laser Installation on a Destroyer,” U.S. Naval Institute News, March 20, 2019, <https://news.usni.org/2019/03/20/navy-ready-burn-boats-2021-laser-installation-destroyer> (accessed August 8, 2019).
187. O’Rourke, “Navy Lasers, Railgun, and Gun-Launched Guided Projectile,” p. 9.
188. Admiral William F. Moran, Vice Chief of Naval Operations, statement on “Current Readiness of U.S. Forces” before the Subcommittee on Readiness, Committee on Armed Services, U.S. Senate, February 14, 2018, pp. 3–4, [https://www.armed-services.senate.gov/imo/media/doc/Moran\\_02-14-18.pdf](https://www.armed-services.senate.gov/imo/media/doc/Moran_02-14-18.pdf) (accessed August 10, 2019).
189. *Ibid.*
190. Testimony of Admiral John M. Richardson, Chief of Naval Operations, in Congressional Quarterly, “Senate Armed Services Committee Holds Hearing on Navy Posture,” CQ Congressional Transcripts, April 19, 2018, <http://www.cq.com/doc/congressionaltranscripts-5302843?3> (accessed August 8, 2019).
191. Figure 2, “Aircraft Carrier, Surface Ship, and Submarine Days of Maintenance Delay, Fiscal Years 2012–2018,” in John H. Pendleton, Director, Defense Capabilities and Management, U.S. Government Accountability Office, “Navy and Marine Corps: Rebuilding Ship, Submarine, and Aviation Readiness Will Require Time and Sustained Management Attention,” GAO-19-225T, testimony before the Subcommittees on Seapower and Readiness and Management Support, Committee on Armed Services, U.S. Senate, December 12, 2018, p. 7, <https://www.gao.gov/assets/700/695911.pdf> (accessed July 3, 2019).
192. *Ibid.*
193. U.S. Department of the Navy, Chief of Naval Operations, “Navy Fiscal Year 2020 Unfunded Priorities List,” p. 1. Specifically, the \$763 million accounts for funding that is most directly related to deferred ship maintenance: \$290 million (*Boise*), \$306 million (*Hartford*); \$57 million (*Columbus*); \$40 million (*Stockdale/Michael Murphy*); and \$70 million (general additional deferred maintenance items) for a total of \$763 million. The remaining \$51 million is attributed to property and overhead.
194. U.S. Government Accountability Office, “Navy Readiness: Actions Needed to Address Costly Maintenance Delays Facing the Attack Submarine Fleet,” GAO-19-229, November 2018, p. 8, <https://www.gao.gov/assets/700/695577.pdf> (accessed August 5, 2019).
195. *Ibid.*
196. Hugh Lessig, “Submarine Maintenance Behind Schedule at Newport News Shipyard,” *The Virginian-Pilot*, April 18, 2019, [https://pilotonline.com/business/defense-shipyards/article\\_f2905e94-6142-11e9-b778-a7a333fd74e5.html](https://pilotonline.com/business/defense-shipyards/article_f2905e94-6142-11e9-b778-a7a333fd74e5.html) (accessed August 9, 2019).
197. Testimony of Admiral William Moran, Vice Chief of Naval Operations, in Congressional Quarterly, “House Armed Services Subcommittee on Readiness Holds Hearing on Fiscal 2020 Budget Request for Military Readiness,” CQ Congressional Transcripts, May 9, 2019, <https://plus.cq.com/doc/congressionaltranscripts-5534728?4> (accessed August 9, 2019).
198. Figure 3.5, “Department of the Navy Ship Maintenance,” in U.S. Department of the Navy, *Highlights of the Department of the Navy FY 2020 Budget*, p. 3-5.
199. Figure 3.8, “Aircraft Depot Maintenance and Aviation Logistics,” in U.S. Department of the Navy, *Highlights of the Department of the Navy FY 2020 Budget*, p. 3-9.
200. U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfare System Requirements–OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, p. 19.

201. Figure 2.10, “DON Civilian Manpower in Full-Time Equivalent Personnel,” in U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, p. 2-13.
202. “Executive Summary” of U.S. Navy, Naval Sea Systems Command, Shipyard Optimization and Recapitalization Plan, released September 12, 2018, p. 3, <https://news.usni.org/2018/09/12/executive-summary-to-naval-shipyard-recapitalization-and-optimization-plan> (accessed August 9, 2019).
203. U.S. Navy, Naval Sea Systems Command, *Report to Congress on the Long-Range Plan for Maintenance and Modernization of Naval Vessels for Fiscal Year 2020*, March 21, 2019, pp. 1, 2–5, and 6, <https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/FY20%20Long%20Range%20Maintenance+Modernization%20Plan.pdf> (accessed August 5, 2019).
204. U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, p. 3-3.
205. *Ibid.*, p. 3-8.
206. U.S. Department of the Navy, *Naval Aviation Vision 2016–2025*, p. 12, [http://www.navy.mil/strategic/Naval\\_Aviation\\_Vision.pdf](http://www.navy.mil/strategic/Naval_Aviation_Vision.pdf) (accessed August 9, 2019).
207. Tara Copp, “Navy’s Spike in Aviation Mishaps Is the Military’s Worst, up 82 Percent,” *Military Times*, April 8, 2018, <https://www.militarytimes.com/news/your-military/2018/04/08/navys-spike-in-aviation-mishaps-is-the-militarys-worst-up-82-percent/> (accessed August 9, 2019).
208. Vice Admiral Troy M. Shoemaker, Commander, Naval Air Forces, statement on “Aviation Readiness” before the Subcommittee on Readiness, Committee on Armed Services, U.S. House of Representatives, November 9, 2017, pp. 3 and 4, <https://docs.house.gov/meetings/AS/AS03/20171109/106611/HHRG-115-AS03-Wstate-ShoemakerM-20171109.pdf> (accessed August 9, 2019).
209. James N. Mattis, U.S. Secretary of Defense, Memorandum for Secretaries of the Military Services, Under Secretary of Defense for Acquisition and Sustainment, and Under Secretary of Defense for Personnel and Readiness on “NDS Implementation—Mission Capability of Critical Aviation Platforms,” September 17, 2018, <https://news.usni.org/2018/10/09/secdef-mattis-wants-80-percent-super-hornet-mission-capable-next-year> (accessed August 6, 2019).
210. Sam LaGrone, “SECDEF Mattis Wants 80 Percent of Super Hornets Mission Capable by Next Year,” U.S. Naval Institute News, October 9, 2018, <https://news.usni.org/2018/10/09/secdef-mattis-wants-80-percent-super-hornet-mission-capable-next-year> (accessed August 6, 2019).
211. Testimony of Secretary of the Navy Richard Spencer in Congressional Quarterly, “House Armed Services Committee Holds Hearing on the Navy Fiscal Year 2020 Defense Authorization Request,” CQ Congressional Transcripts, April 10, 2019, <https://plus.cq.com/doc/congressionaltranscripts-5511018?2> (accessed August 6, 2019).
212. Testimony of Rear Admiral Scott D. Conn, Director, Air Warfare, Office of the Chief of Naval Operations, in Congressional Quarterly, “House Armed Services Subcommittee on Tactical Air and Land Forces Holds Hearing on Navy and Marine Corps Tactical Aviation and Ground Modernization,” CQ Congressional Transcripts, April 4, 2019, <https://plus.cq.com/doc/congressionaltranscripts-5505435?4> (accessed August 5, 2019).
213. Testimony of Vice Admiral Mathias W. Winter, Executive Officer, F-35 Lightning II Program, in *ibid.*
214. Corey Dickstein, “CNO Orders Navy-wide Pause, Broad Review After 2nd Pacific Collision in 2 Months,” *Stars and Stripes*, August 21, 2017, <https://www.stripes.com/news/pacific/cno-orders-navy-wide-pause-broad-review-after-2nd-pacific-collision-in-2-months-1.483806#.WZxmGumQyUk> (accessed August 9, 2019).
215. U.S. Department of the Navy, Fleet Forces Command, *Comprehensive Review of Recent Surface Force Incidents*, October 26, 2017, p. 6, [http://s3.amazonaws.com/CHINFO/Comprehensive+Review\\_Final.pdf](http://s3.amazonaws.com/CHINFO/Comprehensive+Review_Final.pdf) (accessed August 9, 2019).
216. *Ibid.*, pp. 6–7 and 107–114.
217. U.S. Department of the Navy, *Strategic Readiness Review 2017*, pp. 4–5, <http://s3.amazonaws.com/CHINFO/SRR+Final+12112017.pdf> (accessed August 9, 2019).
218. Naval Sea Systems Command Corporate Communication, “USS Fitzgerald Leaves Dry Dock, Continues Repairs Pierside in Pascagoula,” April 16, 2019, [https://www.navy.mil/submit/display.asp?story\\_id=109278](https://www.navy.mil/submit/display.asp?story_id=109278) (accessed August 9, 2019).
219. U.S. Navy, “USS John S. McCain Leaves Dry Dock, Continues Repairs in Yokosuka,” November 27, 2018, [https://www.navy.mil/submit/display.asp?story\\_id=107922](https://www.navy.mil/submit/display.asp?story_id=107922) (accessed August 9, 2019).
220. See note 164, *supra*.

221. U.S. Navy, Naval History and Heritage Command, “Naval Aviation Units Involved in the Persian Gulf War (16 January–27 February 1991),” August 30, 2018, <https://www.history.navy.mil/content/history/nhhc/research/histories/naval-aviation-history/involvement-by-conflict/gulf-war-carrier-deployments.html> (accessed August 10, 2019); Gregory Bereiter, “The US Navy in Operation Enduring Freedom, 2001–2002,” U.S. Navy, Naval History and Heritage Command, July 11, 2019, <https://www.history.navy.mil/research/library/online-reading-room/title-list-alphabetically/u/us-navy-operation-enduring-freedom-2001-2002.html> (accessed August 10, 2019); and U.S. Navy, Naval History and Heritage Command, “Operation Iraqi Freedom,” May 20, 2019, <https://www.history.navy.mil/content/history/nhhc/browse-by-topic/wars-conflicts-and-operations/middle-east/operation-iraqi-freedom.html> (accessed August 10, 2019).
222. Congressional Budget Office, *The U.S. Military’s Force Structure: A Primer*, July 2016, p. 45, <https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/51535-fsprimerlite.pdf> (accessed August 10, 2019).
223. This requirement is derived from the BUR’s requirement for four–five carrier strike groups per MRC; however, this *Index* finds that this number is low by historical accounts and therefore recommends one additional carrier per MRC.
224. The 2016 Force Structure Assessment established a requirement for “[a] minimum of 12 Aircraft Carriers...to meet the increased warfighting response requirements of the Defense Planning Guidance Defeat/Deny force sizing direction.” U.S. Navy, “Executive Summary: 2016 Navy Force Structure Assessment (FSA),” p. 3.
225. The Navy’s Optimized Fleet Response Plan dictates a 36-month cycle of maintenance, training, and forward deployment. The OFRP allows for six months of shipyard maintenance, eight months of basic and integrated training, and a seven-month deployment followed by a 15-month sustainment period in which the CSG will be at its homeport but maintaining a deployed-force level of proficiency. Assuming that the carrier and its escort ships are not available during their maintenance cycle for even a 30-day surge, this equates to just over 19 percent unavailability in the 36-month cycle. The seven-month deployment per each cycle also equates to five CVNs required for a 1.0 continuous CVN presence.
226. U.S. Department of the Navy, Office of the Chief of Naval Operations, “Force Composition of Afloat Navy and Naval Groups,” OPNAV INSTRUCTION 3501.316C, November 10, 2017, Enclosure (1), “Carrier Strike Group,” p. 2, <https://www.secnav.navy.mil/doni/Directives/03000%20Naval%20Operations%20and%20Readiness/03-500%20Training%20and%20Readiness%20Services/3501.316C.pdf> (accessed August 8, 2019).
227. Table 1.1, “Notional Configuration for a Carrier Battle Group,” in U.S. General Accounting Office, *Navy Carrier Battle Groups: The Structure and Affordability of the Future Force*, GAO/NSIAD-93-94, February 1993, p. 18, <https://www.gao.gov/assets/160/152948.pdf> (accessed August 5, 2019).
228. See note 221, *supra*.
229. U.S. Navy, “The Carrier Air Wing,” <http://www.navy.mil/navydata/ships/carriers/powerhouse/airwing.asp> (accessed August 8, 2019).
230. The full array of aircraft comprising a carrier air wing also includes one EA-18G Growler electronic attack squadron, one E-2D Hawkeye airborne early warning squadron, two SH-60 Seahawk helicopter squadrons, and one C-2 Greyhound logistics support squadron.
231. Table, “Features of Recent Navy Force Structure Plans,” in O’Rourke, “Navy Force Structure and Shipbuilding Plans,” p. 43, note 44.
232. U.S. Navy, “Executive Summary: 2016 Navy Force Structure Assessment (FSA),” p. 1.
233. The size and capability of amphibious ships also have grown over time, with smaller amphibious ships like the old landing ship tank (LST) replaced by the much larger LSD and LPD classes. Consequently, fewer ships are required to lift the same or an even larger amphibious force.
234. U.S. Marine Corps, “Concepts and Programs: Types of MAGTFs,” <http://www.candp.marines.mil/Organization/MAGTF/Types-of-MAGTFs/> (accessed August 8, 2019). See especially the included graphic, “Notional Laydown of a Marine Expeditionary Brigade (MEB).”
235. *Ibid.*
236. The Navy defines the requirements for an ESG as follows: “[a] minimum of three amphibious ships” based on Combatant Commander requirements and missions, including “[a]t least one amphibious assault ship, multi- or general purpose ship (landing ship assault (LHA) [or] landing helicopter dock (LHD)); “[a]t least one amphibious transport dock (LPD);” and “[a]t least one amphibious dock landing ship (LSD).” An ESG may also include “other forces assigned (surface combatants and auxiliary support vessels will be similar to those assigned to a CSG dependent on the threat and capabilities of the ships assigned).” U.S. Department of the Navy, Office of the Chief of Naval Operations, “Force Composition of Afloat Navy and Naval Groups,” Enclosure (2), “Amphibious Ready Group and Marine Expeditionary Unit,” p. 1, and Enclosure (3), “Expeditionary Strike Group.”

237. U.S. Department of the Navy, Office of the Chief of Naval Operations, "Force Composition of Afloat Navy and Naval Groups," Enclosure (3), "Expeditionary Strike Group."
238. Congressional Budget Office, *An Analysis of the Navy's Amphibious Warfare Ships for Deploying Marines Overseas*, November 2011, p. 1, <http://www.cbo.gov/sites/default/files/cbofiles/attachments/11-18-AmphibiousShips.pdf> (accessed August 8, 2019).
239. It is important to note that the two-MEB reference is tied to a conventional approach to major amphibious operations where, in the past, several amphibious ships were deployed or brought together to execute an insertion of Marine Corps forces onto some landing objective. As mentioned, the Navy and Marine Corps are in the lengthy process of determining what revised Marine operational concepts, such as LOCE and EABO, will mean for the size and shape of the Navy's amphibious fleet. Whether the numbers of specific types of ships—LHAs, LSDs, LPDs—will change to a different arrangement of a greater number of smaller amphibious platforms of different design remains to be seen.
240. For additional detail on the analysis behind the 400-ship benchmark, see Callender, "The Nation Needs a 400-Ship Navy."
241. U.S. Navy, "Executive Summary: 2016 Navy Force Structure Assessment (FSA)," p. 3.
242. *Ibid.*, p. 2.
243. Mattis, *Summary of the 2018 National Defense Strategy of the United States of America*, p. 4.
244. Congressional Quarterly, "Senate Armed Services Committee Holds Hearing on Navy Posture," April 19, 2018.
245. U.S. Department of the Navy, *Highlights of the Department of the Navy FY 2020 Budget*, March 12, 2019, p. 2-2.
246. Testimony of Admiral Christopher Grady, Commander, U.S. Naval Forces Northern Command, in Congressional Quarterly, "House Armed Services Subcommittee on Readiness and Subcommittee on Seapower and Projection Forces Hold Joint Hearing on Naval Surface Forces Readiness," CQ Congressional Transcripts, February 26, 2019, <https://plus.cq.com/doc/congressionaltranscripts-5471656?7> (accessed August 8, 2019).
247. Mark D. Faram, "How the Navy Got to Be 6K Sailors Short at Sea," *Navy Times*, March 25, 2019, <https://www.navytimes.com/news/your-navy/2019/03/25/how-the-navy-got-to-be-6k-sailors-short-at-sea/> (accessed July 3, 2019).
248. News release, "Department of Defense Announces Fiscal Year 2018 Recruiting and Retention Numbers—End of Year Report," U.S. Department of Defense, November 15, 2018, <https://dod.defense.gov/News/News-Releases/News-Release-View/Article/1691314/departement-of-defense-announces-fiscal-year-2018-recruiting-and-retention-numbe/> (accessed July 3, 2019).
249. Mark D. Faram, "Navy Sees Recruiting Challenges on the Horizon," *Navy Times*, November 2, 2018, <https://www.navytimes.com/news/your-navy/2018/11/02/navy-sees-recruiting-challenges-on-the-horizon/> (accessed July 3, 2019).
250. Stenographic transcript of *Hearing to Receive Testimony on the Current Readiness of U.S. Forces*, Subcommittee on Readiness and Management Support, Committee on Armed Services, U.S. Senate, February 8, 2016, pp. 44–45, [https://www.armed-services.senate.gov/imo/media/doc/17-07\\_02-08-17.pdf](https://www.armed-services.senate.gov/imo/media/doc/17-07_02-08-17.pdf) (accessed July 3, 2019).
251. Hope Hodge Seck, "CNO Orders Operational Pause, Review After Latest Ship Collision," *Military.com*, August 21, 2017, <https://www.military.com/daily-news/2017/08/21/cno-orders-operational-pause-review-after-latest-ship-collision.html> (accessed July 3, 2019).
252. John H. Pendleton, Director, Defense Capabilities and Management, U.S. Government Accountability Office, "Navy Readiness: Actions Needed to Address Persistent Maintenance, Training, and Other Challenges Affecting the Fleet," GAO-17-809T, testimony before the Committee on Armed Services, U.S. Senate, September 19, 2017, p. 8, <https://www.gao.gov/assets/690/687224.pdf> (accessed July 3, 2019).
253. David B. Larter, "Troubling US Navy Review Finds Widespread Shortfalls in Basic Seamanship," *Defense News*, June 6, 2018, <https://www.defensenews.com/naval/2018/06/06/troubling-us-navy-review-finds-widespread-shortfalls-in-basic-seamanship/> (accessed August 7, 2019).
254. Congressional Quarterly, "House Armed Services Subcommittees on Readiness and Seapower and Projection Forces Holds [sic] Joint Hearing on Surface Warfare," CQ Congressional Transcripts, January 18, 2018, <http://www.cq.com/doc/congressionaltranscripts-5250864?2> (accessed July 3, 2019).
255. David B. Larter, "In Japan, a Hard-Hit US Navy Fleet Is Steadying on a New Course," *Defense News*, April 10, 2018, <https://www.defensenews.com/digital-show-dailies/navy-league/2018/04/10/in-japan-a-hard-hit-fleet-is-steadying-on-a-new-course/> (accessed July 3, 2019).
256. Admiral John M. Richardson, U.S. Navy, Chief of Naval Operations, statement on "Surface Warfare at a Crossroads" before the Subcommittee on Readiness and Subcommittee on Seapower and Projection Forces, Committee on Armed Services, U.S. House of Representatives, January 18, 2018, p. 2, <https://docs.house.gov/meetings/AS/AS03/20180118/106784/HHRG-115-AS03-Wstate-RichardsonJ-20180118.pdf> (accessed July 3, 2019).

257. Vice Admiral Richard Brown, Commander, Naval Surface Forces (COMNAVSURFOR), message on “Surface Warfare Officer Career Path and Training Continuum,” June 15, 2018, <https://news.usni.org/2018/06/28/new-career-path-surface-warfare-officers-stresses-fundamentals-training-first-ship-time-sea> (accessed July 3, 2019).
258. Enclosure (1), “Charter for the Readiness Reform and Oversight Council,” in William F. Moran, Vice Chief of Naval Operations, Memorandum for the Record, “Readiness Reform Oversight Committee,” February 25, 2019, <https://www.navy.mil/strategic/RROCIYR.pdf> (accessed July 3, 2019).
259. Enclosure (2), “RROC One Year Later,” in Moran, Memorandum for the Record, “Readiness Reform Oversight Committee.”
260. Richardson, statement on “Fiscal Year 2020 Navy Budget,” April 10, 2019, p. 12.





# U.S. Air Force

The U.S. Air Force (USAF) is the youngest of the U.S. military's four branches, having been born out of the Army Signal Corps to become its own service in 1947. The significant expansion of the USAF's mission over the years is reflected in the changes in its organizational structure. Initially, Air Force operations were divided among four major components—Strategic Air Command, Tactical Air Command, Air Defense Command, and Military Air Transport Service—that collectively reflected its “fly, fight, and win” nature. Space's rise to prominence began in the early 1950s, and with it came a host of faculties that would help to expand the service's impact and mission set.

Today, the Air Force focuses on five principal missions:

- Air and space superiority;
- Intelligence, surveillance, and reconnaissance (ISR);
- Mobility and lift;
- Global strike; and
- Command and control (C2).

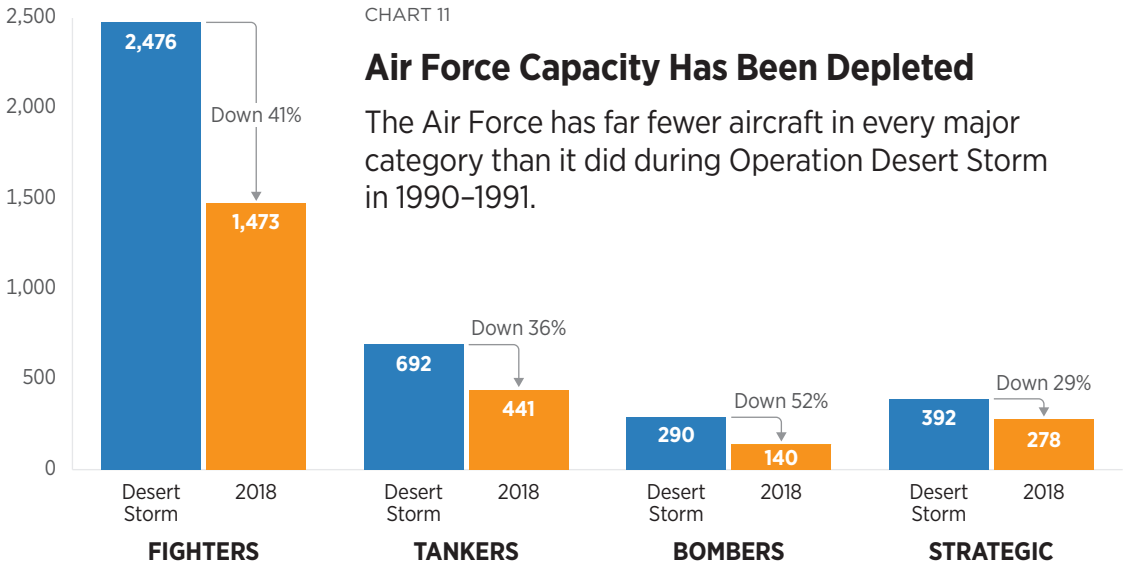
These missions, while all necessary, put even greater demands on the resources available to the Air Force in an incredibly strained and competitive fiscal environment. Unlike some of the other services, the Air Force did not expand in numbers during the post-9/11 buildup. Instead, it grew smaller as acquisitions of new aircraft failed to offset

programmed retirements of older aircraft. Following the sequestration debacle in 2012, the Air Force began to trade size for quality. Using the 2012 Defense Strategic Guidance (DSG) as its framework for determining investment priorities and posture, the Air Force “aim[ed] to be a smaller, but superb, force that maintains the agility, flexibility, and readiness to engage a full range of contingencies and threats.”<sup>1</sup>

There is no doubt that the Air Force has become smaller over the years, but there comes a point when capacity begins to limit operational capability. In the words of then-Secretary of the Air Force Heather Wilson, “It's no surprise that the Air Force we have is...smaller than the Air Force we need.”<sup>2</sup>

The years of funding shortfalls, coupled with wartime demands and the weight of an ever-aging fleet of aircraft, would not allow the service to reverse the downward spiral in capability, capacity, and readiness. The Air Force was forced to make strategic trades in capability, capacity, and readiness to meet the operational demands of the war on terrorism and develop the force it needed for the future. Budgetary uncertainty throughout the five years after passage of the Budget Control Act had many cumulative and detrimental effects on the USAF, which, while it sustained the war on terrorism and began to modernize its aging fleet of aircraft, struggled to sustain the type of readiness required to employ in a major regional contingency (MRC) against a near-peer threat.

Presidential defense budgets from 2012 through 2017 during the Obama Administration proved merely aspirational and forced



**SOURCE:** Stephen Losey, “Aircraft Mission-capable Rates Hit New Low in Air Force, Despite Efforts to Improve,” *Air Force Times*, July 26, 2019, <https://www.airforcetimes.com/news/your-air-force/2019/07/26/aircraft-mission-capable-rates-hit-new-low-in-air-force-despite-efforts-to-improve/> (accessed July 29, 2019).

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deeper trade-offs in capability, capacity, and readiness for operational employment, all of which put the Air Force in an ever-expanding readiness trough. When funding did arrive, it was through continuing resolutions that, passed well into the year of execution, prevented any real form of strategic planning.<sup>3</sup> The collective effects left the Air Force of 2016 with just four of 32 active-duty fighter squadrons ready for conflict with a near-peer competitor and just 14 others that were considered ready for low-threat combat operations.<sup>4</sup>

During a series of speeches in 2018, Secretary Wilson and Air Force Chief of Staff General David Goldfein laid out a plan to build the “Air Force We Need” that included more flying hours for pilots and expanding the number of Air Force squadrons from 312 to 386.<sup>5</sup> Those goals, coupled with an order by then-Secretary of Defense James Mattis to increase mission-capable rates for the F-16, F-22, and F-35 aircraft to 80 percent by the end of September 2019,<sup>6</sup> has given the Air Force the potential to

reverse the critical areas of capacity, capability, and readiness trends.

Both the Air Force goals and the Mattis order assume that commensurate funding is made available and applied to those efforts, and the current Administration has taken significant steps to ensure that the money is available to make both happen. Since President Trump’s inauguration, the Air Force budget has increased incrementally to a level that is now 25 percent higher (\$33.2 billion) than it was when he took office.<sup>7</sup> Unfortunately, the Air Force has had little measurable success in using that funding to bolster any of those critical areas.

### Capacity

Fifteen years of trading capacity for readiness funding to further modernization has meant serious reductions in the bottom-line number of available fighter, bomber, tanker, and airlift platforms. In 1991, the USAF had 2,476 fighters and 290 bombers in its

TABLE 3

## Total Active-Duty Aircraft Inventory

	2016	2017	2018	End 2019 Total
A-10	143	143	143	143
AC-130J	29	28	35	41
B-1	61	62	62	62
B-2	20	20	20	20
B-52	58	58	58	58
C-130H	13	4	3	0
C-130J	85	94	104	105
C-5	36	33	36	36
C-12	28	28	28	28
C-17	170	147	154	146
C-20	5	0	—	0
C-21	17	17	19	19
C-32	4	4	4	4
C-37	12	12	12	12
C-40	4	4	4	4
CV-22	49	50	50	50
E-3	31	31	31	31
E-4	4	4	4	4
E-9	2	2	2	2
E-11A	—	—	4	4
EC-130H	14	14	14	13
F-15	317	313	316	316
F-16	570	570	557	548
F-22	165	166	166	166
F-35	102	123	161	212
HC-130J	19	19	19	23
HC-130N	2	2	0	0
HH-60	78	86	82	89
KC-10	59	59	59	53*
KC-135	156	155	147	146*
KC-46	11	16	28	34*
MC-130H	13	16	16	15
MC-130J	35	37	37	41
MQ-9	228	225	220	228
NC-135	1	1	1	1
OC-135	2	2	2	2
RC-135	22	22	22	22
RQ-4	7	33	36	36
T-1	178	178	178	178
T-6	445	445	444	444
T-38	506	505	504	504
T-41	4	4	3	3
T-51	3	3	3	3
T-53	25	24	24	24
TC-135	3	3	3	3
TG-15	5	5	5	5
TG-16	19	19	19	19
TH-1	28	28	28	28
TU-2	5	5	5	4
U-2	27	27	27	26
UH-1	68	68	68	68
UV-18B	3	3	3	3
VC-25	2	2	2	2
WC-135	2	2	2	2

\* FY 2019 total numbers are contingent upon acquisition of six KC-46 aircraft.

**SOURCE:** Headquarters U.S. Air Force response to query by The Heritage Foundation.

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active-duty inventory<sup>8</sup> in addition to 692 tankers and 392 strategic airlift platforms in its total force inventory that were available to execute Desert Storm.<sup>9</sup> The trade-offs in the following years resulted in a 2018 Air Force that had just 1,473 fighters and 140 bombers in its active force and 441 tankers and 278 strategic airlift assets in its total force inventory.<sup>10</sup> (See Chart 11).

The force required to fight, fuel, and resupply a war with China across the vast expanse of the Pacific would need to be much larger than the force that was employed in Desert Storm. The tanker bridge would need to be much longer and more robust,<sup>11</sup> and the airlift capacity required to move and sustain those assets would be greater even without the plethora of air bases that were available to the allied force in 1991. It is hard to fathom how the current number of total force tanker and strategic airlift aircraft assets would be sufficient to fulfill the associated requirements.

Facing shortfalls in the Air Force's current requirement to support combatant commanders' deterrence and warfighting requirements, Secretary Wilson commissioned a study to determine the size and composition of the force needed to meet the new defense strategy. The study revealed that the service requires another 74 operational squadrons, to include 14 more tanker, one more airlift, seven more fighter, and five more bomber squadrons, to meet those needs. In general terms, that equates to at least 210 more KC-46 tankers, 15 more C-17 transport aircraft, 50 more bombers, and 182 more fighter aircraft than the Air Force currently has in its inventory.

Considering such a finding, one would probably expect the Air Force to increase its procurement budget, both for FY 2020 and for the Future Years Defense Program (FYDP), by a substantial margin. However, and in spite of a \$10.8 billion increase in the FY 2020 budget, the procurement request submitted to the White House actually fell by \$100 million, while the research, development, test, and evaluation (RDT&E) request increased by \$4.5 billion. This left the acquisition rates for the

F-35 and KC-46 flat at 48 and 15 aircraft, respectively, throughout the FYDP.

The RDT&E budget has increased from \$19.6 billion to \$35.4 billion (more than 80 percent) since FY 2017, and many argue that this increase was hardwired to meet B-21 and follow-on air dominance platform requirements. However, it is hard to imagine the Air Force, if its FY 2020 budget had been reduced by \$4.5 billion rather than increased by \$10.8 billion, cutting the funding for other spending categories to sustain the \$4.5 billion increase in RDT&E. In short, increasing RDT&E at the expense of capacity and operational readiness was a strategic choice.

That said, the reduction in programmed fourth-generation fighter retirement rates, coupled with the arrival of F-35As on Air Force flight lines in Florida, Arizona, and Utah, finally reversed a 67-year downward spiral in the total Air Force aircraft inventory,<sup>12</sup> and for the first time in as many years, the Air Force added 53 aircraft to its roster for a projected total of 5,426 at the end of FY 2019.<sup>13</sup> (See Table 3.)

Today, the average age of Air Force aircraft is more than 29 years, yet the service—even with its FY 2018, FY 2019, and FY 2020 budget increases—has no plans to increase the acquisition rates for any major weapons system.<sup>14</sup> It is instead relying on Congress to increase the USAF procurement budget to cover what it perceives as a budget shortfall. The decades-long trend of steadily declining aircraft numbers, coupled with the fleet's ever-growing average age, may be lulling senior leaders into believing that the service can be fixed sometime in the future, but the numbers tell a different story.

In 1987, there were 29 active-duty Air Force fighter squadrons based in Europe alone. The combination of post-Cold War downsizing and spending caps mandated by the Budget Control Act of 2011 (BCA) caused the Air Force to shrink from 70 combat-coded<sup>15</sup> active-duty fighter squadrons during Operation Desert Storm<sup>16</sup> to just 55 across the whole of the Active, Guard, and Reserve force. As of 2019, just 32 of those fighter squadrons were in the active-duty force.<sup>17</sup>

For the purpose of assessing capacity and readiness, this *Index* uses “combat-coded” fighter aircraft maintained within the Active component of the U.S. Air Force as a primary indicator of capacity. Combat-coded aircraft and related squadrons are aircraft and units with an assigned wartime mission, which means those numbers exclude units and aircraft assigned to training, operational test and evaluation (OT&E), and other missions. The software and munitions carriage/delivery capability of aircraft in noncombat-coded units renders them incompatible with or less survivable than combat-coded versions of the same aircraft. For example, all F-35As may appear to be ready for combat, but training wings and test and evaluation jets have hardware and software limitations that would severely curtail their utility and effectiveness in combat. While those jets could be slated for upgrades, hardware updates sideline jets for several months, and training wings and certain test organizations generally will be the last to receive those upgrades.

The Heritage *Index of U.S. Military Strength* assesses that a force of 1,200 combat-coded fighter aircraft is required to execute a two-MRC strategy. This number is also reflected in testimony presented to Congress by Air Force leaders in 2015.<sup>18</sup>

Of the 5,426 manned and unmanned aircraft projected to be in the USAF’s inventory at the end of FY 2019, 1,374 are active-duty fighters, and 951 of these are combat-coded aircraft.<sup>19</sup> This number includes all active-duty backup inventory aircraft as well as attrition reserve spares.<sup>20</sup>

However, the number of fighters and fighter squadrons available to deploy to contingency operations affects more than wartime readiness; it also affects retention. The constant churn of overseas deployments and stateside temporary duty (TDY) assignments is one of the primary reasons cited by pilots for separating from the service. This problem can be solved in two ways: by decreasing operational tempo and/or by increasing capacity. When the order to deploy assets comes from the

President, the Air Force must answer that call with assets capable of executing the mission no matter what the effects on morale or retention might be, which means that reducing operational tempo is not an option for Air Force leadership. This leaves increasing capacity as the only fix, and while the Air Force made a budgetary decision *not* to increase the rate at which it builds additional capacity beyond 48 F-35s a year, Congress appears to be coming through with 12 additional F-35s and six new F-15Xs in the proposed FY 2020 budget.

Nevertheless, neither the Air Force nor Congress appears to be acting to fill the shortfall in air refueling or strategic lift assets more rapidly. In spite of the Air Force identified shortfall of 14 tanker squadrons/210 air refueling aircraft, that service will continue on an unaccelerated KC-46 procurement schedule of 15 aircraft a year throughout the FYDP, and there is no plan in place to acquire additional strategic airlift assets.

The funding that facilitated the Reagan buildup of the 1980s was available for just a few years, and the assets acquired during that period are now aging out. Even the most stalwart defense hawks are saying that growth in the defense budget is unlikely in the years beyond FY 2020, and unless Congress continues to intervene by acquiring more fighter assets, the opportunity to increase Air Force capacity beyond its current marginal level may be lost.

Capacity also relies on the stockpile of available munitions and the production capacity of the munitions industry. The actual number of munitions within the U.S. stockpile is classified, but there are indicators that make it possible to assess the overall health of this vital area. The inventory for precision-guided munitions (PGM) has been severely stressed by nearly 18 years of sustained combat operations and budget actions that limited the service’s ability to procure replacements and increase stockpiles. In an effort to continue rebuilding the PGM stockpile, the Air Force will purchase 53,976 precision-guided munitions and guidance kits in FY 2020. Typically, there is a delay of 24–36 months between conclusion of a contract and

TABLE 4

## Precision-Guided Munitions: Expenditures and Programmed Acquisitions

	Expenditures FY 2018 (estimate)	Acquisitions FY 2019 (FN1)	Acquisitions FY 2020 (FN2)
JDAM	5,297	36,000	37,000
HELLFIRE	1,828	3,734	3,859
SDB-I/II	700	6,254	8,253
APKWS	-	6,879	5,400
JASSM	19	360	430
LGB	373	0	0
Maverick	16	0	0
<b>Totals</b>	<b>8,982</b>	<b>53,976</b>	<b>55,691</b>

**SOURCE:** Headquarters U.S. Air Force, A8XC/A5RW, written response to Heritage Foundation request for information on Air Force precision-guided munitions expenditures and programmed replenishments, July 10, 2018.

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delivery of these weapons, which means that munitions are often replaced three years after they were expended.

During the past three years, however, funding for munitions has improved significantly, and the preferred munitions inventory is starting to recover to pre-war levels. (See Table 4).

### Capability

The risk assumed with capacity has placed an ever-growing burden on the capability of Air Force assets. The ensuing capability-over-capacity strategy centers on the idea of developing and maintaining a *more*-capable force that can win against the advanced fighters and surface-to-air missile systems now being developed by top-tier potential adversaries like China and Russia, which are also increasing their capacity.

Any assessment of capability includes not only the incorporation of advanced technologies, but also the overall health of the inventory. Most aircraft have programmed life spans of 20 to 30 years based on a programmed level of annual flying hours. The bending and flexing of airframes over time in the air generates

predictable levels of stress and fatigue on everything from metal airframe structures to electrical wiring harnesses.

The average age of Air Force aircraft is 28 years, and some fleets, such as the B-52 bomber, average 58 years. In addition, KC-135s comprise 87 percent of the Air Force's tankers and are over 57 years old on average. The average age of the F-15C fleet is over 35 years, leaving less than 6 percent of its useful service life remaining,<sup>21</sup> and that fleet comprises 44 percent of USAF air superiority platforms.<sup>22</sup> The Air Force is considering the F-15C for airframe modifications through a service life extension program (SLEP), but with or without a SLEP, that hard-to-maintain system will likely stay in the inventory at least through 2030.

The fleet of F-16Cs are 29 years old on average,<sup>23</sup> and the service has used up nearly 85 percent of its expected life span. The Air Force recently announced its intent to extend the service lives of 300 F-16s with a plan to keep those jets flying through 2050.<sup>24</sup> SLEPs lengthen the useful life of airframes, and these F-16 modifications also include programmed funding for the modernization of avionics within

TABLE 5

## Total Air Force Inventory (Page 1 of 3)

Aircraft	Total Aircraft Inventory	Average Age in Years	FY 2017 Mission-Capable Rate	FY 2018 Mission-Capable Rate	Change, 2017 to 2018	Average Number of Mission-Capable Aircraft
A010C	282	37	74%	73%	-1.25%	204
AC130J	11	2	91%	87%	-4.11%	9
AC130U	12	28	83%	87%	4.02%	10
B-1B	62	31	53%	52%	-1.04%	32
B-2A	20	24	54%	61%	6.87%	12
B-52H	75	57	72%	69%	-2.52%	52
C-130H	177	28	73%	68%	-4.84%	121
C-130J	124	9	77%	77%	-0.28%	95
C-17A	222	15	84%	83%	-1.12%	183
CV022B	50	6	67%	59%	-7.20%	30
E003B	11	40	69%	69%	-0.15%	8
E003C	2	35	67%	70%	2.99%	1
E003G	17	38	75%	66%	-8.73%	11
E008C	16	18	64%	67%	2.80%	11
EC130H	14	45	74%	73%	-1.09%	10
EC130J	7	18	66%	66%	0.40%	5
F015C	212	34	71%	71%	0.23%	152
F015D	23	34	70%	69%	-0.99%	16
F015E	218	26	75%	71%	-4.10%	155
F016C	785	28	70%	70%	-0.19%	550
F016D	154	28	66%	66%	0.28%	102
F022A	186	11	49%	52%	2.73%	96
F035A	148	3	55%	50%	-5.12%	73
HC130J	24	4	84%	81%	-3.58%	19
HC130N	6	24	55%	61%	6.89%	3
HC130P	3	52	34%	21%	13.13%	1
HH060G	97	28	69%	71%	1.72%	69
HH060U	3	7	0%	0%	—	—
KC010A	59	34	78%	80%	1.50%	47
KC135R	344	57	73%	73%	-0.17%	251
KC135T	54	58	75%	74%	-1.46%	40
LC130H	10	33	50%	45%	-5.17%	5
MC012W	35	8	0%	100%	—	35

TABLE 5

## Total Air Force Inventory (Page 2 of 3)

Aircraft	Total Aircraft Inventory	Average Age in Years	FY 2017 Mission-Capable Rate	FY 2018 Mission-Capable Rate	Change, 2017 to 2018	Average Number of Mission-Capable Aircraft
MC130H	17	30	69%	68%	-0.41%	11
MC130J	36	4	84%	79%	-5.05%	28
MC130P	2	52	46%	55%	9.07%	1
MQ001B	94	11	91%	92%	1.04%	86
MQ009A	247	5	90%	90%	0.66%	223
NC135W	1	56	0%	0%	—	—
OC135B	2	56	86%	65%	-21.39%	1
RC135S	3	56	69%	79%	10.34%	2
RC135U	2	53	82%	83%	1.57%	2
RC135V	8	54	71%	71%	-0.17%	6
RC135W	12	55	66%	60%	-5.52%	7
RC026B	11	24	0%	0%	—	—
RQ004B	35	7	74%	74%	-0.63%	25
T001A	178	24	56%	59%	2.96%	105
T038A	53	52	75%	73%	-1.95%	38
T038C	442	51	60%	61%	1.42%	270
T041D	4	49	0%	0%	—	—
T051A	3	13	0%	0%	—	—
T053A	24	6	0%	0%	—	—
T006A	444	13	76%	66%	-10.07%	293
TC135W	3	56	75%	76%	1.52%	2
TE008A	1	28	81%	85%	4.35%	1
TG010D	4	16	0%	0%	—	—
TG014A	4	15	0%	0%	—	—
TG015A	2	15	0%	0%	—	—
TG015B	3	15	0%	0%	—	—
TG016A	19	6	0%	0%	—	—
TH001H	28	37	65%	73%	7.93%	21
TU002S	4	34	73%	69%	-4.29%	3
U002S	27	35	75%	77%	1.70%	21
UH001N	63	46	84%	82%	-1.61%	52
UV018B	3	34	0%	0%	0.00%	—
VC025A	2	28	93%	90%	-2.94%	2



TABLE 5

## Total Air Force Inventory (Page 3 of 3)

Aircraft	Total Aircraft Inventory	Average Age in Years	FY 2017 Mission-Capable Rate	FY 2018 Mission-Capable Rate	Change, 2017 to 2018	Average Number of Mission-Capable Aircraft
WC130H	5	52	53%	27%	-26.58%	1
WC130J	10	17	59%	65%	6.63%	7
WC135C	1	54	50%	72%	21.86%	1
WC135W	1	56	65%	75%	10.50%	1

**NOTE:** The average number of mission-capable aircraft is calculated as the Total Aircraft Inventory multiplied by the Mission-Capable Rate.

**SOURCE:** Stephen Losey, "Aircraft Mission-capable Rates Hit New Low in Air Force, Despite Efforts to Improve," *Air Force Times*, July 26, 2019, <https://www.airforcetimes.com/news/your-air-force/2019/07/26/aircraft-mission-capable-rates-hit-new-low-in-air-force-despite-efforts-to-improve/> (accessed July 29, 2019).

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those airframes. However, those modifications are costly, and the added expense consumes available funding, reducing the amount the services have to invest in modernization, which is critical to ensuring future capability. Even with a SLEP, there is a direct correlation between aircraft age and the maintainability of those platforms. (See Table 5.)

The Air Force's ISR and lift capabilities face similar problems in specific areas that affect both capability and capacity. The majority of the Air Force's ISR aircraft are now unmanned aerial vehicles (UAVs),<sup>25</sup> but even here the numbers fell in 2018 from 371<sup>26</sup> to 251 with the complete retirement of the MQ-1 Predator weapons system.<sup>27</sup> The RQ-4 Global Hawk is certainly one of the more reliable of those platforms, but gross weight restrictions limit the number of sensors that it can carry, and the warfighter still needs the capability of the U-2, a jet with an average age of 36 years and no scheduled retirement date.<sup>28</sup>

The E-8 Joint Surveillance Target Attack Radar System (J-STARS) and the RC-135 Rivet Joint are critical ISR platforms, and each was

built on the Boeing 707 platform, the last one of which came off the production line 40 years ago in 1979. The reliability of the USAF fleet of 707 airframes is at risk because of the challenges linked to aircraft age and flight hours, and those aircraft need to be modernized. In the 2019 National Defense Authorization Act (NDAA), Congress elected not to recapitalize the J-STARS fleet, a decision that is in line with the service's belief that the platform could not survive in a modern high-threat environment. In its stead, the Air Force is working on an incremental approach for a J-STARS replacement that focuses on advanced and disaggregated sensors (a system of systems) that will require enhanced and hardened communications links. Known as the Air Battle Management System (ABMS), it is envisioned as an all-encompassing approach to both airborne and ground Battle Management Command and Control (BMC2) that will allow the Air Force to fight and support joint and coalition partners in the high-end engagements ahead.<sup>29</sup>

A service's investment in modernization ensures that future capability remains healthy.

Investment programs aim not only to procure enough to fill current capacity requirements, but also to advance future capabilities with advanced technology.

The Active Air Force has just 105 F-15Cs left in its fleet, and concerns about what platform will fill this role when the F-15C is retired are well justified. The Department of Defense (DOD) planned to purchase 750 F-22A stealth air superiority fighters to replace the F-15C, but draconian cuts in the program of record reduced the acquisition to just 183 total F-22As for the Active, Guard, and Reserve force.<sup>30</sup>

Fulfilling the operational need for air superiority fighters will be further strained in the near term because of the F-22's low availability rates and a retrofit that always causes some portion of those jets to be unavailable for operational use. The retrofit is a mix of structural alterations required for the airframe to reach its promised service life, and the process takes six F-22s off the flight line for the retrofit at any given time. The retrofit is forecasted to continue through 2021.<sup>31</sup> The Raptor's 62.8 percent availability rate means that of the 138 combat-coded F-22As on active duty, approximately 72 are available to fly combat sorties at any given time.<sup>32</sup> That low mission-capable rate means in turn that even with their superior technology, and adding in the Guard's 20 jets, the total mission-capable inventory would be 85 jets, which likely would not be sufficient to fulfill the single-MRC wartime requirement for air superiority fighters.

The Air Force's number one priority remains the F-35A, the next-generation fighter scheduled to replace all legacy multirole and close air support aircraft. A host of developmental problems caused this new fighter's initial operating capability (IOC) date to be pushed from 2013 to 2016. However, the jet's full operating capability (FOC) was delivered in early 2018 with the fielding of 3F software, and every F-35 pilot interviewed at Hill Air Force Base voiced full confidence in this weapons system if called to employ the F-35A in the highest-threat environment.<sup>33</sup> The updated software and required hardware modifications

are already incorporated in jets coming off the production line<sup>34</sup>

The rationale for the Air Force's 1,763-aircraft program of record is to replace every F-117, F-16, and A-10 aircraft on a one-for-one basis.<sup>35</sup> The F-35A's multirole design favors the air-to-ground mission, but its fifth-generation faculties will also be dominant in an air-to-air role, allowing it to augment the F-22A in many scenarios.<sup>36</sup> As noted, Heritage analysis has identified a requirement for 1,200 combat-coded active-duty fighters. Even accounting for additional aircraft for training, testing, and OT&E, the acquisition of 1,763 would well exceed the combat-coded fighter requirement. The active-duty Air Force has 138 combat-coded F-22As and a stated intent to retain several hundred more fourth-generation fighters on active duty through the mid-2040s. Taking those aircraft into consideration, the Air Force should reduce the F-35A program of record to 1,260 fighters and move to accelerate the rate at which it acquires those platforms.<sup>37</sup>

A second top acquisition priority is the KC-46A air refueling tanker. The KC-46 has experienced a series of delays, the latest of which involves foreign object debris (FOD) inside the jet's cabin, which, in addition to being a safety hazard when operating the plane, implies poor quality control by the manufacturer. The Air Force expects to receive 24 KC-46s by the end of FY 2019 and an additional 28 in FY 2020 for a total of 52 on the ramp by the end of FY 2020.<sup>38</sup> It also intends to acquire 15 additional KC-46 Pegasus tankers a year through 2028, at which time it will have all 179 of these new tankers in service. The KC-46 will replace less than half of the current tanker fleet and will leave the Air Force with over 200 aging KC-135s that still need to be recapitalized.<sup>39</sup>

The third major USAF acquisition priority is the B-21 Raider, formerly called the Long-Range Strike Bomber (LRSB). The USAF awarded Northrop Grumman the B-21 contract to build the Engineering and Manufacturing Development (EMD) phase, which includes associated training and support systems and initial production lots. The program

completed an Integrated Baseline Review for the overall B-21 development effort as well as the jet's Preliminary Design Review. The Air Force is committed to a minimum of 100 B-21s at an average cost of \$564 million per plane.<sup>40</sup>

With the budget deal that was reached for FY 2018 and FY 2019, the Secretary of the Air Force announced the service's intent to retire all B-1s and B-2s and sustain a fleet comprised of 100 B-21s and 71 B-52s.<sup>41</sup> The B-21 is programmed to begin replacing portions of the B-52 and B-1B fleets by the mid-2020s.<sup>42</sup> In the interim, the Air Force continues to execute a SLEP on the entire fleet of 62 B-1s in the inventory to restore all 289 B-1 engines to their original specifications. The Air Force plans to modernize the B-2's Defense Management System, Stores Management Operational Flight Program, and Common Very-Low-Frequency/Low Frequency Receiver Program to ensure that this penetrating bomber remains viable in highly contested environments, keeping it fully mission capable until it is replaced by the B-21.

Modernization efforts are also underway for the B-52. The jet was designed in the 1950s, and the current fleet entered service in the 1960s. The FY 2018 budget funded the re-engineering of this fleet, and the aircraft will remain in the inventory through 2050.

When the Secretary of the Air Force and the Chief of Staff rolled out the Air Force's plan to expand the size of the service from 312 to 386 squadrons, one of the stated elements of that campaign was to fill the ranks of those new squadrons with only the newest generation of aircraft—F-35s, B-21s, and KC-46s—because of the capabilities that those platforms bring to bear.<sup>43</sup> Curiously, the Air Force is now seeking to acquire the fourth-generation F-15X, based primarily on projected operating cost savings, to increase fighter capacity.<sup>44</sup> Although the service will certainly increase its numbers with that approach, the capability of the F-15X system will not be survivable in the high-threat environment in which deployed assets will be required to fight by the time that fielding has been completed.

## Readiness

According to the USAF's official FY 2020 posture statement, more than 90 percent of the "lead force packages" within the service's 204 "pacing squadrons" are "ready to 'fight tonight.'" Unpacking that statement is challenging even for the most experienced airmen because the terms "pacing unit" and "pacing squadron" are new and the definition is somewhat elusive. Assuming that a pacing squadron is an operational unit that is fully qualified and ready to execute its primary wartime mission (C1), one is still left wondering what "lead force packages" within those 204 pacing/mission-ready units might mean. The posture statement goes on to say that those "pacing squadrons are on track to reach 80% readiness before the end of Fiscal Year 2020."<sup>45</sup>

When taken together, these statements imply that only portions of the Air force's mission-ready/pacing units are mission capable/currently qualified to execute the unit's primary wartime mission. The available open-source readiness indicators, coupled with Air Staff responses to direct requests for information, bring clarity and support to that assessment.

In 2017, the Secretary of the Air Force and the Chief of Staff informed Congress that "[w]e are at our lowest state of full spectrum readiness in our history."<sup>46</sup> In the two years since their testimony, however, the DOD seems to have stifled open conversation or testimony about readiness. Even though things have improved, there are enough facts and ancillary evidence to conclude that the substance of their statements still applies in 2019. Overcoming the effects of previous years of overtasking in low-threat contingency operations, as well as the lack of full-spectrum, high-threat training, is a task that clearly will require many years.

Full-spectrum operations include continued support of counterterrorism (CT) operations, the seamless conduct of nuclear deterrence operations, and readiness for potential conflict with a near-peer competitor. In 2016, Major General Scott West informed the House Armed Services Committee Subcommittee on Readiness that the Air Force was "able

## Air Force Maintenance Skill Level Manning

Skill Level	2017	2018
Apprentice: 3-level	119%	117%
Journeyman: 5-level	91%	91%
Craftsman: 7-level	96%	97%
Leadership: 9-level	96%	99%

**SOURCE:** Headquarters U.S. Air Force, Deputy Chief of Staff for Operations, written response to Heritage Foundation request for information on Air Force manning levels, April 9, 2018.

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to conduct nuclear deterrence operations and support CT operations, [but] operations against a near-peer competitor would require a significant amount of training” because readiness is out of balance “at a time when the Air Force is small, old, and heavily tasked.”<sup>47</sup> Two areas that offer insight into how well the Air Force is doing with regard to retraining for a near-peer fight are aircraft mission-capable (MC) rates and the rate at which aircrew members are flying, which is generally measured in sorties and hours per month.

MC rates are defined as the percentage of aircraft possessed by a unit that are capable of executing the unit’s mission set. Several factors drive MC rates, but two are common to mature systems: manning and operations and maintenance (O&M) funding. Taken together, they dictate the number of sorties and flight hours that units have available for aircrew training. One of sequestration’s many detrimental impacts on the Air Force became apparent in 2014 with a shortage of aircraft maintenance personnel (maintainers). At its height at the close of 2015, that shortfall grew to more than 4,000 highly skilled aircraft maintainers.<sup>48</sup> Senior leaders cited this gap in maintenance manning as the principal reason why fighter pilots who once averaged over 200 hours per year were fortunate to fly slightly more than 120 hours in 2014.<sup>49</sup>

By the close of FY 2017, the maintenance shortfall in both manning and qualifications

had been reduced significantly, and by the end of FY 2018, the gaps for all four qualification levels had reached or exceeded historical norms, removing maintenance manning as a primary reason for low sortie rates. (See Table 6.)

Another area of concern is pilot manning levels. In March 2017, Lieutenant General Gina M. Grosso, Air Force Deputy Chief of Staff for Manpower, Personnel, and Services, testified that at the end of FY 2016, the Air Force had a shortfall of 1,555 pilots across all mission areas (608 Active, 653 Guard, and 294 Reserve). Of that total, the Air Force was short 1,211 fighter pilots (873 Active, 272 Guard, and 66 Reserve).<sup>50</sup> The numbers continued to fall, and at the end of FY 2017, the Air Force was short more than 2,000 pilots. Although the Air Force stopped breaking the numbers down into Active, Guard, and Reserve numbers, the total pilot shortfall appears to remain at 9 percent.<sup>51</sup> Recovering from that shortfall will depend on how well the Air Force addresses several major issues, especially the available number of pilot training slots, an area in which it appears that some progress is being made.

In 2018, the Air Force graduated 1,200 pilots. The projections for 2019 forecast increases to 1,300, rising to 1,480 in 2020. Those projected numbers rely on a graduation rate of nearly 100 percent for every pilot training class, and the service is already close to that

TABLE 7

## Operational Fighter Pilot Manning

Weapons System	Pilot Manning Authorized	Qualified Fighter Pilots 2017	Qualified Fighter Pilots 2018
F-22	233	193	188
F-35A	107	33	46
F-15C	149	124	132
F-16C	787	677	771
F-15E	307	264	276
A-10	184	144	166
<b>All Jets</b>	<b>1,766</b>	<b>1,434</b> (81% manning)	<b>1,579</b> (89% manning)

**NOTES:** Pilot manning authorized figures are based on actual manning percentages (actual manning divided by authorized manning) in each major weapons system established in Air Force Instruction 11-102. Qualified fighter pilots figures are derived from actual manning percentages (actual manning divided by authorized manning) for each major weapons system.

**SOURCES:** Secretary of the Air Force, “Air Force Instruction (AFI) 11-102: Flying Hour Program Management,” August 30, 2011, p. 17, [https://static.e-publishing.af.mil/production/1/af\\_a3\\_5/publication/afi11-102/afi11-102.pdf](https://static.e-publishing.af.mil/production/1/af_a3_5/publication/afi11-102/afi11-102.pdf) (accessed July 24, 2019), and Headquarters U.S. Air Force, Deputy Chief of Staff for Operations, written response to Heritage Foundation request for information on Air Force manning levels, April 9, 2018.

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mark. In 2016, the graduation rate was 93 percent; in 2017, it was 98 percent; and in 2018, it was 97 percent.<sup>52</sup> At the same time, however, the expectation of high graduation rates during years of significant pilot shortfalls puts quality at risk, and it is hard to fathom how the pilot production pipeline is going to ensure that all of those who earn their wings will be as competent and capable as they need to be in the years ahead.

The Air Force is still suffering a pilot shortage, but it has done an excellent job of emphasizing operational manning at the cost of placing experienced fighter pilots at staffs and schools. Operational fighter pilot manning in every major fighter weapons system increased by an average of 8 percent in 2018. (See Table 7.)

While pilot manning levels are improving, those numbers say little about the qualifications of the pilots within those weapons

systems. “Higher sortie rates mean increased proficiency for our combat aircrews,” in the words of General Bill Creech,<sup>53</sup> and given the right number of sorties and quality flight time, it takes seven years beyond mission qualification in a fighter for an individual to maximize his potential as a fighter pilot.<sup>54</sup> With an 18-year drought in training for combat with a near-peer competitor, it will take even highly experienced fighter pilots a year or two of training to master the skill sets required to dominate the air against a near-peer competitor in a high-threat environment—skill sets that most have never had the opportunity to develop. Because squadrons have a mix of experience and talent levels, it will take several years of robust training for any operational fighter squadron to become ready for a high-end fight.

The associated training requires sortie rates averaging above three sorties a week or

TABLE 8

## Operational Sorties Pilots Received per Month, by Aircraft

	2017	2018	Difference
F-22	7.4	7.3	-1%
F-35A	7.9	7.5	-5%
F-15C	8.9	8.4	-6%
F-16C	9.1	9.3	2%
F-15E	8.8	8.5	-3%
A-10	9.2	9.7	6%
<b>All Jets: Average Sorties per Month</b>	<b>8.8</b>	<b>9.5</b>	<b>8%</b>
<b>All Jets: Average Sorties per Week</b>	<b>2.2</b>	<b>2.4</b>	<b>9%</b>

**SOURCE:** Headquarters U.S. Air Force, Deputy Chief of Staff for Operations, written response to Heritage Foundation request for information on Air Force manning levels, July 8, 2018.

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more and flying hours averaging more than 200 hours per year. Despite having made great strides in sortie production since 2014, the Air Force is still falling short of those thresholds

because of its low fighter mission-capable rates. (See Table 8.)

As noted, the primary drivers for mission-capable rates are maintenance manning

TABLE 9

## Average Hours Fighter Pilots Received per Month

	2017	2018	Difference
F-22	13.4	12.1	-10%
F-35A	11.5	11.0	-4%
F-15C	12.5	8.9	-29%
F-16C	14.2	13.9	-2%
F-15E	20.6	17.1	-17%
A-10	22.7	20.1	-11%
<b>All Jets: Average Hours per Month</b>	<b>15.8</b>	<b>14.3</b>	<b>-9%</b>
<b>All Jets: Average Hours per Year</b>	<b>189.4</b>	<b>171.7</b>	<b>-9%</b>

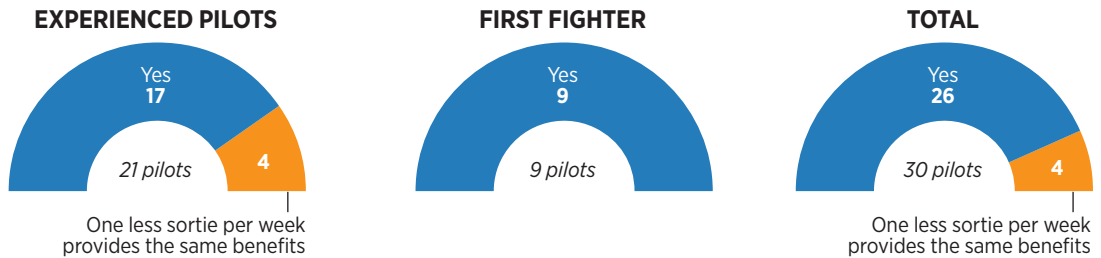
**NOTE:** Average hours are based on weighted fighter manning levels for each of the six major weapons systems.

**SOURCE:** Headquarters U.S. Air Force, Deputy Chief of Staff for Operations, written response to Heritage Foundation request for information on Air Force manning levels, July 8, 2018.

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## How Many Sorties per Week Should Pilots Fly?

Q: “Do you agree with this statement regarding proficiency and sorties per week? If I fly two sorties or less a week, my skills in the jet diminish; flying three per week maintains and sustains my skills, and when I fly four times or more a week, my skills in the jet improve across the board.”



**SOURCE:** John Venable, “The F-35A Fighter Is the Most Dominant and Lethal Multi-Role Weapons System in the World: Now Is the Time to Ramp Up Production,” Heritage Foundation *Backgrounder* No. 3406, May 14, 2019, <https://www.heritage.org/defense/report/the-f-35a-fighter-the-most-dominant-and-lethal-multi-role-weapons-system-the-world>.

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and O&M funding. Maintenance manning has been healthy for more than two years, and O&M funding has risen by 16 percent since 2017, but flying hours across the fleet of fighters have increased by just 9 percent over that same period. USAF leadership has not increased the flying hour budget for FY 2020 because of an assessment that the Air Force is flying at the maximum executable levels.<sup>55</sup> This calls into question how well maintenance is organized to generate those sorties.

The sortie production recovery that took place at the end of the hollow-force days of the Carter Administration happened while levels of maintenance experience and inventories of spare parts were still low and well before the Reagan Administration’s increase in defense spending.<sup>56</sup> The maintenance organization that created that turnaround was changed in 1989 to “save money by reducing maintenance staffing, equipment and base level support,”<sup>57</sup> which may help to explain the lackluster performance. No matter what the rationale may

be, even with robust manpower and funding, flying hours and sortie rates are still short of the levels required for a rapid increase in readiness levels across the fighter force.

The sortie rate for the average Air Force fighter pilot was said to have risen to 16.4 hours a month in 2017,<sup>58</sup> but data provided by the Air Force organization charged with tracking these details revealed a less favorable picture. Fighter pilots actually received an average of 15.8 hours per month in 2017, and the average fell by 9 percent to 14.3 hours per month in 2018.<sup>59</sup> (See Table 9.)

The average line fighter pilot assigned to a combat-coded (operational) unit received a healthy rate of 17.6 hours per month in 2017, but that rate fell by 9 percent in 2018 to 16 hours per month.<sup>60</sup> Sortie rates for the same category of pilots increased from 2.2 to 2.4 sorties per week during the same years but remained well below the average of three sorties per week needed to sustain or grow readiness levels. (See Chart 12).

The current state of overall Air Force readiness includes many intangibles, but the things like averages for fighter pilot sortie rates and hours per month that can be measured all point to a readiness level that did not increase markedly between 2017 and 2018. The first five months of 2019 have shown an improvement in both sortie rates and hours, but the same was true in 2018, and flying hours fell to below 2017 levels by the end of 2018. With that in mind, any assessment of 2019 will have to wait until the end of the year.

## Space

The classified nature of deployed space assets and their capabilities makes any assessment of this mission area challenging. Nevertheless, the United States' constellation of ISR, navigation, and communication satellites is arguably unrivaled by any other nation-state. This array allows the Air Force and its sister services to find, fix, and target virtually any terrestrial or sea-based threat anywhere, anytime.

Unfortunately, America's historically unchecked dominance in space has encouraged an environment of overreliance on the domain and underappreciation of the vulnerabilities of its capabilities.<sup>61</sup> Some space assets represent nearly single-point failures in which a loss caused by a system failure or an attack could cripple a linchpin capability. Because of U.S. dominance of and nearly complete reliance on assets based in space, for everything from targeting to weapons guidance, other state actors have every incentive to target those assets.<sup>62</sup>

Adversaries will capture and hold the initiative by leveraging surprise and every asymmetric advantage that they possess while denying those warfighting elements to their opponents. Since Operation Desert Storm, the world and every American near-peer competitor therein have watched the United States employ satellite-enabled precision targeting to profound effect on the battlefield. That ability depends almost entirely on the kinetic end of the strike system: precision-guided munitions.<sup>63</sup>

China and Russia are investing heavily in ground-based anti-satellite (ASAT) missiles; orbital ASAT programs that can deliver a kinetic blow; or co-orbital robotic interference to alter signals, mask denial efforts, or even pull adversary satellites out of orbit.<sup>64</sup> If near-peer competitors were able to degrade regional GPS signals or blind GPS receivers, they could neutralize the PGMs that the U.S. uses to conduct virtually every aspect of its kinetic strike capability.

As General John Hyten, former Commander of Air Force Space Command, has clearly indicated, the vulnerability of the U.S. space constellation lies in its design.<sup>65</sup> Each of the satellites on which we currently rely costs millions of dollars and takes years to design, build, and launch into orbit. Until the Air Force shortens that time span or diversifies its ability to find, fix, and destroy targets with precision, space will remain both a dominant and an incredibly vulnerable domain for the U.S. Air Force.

## Scoring the U.S. Air Force

### Capacity Score: Marginal

One of the key elements of combat power in the U.S. Air Force is its fleet of fighter aircraft. In responding to major combat engagements since World War II, the Air Force has deployed an average of 28 fighter squadrons, based on an average of 18 aircraft per fighter squadron. That equates to a requirement of 500 active component fighter aircraft to execute

one MRC. Based on government force-sizing documents that count fighter aircraft, squadrons, or wings, an average of 55 squadrons (990 aircraft) is required to field a force capable of executing two MRCs (rounded up to 1,000 fighter aircraft to simplify the numbers). This *Index* looks for 1,200 active fighter aircraft to account for the 20 percent reserve necessary when considering availability for deployment



TABLE 10

## Mission-Capable Combat-Coded Fighters in Active Duty Air Force

Fighter	Combat-Coded Fighters	Average Age in Years	FY 2018 Mission-Capable Rate	Mission-Capable Combat-Coded Fighters
A-10C	116	37	0.73	84
F-15C	105	34	0.71	75
F-15E	158	26	0.71	112
F-16C	369	28	0.70	258
F-22A	138	11	0.52	72
F-35A	65	3	0.50	32
	<b>951</b>	—	—	<b>634</b>

**SOURCE:** Air Force Association, “USAF Almanac 2018,” *Air Force Magazine*, June 2018, “The Air Force in Facts and Figures,” <http://www.airforcemag.com/MagazineArchive/Pages/TableOfContents.aspx?Date=06/2018> (accessed July 25, 2019).

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and the risk of employing 100 percent of fighters at any one time.

- **Two-MRC Level:** 1,200 fighter aircraft.
- **Actual 2019 Level:** 951 fighter aircraft.

Based on a pure count of combat-coded fighter/attack platforms that have achieved IOC, the USAF currently is at 79 percent of the two-MRC benchmark. While the active fighter and bomber assets available would likely prove adequate to fight a single regional conflict, when coupled with the low mission capability rates of those aircraft (see Table 10), the global sourcing needed to field the required combat fighter force assets would leave the rest of the world uncovered. Nevertheless, the capacity level is well within the methodology’s range of “marginal.” This score is now trending upward.

### Capability Score: Marginal

The Air Force’s capability score is “marginal,” the result of being scored “strong” in “Size of Modernization Program,” “marginal” for “Age of Equipment” and “Health of

Modernization Programs,” but “weak” for “Capability of Equipment.” These scores have not changed from the *2019 Index*’s assessment. However, with new F-35 and KC-46 aircraft continuing to roll off their respective production lines, this score is now trending upward.

### Readiness Score: Marginal

The Air Force scores “marginal” in readiness in the *2020 Index*, the same grade it received in the *2019 Index*. The USAF’s sustained pilot deficit and systemically low sortie rates and flying hours are the principal reasons for this assessment.<sup>66</sup> The Air Force should be prepared to respond quickly to an emergent crisis and retain full readiness of its combat airpower and, with a significant curtailment in deployments to support the war on terrorism, begin to improve its full-spectrum readiness levels much more rapidly than we have witnessed to date.

Fighter pilots should receive an average of three or more sorties a week and 200 hours per year to develop the skill sets needed to survive in combat. Even with greatly improved maintenance manning/experience levels and

increased funding levels, average monthly sorties and flying hours have not reached those thresholds. Whether they can or will be sustained for the length of time it will take to recover from the ongoing readiness shortfall is therefore open to question.

**Overall U.S. Air Force Score: Marginal**

This is an unweighted average of the USAF’s capacity score of “marginal,” capability score of “marginal,” and readiness score of “marginal.”

The shortage of pilots and flying time for those pilots degrades the ability of the Air Force to generate the amount and quality of combat air power that would be needed to meet wartime requirements. Although it could eventually win a single major regional contingency in any theater, if the Air Force had to go to war today, its attrition rates would be significantly higher than those sustained by a ready, well-trained force.

**U.S. Military Power: Air Force**

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Capacity			✓		
Capability			✓		
Readiness			✓		
<b>OVERALL</b>			✓		

# AIR FORCE SCORES



Procurement and Spending ■ Through FY 2019  
■ Pending

## Strategic Bomber

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>B-52 Stratofortress</b> Inventory: <b>75</b> Fleet age: <b>56.8</b> Date: <b>1961</b></p> <p>The B-52, the oldest of the bombers, provides global strike capabilities with conventional or nuclear payloads. Programmed upgrades for B-52 include a new communications, avionics, and Multi-Functional Color Displays. The Air Force plans to use this aircraft through the 2050s</p>	1		<p>The B-21 is an advanced stealth bomber that will replace all B-1s and B-2s within the Air Force bomber fleet. Flight testing is scheduled for 2021. Fielding is expected in the mid-2020s.</p>		
<p><b>B-1 Lancer</b> Inventory: <b>62</b> Fleet age: <b>31.1</b> Date: <b>1986</b></p> <p>The B-1B is a supersonic all-weather conventional bomber. It was modified in the mid-1990s to disable its nuclear weapon delivery capability. Block 16 upgrades to be completed by 2020 include a fully integrated data link, navigation, radar, and diagnostic upgrades. B-1B phase-out is scheduled for 2032.</p>		2			
<p><b>B-2 Spirit</b> Inventory: <b>20</b> Fleet age: <b>24.2</b> Date: <b>1997</b></p> <p>The B-2 bomber provides the USAF with global strike capabilities for both nuclear and conventional payloads. The stealth bomber's communication suite is currently being upgraded. The current plan is to begin phasing the B-2 out in 2032.</p>		4		4	

**NOTE:** See page 433 for details on fleet ages, dates, and procurement spending.

# AIR FORCE SCORES



Procurement and Spending ■ Through FY 2019 ■ Pending

## Ground Attack/Multi-Role Aircraft

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>A-10 Thunderbolt II</b></p> <p>Inventory: <b>281</b> Fleet age: <b>37.4</b> Date: <b>1977</b></p> <p>The A-10 is the only USAF platform designed specifically for close air support mission using both self-designated precision guided munitions and an internal 30MM cannon. The A-10 is scheduled to be phased out in 2030.</p>	2	2	<p><b>F-35A</b></p> <p>Timeline: <b>2016-TBD</b></p> <p>The F-35A "Lightning" is a multirole stealth fighter that became IOC on August 2, 2016. The Air Force plans to acquire 48 F-35As a year across the FYDP.</p>	5	3
<p><b>F-16C Falcon</b></p> <p>Inventory: <b>235</b> Fleet age: <b>28</b> Date: <b>1980</b></p> <p>The F-16 is a multirole aircraft capable of tactical nuclear delivery, all-weather strike, and Suppression of Enemy Air Defenses (SEAD). An ongoing Service Life Extension Program (SLEP) will keep this jet in the inventory through the late 2040s.</p>			<p><b>PROCUREMENT</b></p>	<p><b>SPENDING (\$ millions)</b></p>	
<p><b>F-35A Lightning</b></p> <p>Inventory: <b>154</b> Fleet age: <b>3.6</b> Date: <b>2016</b></p> <p>The F-35 is a multirole stealth fighter that became operational in 2016. The Air Force has received more than 200 of a planned purchase of 1,763 aircraft.</p>			5	5	
<p><b>F-15E Strike Eagle</b></p> <p>Inventory: <b>218</b> Fleet age: <b>26.4</b> Date: <b>1989</b></p> <p>The F-15E is a multirole aircraft capable of all weather, deep interdiction/attack, and tactical nuclear weapons delivery. Upgrades include an AESA radar, EPAWSS self-defense suite, a new central computer, and cockpit displays.</p>	2	2			

**NOTE:** See page 433 for details on fleet ages, dates, and procurement spending.

# AIR FORCE SCORES



Procurement and Spending ■ Through FY 2019  
■ Pending

## Fighter Aircraft

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>F-15C/D Eagle</b></p> <p>Inventory: <b>235</b> Fleet age: <b>34.2</b> Date: <b>1975</b></p> <p>The F-15C/D is an air superiority fighter that has been in service since the late 1970s. The jet is receiving upgrades including a new AESA radar and self-defenses needed to survive and fight in contested airspace. Discussions are underway to retire the F-15C in late 2020s.</p>	1	2	<p>The F-15EX will be based on the 2-seat F-15QA (Qatar) configuration upgraded with USAF-only capabilities, including the Eagle Passive Active Warning and Survivability System (EPAWSS) and advanced Operational Flight Program (OFP) software. The PB for FY20 will acquire 8 F-15EXs in FY20 and a total of 80 over the FYDP.</p>		
<p><b>F-22A Raptor</b></p> <p>Inventory: <b>187</b> Fleet age: <b>11</b> Date: <b>2005</b></p> <p>The F-22 is the preeminent air superiority stealth fighter aircraft, modified to enable delivery of precision guided weapons delivery. The jet is currently undergoing a modification called RAAMP that will improve reliability, maintainability and performance</p>	4	5			

**NOTE:** See page 433 for details on fleet ages, dates, and procurement spending.

# AIR FORCE SCORES



Procurement and Spending ■ Through FY 2019 ■ Pending

## Tanker

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>KC-10 Extender</b> Inventory: <b>59</b> Fleet age: <b>33.7</b> Date: <b>1981</b></p> <p>The KC-10 is a multirole tanker and airlift platform that can refuel both boom and drogue compatible fighters on the same mission. Recent modifications have enabled a service life extension through 2045. The Air Force planned to retire the KC-10 by 2024, but with a shortfall of refueling platforms, and slow acquisition of the KC-46, that appears unlikely.</p>	2	5	<p><b>KC-46</b> Timeline: <b>TBD</b></p> <p>The KC-46 Pegasus will replace portions of the KC-135 tanker fleet. The program entered low rate initial production in August 2016 and the Air Force accepted the first Pegasus on January 10, 2019. After several production and delivery delays, Boeing is on track to deliver three jets a month through the end of 2019 and 15 a year throughout the FYDP.</p> <p><b>PROCUREMENT</b>              67 108</p> <p><b>SPENDING (\$ millions)</b>              \$11,238 \$21,177</p>	3	3
<p><b>KC-135 Stratotanker</b> Inventory: <b>344</b> Fleet age: <b>57.8</b> Date: <b>1957</b></p> <p>The KC-135 is a multirole tanker/airlift platform. The aircraft has undergone several modifications, mainly engine upgrades, to improve performance and reliability. Part of the fleet will be replaced with the KC-46, with the remainder scheduled to be in service through 2040.</p>	1				
<p><b>KC-46 Pegasus</b> Inventory: <b>67</b> Fleet age: <b>n/a</b> Date: <b>n/a</b></p> <p>The Pegasus is a multirole tanker/airlift platform that can refuel both boom and drogue compatible fighters on the same mission. The Air Force accepted the first of 179 programmed aircraft in 2019. Deliveries will continue at a rate of 15 aircraft a year.</p>	5	n/a			

**NOTE:** See page 433 for details on fleet ages, dates, and procurement spending.

# AIR FORCE SCORES



Procurement and Spending ■ Through FY 2019 ■ Pending

## Heavy Lift

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>C-5M Galaxy</b> Inventory: <b>51</b> Fleet age: <b>31.4</b> Date: <b>1970</b></p> <p>The C-5 is the USAF's largest mobility aircraft. It can transport 270,000 pounds of cargo over intercontinental ranges. The "M" models are heavily modified C-5A/Bs that have new engines, avionics, and structural/reliability fixes. Ongoing mods include a new weather radar and mission computer, and improved Large Aircraft IR Countermeasures (LAIRCM).</p>	2	5	None		
<p><b>C-17 Globemaster III</b> Inventory: <b>222</b> Fleet age: <b>15</b> Date: <b>1995</b></p> <p>The C-17 is a large, air refuellable transport aircraft that is capable of operating on small, austere airfields (3,500 ft by 90 ft). Ongoing mods include next generation Large Aircraft Infrared Countermeasures (LAIRCM), structural, safety, and sustainment mods.</p>	4				

## Medium Lift

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>C-130J Super Hercules</b> Inventory: <b>110</b> Fleet age: <b>9.8</b> Date: <b>2006</b></p> <p>The C-130J is an improved tactical airlift platform that can operate from small, austere airfields, and provide inter-theater airlift and airdrop and humanitarian support. The Air Force active component completed transition to the C-130J in October 2017.</p>	5	5	<p><b>C-130J</b> Timeline: <b>2006-2022</b></p> <p>An upgraded medium-lift capability with multiple variants including the C-130J-30, AC-130J gunship, and HC-130 rescue/air refueling platform. The C-130J-30 can carry 92 Airborne troops and lift over 40,000 pounds of cargo. The current MYP procures 16 C-130Js per year through FY2023.</p> <p><b>PROCUREMENT</b> <b>SPENDING (\$ millions)</b></p> <p>Procurement: 137 (Through FY 2019), 4 (Pending) Spending: \$10,987 (Through FY 2019), \$510 (Pending)</p>	5	4

**NOTE:** See page 433 for details on fleet ages, dates, and procurement spending.

# AIR FORCE SCORES



Procurement and Spending ■ Through FY 2019 ■ Pending

## Intelligence, Surveillance, and Reconnaissance (ISR)

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score						
<p><b>RQ-4 Global Hawk</b></p> <p>Inventory: <b>33</b> Fleet age: <b>7.6</b> Date: <b>2011</b></p> <p>The RQ-4 is an unmanned aerial vehicle (UAV). Unlike the MQ-1 or MQ-9, the RQ-4 is a high-altitude, long-endurance (HALE) UAV, which in addition to higher altitude has a longer range than medium-altitude, long-endurance (MALE) UAVs.</p>	4	3	None								
<p><b>MQ-9 A/B Reaper</b></p> <p>Inventory: <b>218</b> Fleet age: <b>5.4</b> Date: <b>2007</b></p> <p>The MQ-9 is a hunter/killer Remotely Piloted Aircraft (RPA) with EO/IR and SAR targeting capabilities and is capable of station times in excess of 24 hours. The Extended Range modification adds external fuel tanks, a four-bladed propeller, engine alcohol/water injection, heavyweight landing gear, longer wings and tail surfaces.</p>	5	2	<p><b>MQ-9</b></p> <p>Timeline: <b>2007-2017</b></p> <p>The MQ-9 "Reaper" is a proven hunter/killer unmanned Aerial Vehicle (UAV). The PB for FY 2019 budget funds the procurement of 24 Reapers, and the proposed PB for 2020 will fund 12 more.</p> <p><b>PROCUREMENT</b> <b>SPENDING (\$ millions)</b></p> <table border="1"> <tr> <td>Procurement</td> <td>Spending (\$ millions)</td> </tr> <tr> <td>387</td> <td>\$6,996</td> </tr> <tr> <td>43</td> <td>\$1,664</td> </tr> </table>	Procurement	Spending (\$ millions)	387	\$6,996	43	\$1,664	5	5
Procurement	Spending (\$ millions)										
387	\$6,996										
43	\$1,664										
<p><b>RC-135 Rivet Joint</b></p> <p>Inventory: <b>25</b> Fleet age: <b>55</b> Date: <b>1972</b></p> <p>The RC-135 is a manned ISR platform that collects electronic and signals intelligence with real time analysis and dissemination for tactical forces, combatant commanders, and National Command Authorities. Ongoing upgrades include new direction finding COMINT, precision ELINT/SIGINT system integration, wideband SATCOMS, enhanced near real-time data dissemination, and new steerable beam antenna.</p>	1	4	None								
<p><b>U-2 Dragon Lady</b></p> <p>Inventory: <b>27</b> Fleet age: <b>34.7</b> Date: <b>1956</b></p> <p>The U-2 is a manned strategic high-altitude, long-endurance ISR platform. Capable of SIGINT, IMINT, and MASINT collection, it can carry a variety of advanced optical, multispectral, EO/IR, SAR, SIGINT, and other payloads simultaneously. No other aircraft in the US inventory has this capability, which will indefinitely delay the U-2's retirement.</p>	1										

**NOTE:** See page 433 for details on fleet ages, dates, and procurement spending.



# AIR FORCE SCORES



Procurement and Spending ■ Through FY 2019  
■ Pending

## Command and Control

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>E-3 AWACS</b></p> <p>Inventory: <b>31</b> Fleet age: <b>38.2</b> Date: <b>1977</b></p> <p>The E-3 is an airborne warning and control system (AWACS) that delivers all-weather, air and maritime surveillance, command and control, battle management, target, threat, and emitter detection, classification, and tracking. Ongoing upgrades include an urgent operational requirement to shorten kill-chains on time-sensitive targets, modernizing airborne moving target indication, and adding high-speed jam-resistant Link 16. The E-3 is scheduled to stay in service through the 2040s.</p>	1	2	None		
<p><b>E-8 JSTARS</b></p> <p>Inventory: <b>16</b> Fleet age: <b>17.8</b> Date: <b>2010</b></p> <p>The E-8 is a ground moving target indication (GMTI), airborne battlefield management/command and control platform. Its primary mission is providing theater commanders with ground surveillance data to support tactical operations. The Air Force plans to retire this platform in the mid-2020s.</p>					

**NOTES:** See Methodology for descriptions of scores. The date is the year the platform reached initial operational capability. The timeline is from the year the platform reached initial operational capability until its final procurement. Spending does not include advanced procurement or research, development, test, and evaluation.

# U.S. Air Force Modernization Table Citations

## MAIN SOURCES

- “USAF Almanac 2018,” *Air Force Magazine*, Vol. 100, No. 6 (June 2018), <http://www.airforcemag.com/MagazineArchive/Magazine%20Documents/2018/June%202018/Air%20Force%20Magazine%202018%20USAF%20Almanac.pdf> (accessed September 5, 2019).
- “USAF Almanac 2019,” *Air Force Magazine*, Vol. 102, No. 5 (June 2019), [http://www.airforcemag.com/MagazineArchive/Magazine%20Documents/2019/June%202019/AFM\\_June2019%20Full%20Issue.pdf](http://www.airforcemag.com/MagazineArchive/Magazine%20Documents/2019/June%202019/AFM_June2019%20Full%20Issue.pdf) (accessed September 5, 2019).
- U.S. Department of the Air Force, *Department of Defense Fiscal Year (FY) 2020 Budget Estimates, Air Force, Justification Book Volume 1 of 2: Aircraft Procurement, Air Force Vol-1*, March 2019, [https://www.saffm.hq.af.mil/Portals/84/documents/FY20/PROCUREMENT/FY20\\_PB\\_3010\\_Aircraft\\_Vol-1.pdf?ver=2019-03-18-152821-713](https://www.saffm.hq.af.mil/Portals/84/documents/FY20/PROCUREMENT/FY20_PB_3010_Aircraft_Vol-1.pdf?ver=2019-03-18-152821-713) (accessed September 5, 2019).
- U.S. Department of the Air Force, *Department of Defense Fiscal Year (FY) 2020 Budget Estimates, Air Force, Justification Book Volume 2 of 2: Aircraft Procurement, Air Force Vol 2-Mods*, March 2019, [https://www.saffm.hq.af.mil/Portals/84/documents/FY20/PROCUREMENT/FY20\\_PB\\_3010\\_Aircraft\\_Vol-2\\_Mods.pdf?ver=2019-03-18-152848-747](https://www.saffm.hq.af.mil/Portals/84/documents/FY20/PROCUREMENT/FY20_PB_3010_Aircraft_Vol-2_Mods.pdf?ver=2019-03-18-152848-747) (accessed September 5, 2019).

## MISC. SOURCES

### *B-1B Lancer:*

- Airman 1st Class Charles V. Rivezzo, “Airmen Gear up for Largest B-1 Modification,” U.S. Air Force, January 31, 2013, <https://www.af.mil/News/Article-Display/Article/109777/airmen-gear-up-for-largest-b-1-modification/> (accessed September 5, 2019).

### *KC-10:*

- Larry Merritt, “Extended Term of Service: KC-10 Turns 25; Introduced Widebody Tanker/Cargo Concept,” *Boeing Frontiers*, September 2006, [https://www.boeing.com/news/frontiers/archive/2006/september/i\\_history.pdf](https://www.boeing.com/news/frontiers/archive/2006/september/i_history.pdf) (accessed September 5, 2019).

### *F-16 Falcon:*

- News release, “U.S. Air Force Authorizes Extended Service Life for F-16,” Lockheed Martin, April 12, 2017, <https://news.lockheedmartin.com/2017-04-12-U-S-Air-Force-Authorizes-Extended-Service-Life-for-F-16> (accessed September 5, 2019).

## Endnotes

1. The Honorable Michael B. Donley, Secretary of the Air Force, and General Mark A. Welsh III, Chief of Staff, United States Air Force, “Fiscal Year 2014 Air Force Posture Statement,” statement before the Committee on Armed Services, U.S. House of Representatives, April 12, 2013, p. 2, [http://www.au.af.mil/au/awc/awcgate/af/posture\\_usaf\\_12apr2013.pdf](http://www.au.af.mil/au/awc/awcgate/af/posture_usaf_12apr2013.pdf) (accessed August 8, 2018).
2. U.S. Air Force, “Wilson, Goldfein Outline Air Force Progress, Need for Larger Force,” April 2, 2019, <https://www.af.mil/News/Article-Display/Article/1802885/wilson-goldfein-outline-air-force-progress-need-for-larger-force/> (accessed July 25, 2019).
3. General David Goldfein, Chief of Staff, U.S. Air Force, “Rebuilding Air Force Readiness,” remarks at The Heritage Foundation, Washington, D.C., April 12, 2017, <http://www.heritage.org/defense/event/rebuilding-air-force-readiness> (accessed July 25, 2019).
4. John Venable, “Independent Capability Assessment of U.S. Air Force Reveals Readiness Level Below Carter Administration Hollow Force,” Heritage Foundation *Backgrounder* No. 3208, April 17, 2017, p. 2, <https://www.heritage.org/sites/default/files/2017-04/BG3208.pdf>.
5. Stephen Losey, “Pilots Are Flying 17 Hours per Month, but It’s Still Not Enough, Air Force Secretary Says,” *Air Force Times*, March 1, 2018, <https://www.airforcetimes.com/news/your-air-force/2018/03/01/secaf-air-force-pilots-are-flying-17-hours-per-month-but-its-still-not-enough/> (accessed July 25, 2019), and U.S. Air Force, “The Air Force We Need: 386 Operational Squadrons,” September 17, 2018, <https://www.af.mil/News/Article-Display/Article/1635070/the-air-force-we-need-386-operational-squadrons/> (accessed July 25, 2019).
6. Aaron Mehta, “Mattis Orders Fighter Jet Readiness to Jump to 80 Percent—in One Year,” *Defense News*, October 9, 2018, <https://www.defensenews.com/air/2018/10/09/mattis-orders-fighter-jet-readiness-to-jump-to-80-percent-in-one-year/> (accessed July 25, 2019).
7. Table 1, “Air Force Budget Highlights Summary,” in U.S. Department of Defense, Secretary of the Air Force, Office of Financial Management and Budget (SAF/FMB), *United States Air Force Fiscal Year 2018 Budget Overview*, May 2017, p. 15, <http://www.saffm.hq.af.mil/LinkClick.aspx?fileticket=m3vZ0mfR368%3d&portalid=84> (accessed August 2, 2019), and Table 1, “Air Force Budget Highlights Summary,” in U.S. Department of Defense, Secretary of the Air Force, Office of Financial Management and Budget (SAF/FMB), *United States Air Force Fiscal Year 2020 Budget Overview*, March 2019, p. 5, <https://www.saffm.hq.af.mil/Portals/84/documents/FY20/FY2020%20Air%20Force%20Budget%20Overview%20Book%20Final%20v3.pdf?ver=2019-03-13-082653-843> (accessed August 2, 2019).
8. The rationale for using active-duty fighter and bomber aircraft and total force numbers for Tanker and Strategic Airlift platforms is based on the mission set. Active-duty fighter and bomber squadrons are required to maintain readiness levels that allow them to deploy and successfully employ into a full-spectrum combat situation within days if not hours of notification. Readiness levels in Guard and Reserve squadrons are such that those units may require six months to a year of training before their qualified manning levels enable them to deploy with the same expectations for success. The mission demands and requirements for Tanker and Strategic Airlift squadrons allow Guard and Reserve squadrons to deploy rapidly and employ as effectively as any active-duty unit with the same mission. As will be noted in the paragraphs on capacity, due to years of underfunding of operational training, even active-duty pilots are nowhere near the level of readiness required to employ successfully against a near-peer competitor without taking serious losses.
9. Table E-2, “Air Force Total Aircraft Inventory (TAI) by Mission”; Table E-5, “Air Force Selected Total Aircraft Inventory (TAI) by Mission/Designation”; and Table E-6, “Air Force Reserve Selected Total Aircraft Invent[ory] (TAI) by Mission/Designation,” in U.S. Air Force, Deputy Assistant Secretary (Cost and Economics), Assistant Secretary of the Air Force (Financial Management and Comptroller of the Air Force), *United States Air Force Statistical Digest, Fiscal Year 1992, 1994*, pp. E-103, E-107, and E-108, <https://media.defense.gov/2011/Apr/19/2001330026/-1/-1/0/AFD-110419-005.pdf> (accessed July 29, 2019).
10. Data extracted from Table, “Air Force Total Aircraft Inventory (TAI),” in U.S. Department of Defense, Secretary of the Air Force, Office of Financial Management and Budget (SAF/FMB), *United States Air Force Fiscal Year 2020 Budget Overview*, p. 38.
11. Air mileage from Spokane, Washington, to Manila, Philippines, is roughly equal to the distance from New York, New York, to Doha, Qatar, (6,693 miles and 6,836 miles, respectively), but the lack of available intermediate stopover/refueling locations means that more tanker aircraft would be required just to move assets from one location to another. Sustaining an air war in the Pacific would be that much more challenging.
12. Technological advances in aircraft materials and structure greatly extended the service life of USAF equipment. As a result, the USAF was able to sustain its force structure while procuring fewer aircraft. See Colonel James C. Ruehrmund Jr. and Christopher J. Bowie, *Arsenal of Airpower: USAF Aircraft Inventory 1950–2009*, Mitchell Institute for Airpower Studies, November 2010, p. 8, [http://docs.wixstatic.com/ugd/a2dd91\\_5ddb04fd26e4f72aef6cfd5ee87913f.pdf](http://docs.wixstatic.com/ugd/a2dd91_5ddb04fd26e4f72aef6cfd5ee87913f.pdf) (accessed July 29, 2019).

13. Table 1, "Air Force Budget Highlights Summary," in U.S. Department of Defense, Secretary of the Air Force, Office of Financial Management and Budget (SAF/FMB), *United States Air Force Fiscal Year 2019 Budget Overview*, February 2018, p. 5, [https://www.saffm.hq.af.mil/Portals/84/documents/FY19/FY19\\_BOB\\_FINAL\\_v3.pdf?ver=2018-02-13-150300-757](https://www.saffm.hq.af.mil/Portals/84/documents/FY19/FY19_BOB_FINAL_v3.pdf?ver=2018-02-13-150300-757) (accessed July 29, 2019).
14. The Honorable Heather A. Wilson, "A Conversation with the Secretary of the Air Force," The Heritage Foundation, March 1, 2018, <https://www.heritage.org/defense/event/conversation-the-secretary-the-air-force> (accessed July 29, 2019).
15. See Report No. 112-329, *National Defense Authorization Act for Fiscal Year 2012*, Conference Report to Accompany H.R. 1540, U.S. House of Representatives, 112th Cong, 1st Sess., December 12, 2011, p. 25, <https://www.gpo.gov/fdsys/pkg/CRPT-112hrpt329/pdf/CRPT-112hrpt329-pt1.pdf> (accessed July 29, 2019).
16. Table, "USAF Flying Squadrons by Mission Type," in "The Air Force in Facts and Figures," *Air Force Magazine*, Vol. 79, No. 5 (May 1996), p. 59, [http://www.airforcemag.com/MagazineArchive/Magazine%20Documents/1996/May%201996/0596facts\\_figures.pdf](http://www.airforcemag.com/MagazineArchive/Magazine%20Documents/1996/May%201996/0596facts_figures.pdf) (accessed July 29, 2019). The Air Force uses a variety of categorizations to describe or refer to its inventory of aircraft and units. This can make assessing Air Force capacity a challenging exercise.
17. *2019 Index of U.S. Military Strength*, ed. Dakota L. Wood (Washington: The Heritage Foundation, 2019), p. 386, [http://thf-graphics.s3.amazonaws.com/2018/2019%20Index%20of%20Military%20Strength/Section%20PDFs/2019\\_IndexOfUSMilitaryStrength.pdf](http://thf-graphics.s3.amazonaws.com/2018/2019%20Index%20of%20Military%20Strength/Section%20PDFs/2019_IndexOfUSMilitaryStrength.pdf).
18. Dr. William A. LaPlante, Assistant Secretary of the Air Force (Acquisition); Lieutenant General James M. "Mike" Holmes, Deputy Chief of Staff (Strategic Plans and Requirements); and Lieutenant General Tod D. Wolters, Deputy Chief of Staff (Operations), "Fiscal Year 2016 Air Force, Force Structure and Modernization Programs," statement before the Subcommittee on Airland Forces, Committee on Armed Services, U.S. Senate, March 19, 2015, p. 8, [http://www.armed-services.senate.gov/imo/media/doc/LaPlante\\_Holmes\\_Wolters\\_03-19-15.pdf](http://www.armed-services.senate.gov/imo/media/doc/LaPlante_Holmes_Wolters_03-19-15.pdf) (accessed August 9, 2018). In 2015, pressured by a third year of budget caps dictated by the BCA, the service acknowledged that it could assume more risk and reduce the requirement for 1,200 fighters by 100 jets. *Ibid.*
19. The numbers of total aircraft inventory (TAI) and combat-coded aircraft for the active-duty Air Force were derived through review of U.S. Department of Defense, Secretary of the Air Force, Office of Financial Management and Budget (SAF/FMB), *United States Air Force Fiscal Year 2020 Budget Overview*, and International Institute for Strategic Studies, *The Military Balance 2019: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2019), pp. 56-57. Where the two publications were in conflict for TAI, the SAF/FMB numbers were adopted. Neither document specifies the number of active-duty combat-coded aircraft. That number was derived by tallying the total number of fighters by type and dividing that number by the total number of active-duty squadrons flying those types of aircraft. The numbers and types of aircraft associated with Weapons Instructor Course Squadrons, Adversary Tactics, Test, OT&E, and other units are not standard/determinable and could not be assessed. The associated error is minimized by totaling all like fighter aircraft (F-16, F-15C, etc.); dividing them by the total number of squadrons flying those aircraft; and spreading the error equally across all combat-coded fighter and training units. The total number of fighters associated with non-Fighter Training Unit (FTU) squadrons was counted as "combat-coded."
20. The numbers here are complicated. Air Force formulas contained in Adam J. Herbert, "The Fighter Numbers Flap," *Air Force Magazine*, Vol. 91, No. 4 (April 2008), p. 26, <http://www.airforcemag.com/MagazineArchive/Documents/2008/April%202008/0408issue.pdf> (accessed July 29, 2019), convey how the service estimates this number, but it is merely an estimate. Using this formula on an AF/A8XC-provided (as of June 9, 2018) figure of 710 PMAI fighters renders a total of 1,136 total Air Force active-duty fighters, a number that is well short of the 1,374 carried on the Air Force roster. This calls for the use of a different method to determine the actual number of combat-coded fighters as detailed in note 19, *supra*.
21. Table, "Total Force Average Aircraft Age (As of Sept. 30, 2018)," in "USAF Almanac 2019," *Air Force Magazine*, Vol. 102, No. 5 (June 2019), p. 59, [http://www.airforcemag.com/MagazineArchive/Magazine%20Documents/2019/June%202019/AFM\\_June2019%20Full%20Issue.pdf](http://www.airforcemag.com/MagazineArchive/Magazine%20Documents/2019/June%202019/AFM_June2019%20Full%20Issue.pdf) (accessed July 29, 2019). Ten months were added because of the difference between the aircraft data capture dates for the 2019 USAF Almanac and publication of this edition of the *Index*.
22. Comparison made between U.S. Department of Defense, Secretary of the Air Force, Office of Financial Management and Budget (SAF/FMB), *United States Air Force Fiscal Year 2019 Budget Overview*, p. 37, and International Institute for Strategic Studies, *The Military Balance 2019*, pp. 55-57.
23. Table, "Total Force Average Aircraft Age (As of Sept. 30, 2018)," in "USAF Almanac 2019," p. 59. Ten months were added because of the difference between the aircraft data capture dates for the 2019 USAF Almanac and publication of this edition of the *Index*.
24. Micah Garbarino, "F-16 Service Life Extension Program a 'Great Deal' for Department of Defense, Taxpayers," Air Force Materiel Command, March 3, 2018, <http://www.afmc.af.mil/News/Article-Display/Article/1512449/f-16-service-life-extension-program-a-great-deal-for-department-of-defense-taxp/> (accessed July 29, 2019).
25. Comparison made between U.S. Department of Defense, Secretary of the Air Force, Office of Financial Management and Budget (SAF/FMB), *United States Air Force Fiscal Year 2019 Budget Overview*, and International Institute for Strategic Studies, *The Military Balance 2019*, pp. 54-55.

26. U.S. Department of Defense, Secretary of the Air Force, Office of Financial Management and Budget (SAF/FMB), *United States Air Force Fiscal Year 2019 Budget Overview*, p. 37.
27. Comparison made between U.S. Department of Defense, Secretary of the Air Force, Office of Financial Management and Budget (SAF/FMB), *United States Air Force Fiscal Year 2019 Budget Overview*, p. 37, and International Institute for Strategic Studies, *The Military Balance 2019*, pp. 54–56.
28. “U-2 Dragon Lady,” in “USAF Almanac 2019,” pp. 59 and 111. Ten months were added to the U-2’s age because of the difference between the data capture date for the 2019 USAF Almanac and publication of this edition of the *Index*.
29. Headquarters U.S. Air Force, A8XC/A5RW, written response to Heritage Foundation request for information on Air Force PGM expenditures and programmed replenishments, June 10, 2018.
30. Jeremiah Gertler, “Air Force F-22 Fighter Program,” Congressional Research Service *Report for Congress*, July 11, 2013, p. 7, <https://www.fas.org/sgp/crs/weapons/RL31673.pdf> (accessed July 29, 2019), and Rebecca Grant and Loren Thompson, “Losing Air Dominance? The Air Force and Its Future Roles,” presentation at Air Force Association Air & Space Conference, Washington, D.C., September 16, 2008, p. 3, [https://secure.afa.org/Mitchell/presentations/091608LosingAirDominance\\_tnx.pdf](https://secure.afa.org/Mitchell/presentations/091608LosingAirDominance_tnx.pdf) (accessed July 29, 2019).
31. James Drew, “F-22 Raptor Retrofit to Take Longer, but Availability Hits 63%,” *FlightGlobal*, July 6, 2015, <http://www.flightglobal.com/news/articles/f-22-raptor-retrofit-to-take-longer-but-availability-hits-414341/> (accessed July 29, 2019).
32. The 2019 *Index of U.S. Military Strength* stated that 103 of 166 of the active-duty mission fleet of F-22As are currently available. 2019 *Index of U.S. Military Strength*, p. 391. The actual number of combat-coded F-22As on active duty is 138. With a mission-capable rate of 62.8 percent, just 72 are flyable to fly combat sorties at any given time, including the retrofit.
33. Kris Osborn, “Air Force: F-35 3F Software Drop Challenges Resolved,” *Defense Systems*, May 17, 2017, <https://defensesystems.com/articles/2017/05/17/f35.aspx> (accessed July 29, 2019).
34. John Venable, “The F-35A Fighter Is the Most Dominant and Lethal Multi-Role Weapons System in the World: Now Is the Time to Ramp Up Production,” Heritage Foundation *Backgrounder* No. 3406, May 14, 2019, pp. 8–9, <https://www.heritage.org/sites/default/files/2019-05/BG3406.pdf>.
35. See Colonel Michael W. Pietrucha, “The Comanche and the Albatross: About Our Neck Was Hung,” *Air & Space Power Journal*, Vol. 28, No. 3 (May–June 2014), pp. 133–156, [https://www.airuniversity.af.mil/Portals/10/ASPJ/journals/Volume-28\\_Issue-3/F-Pietrucha.pdf](https://www.airuniversity.af.mil/Portals/10/ASPJ/journals/Volume-28_Issue-3/F-Pietrucha.pdf) (accessed July 29, 2019).
36. Venable, “Independent Capability Assessment of U.S Air Force Reveals Readiness Level Below Carter Administration Hollow Force,” p. 2, and Dave Majumdar, “Can the F-35 Win a Dogfight?” *War Is Boring*, December 17, 2013, <https://warisboring.com/can-the-f-35-win-a-dogfight/> (accessed July 29, 2019).
37. Thomas W. Spoehr and Rachel Zissimos, eds., “Preventing a Defense Crisis: The 2018 National Defense Authorization Act *Must* Begin to Restore U.S. Military Strength,” Heritage Foundation *Backgrounder* No. 3205, March 29, 2017, p. 8, <https://www.heritage.org/sites/default/files/2017-03/BG3205.pdf>.
38. Headquarters U.S. Air Force, A8XC/A5RW, written response to Heritage Foundation request for information on Air Force PGM expenditures and programmed replenishments, July 10, 2019.
39. Lieutenant General Arnold W. Bunch, Jr., Military Deputy, Office of the Assistant Secretary of the Air Force (Acquisition); Lieutenant General Jerry D. Harris, Deputy Chief of Staff (Strategic Plans and Requirements); and Major General Scott A. Vander Hamm, Assistant Deputy Chief of Staff (Operations), statement on “Air Force Bomber/Tanker/Airlift Acquisition Programs” before the Subcommittee on Seapower and Projection Forces, Committee on Armed Services, U.S. House of Representatives, May 25, 2017, p. 10, <http://docs.house.gov/meetings/AS/AS28/20170525/106013/HHRG-115-AS28-Wstate-BunchA-20170525.pdf> (accessed July 30, 2019).
40. *Ibid.*, p. 4, and Lieutenant General James M. “Mike” Holmes, Deputy Chief of Staff (Strategic Plans and Requirements), and Lieutenant General Arnold W. Bunch, Jr., Military Deputy, Office of the Assistant Secretary of the Air Force (Acquisition), statement on “Air Force Bomber/Tanker/Airlift Acquisition Programs” before the Subcommittee on Seapower and Projection Forces, Committee on Armed Services, U.S. House of Representatives, March 1, 2016, p. 4, <http://docs.house.gov/meetings/AS/AS28/20160301/104353/HHRG-114-AS28-Wstate-BunchA-20160301.pdf> (accessed July 30, 2019).
41. Small group discussion with the Honorable Heather Wilson, Secretary of the Air Force, February 9, 2018.
42. Holmes and Bunch, statement on “Air Force Bomber/Tanker/Airlift Acquisition Programs,” March 1, 2016, pp. 2–3.
43. Dave Majumdar, “Why the Air Force Won’t Buy the F-15X or ‘New’ F-22 Raptor,” *Real Clear Defense*, September 18, 2018, [https://www.realcleardefense.com/articles/2018/09/18/why\\_the\\_air\\_force\\_wont\\_buy\\_the\\_f-15x\\_or\\_new\\_f-22\\_raptor\\_113808.html](https://www.realcleardefense.com/articles/2018/09/18/why_the_air_force_wont_buy_the_f-15x_or_new_f-22_raptor_113808.html) (accessed July 30, 2019).

44. Joe Gould, "US Air Force Defends F-15X Buy to Skeptical Inhofe, Reed," *Defense News*, April 4, 2019, <https://www.defensenews.com/congress/2019/04/04/usaf-defends-f-15x-buy-to-skeptical-inhofe-reed/> (accessed July 30, 2019).
45. The Honorable Dr. Heather Wilson, Secretary of the Air Force, and General David L. Goldfein, Chief of Staff, United States Air Force, "USAF Posture Statement, Fiscal Year 2020," Department of the Air Force Presentation to the Committees and Subcommittees of the United States Senate and the House of Representatives, 116th Cong., 1st Sess., p. 4, [https://www.af.mil/Portals/1/images/posturestatement/FY20\\_POSTURE\\_STATEMENT\\_OMB\\_Cleared\\_12MAR\\_1310L.pdf](https://www.af.mil/Portals/1/images/posturestatement/FY20_POSTURE_STATEMENT_OMB_Cleared_12MAR_1310L.pdf) (accessed July 30, 2019).
46. The Honorable Heather A. Wilson, Secretary of the Air Force, and General David L. Goldfein, Chief of Staff of the Air Force, statement on "Air Force Budget Posture" before the Committee on Armed Services, U.S. Senate, June 6, 2017, p. 3, [https://www.armed-services.senate.gov/imo/media/doc/Wilson-Goldfein\\_06-06-17.pdf](https://www.armed-services.senate.gov/imo/media/doc/Wilson-Goldfein_06-06-17.pdf) (accessed July 30, 2019).
47. Major General Scott West, Director of Current Operations, Deputy Chief of Staff for Operations, Headquarters, U.S. Air Force, statement on "Military Aviation Readiness and Safety" before the Subcommittee on Readiness, Committee on Armed Services, U.S. House of Representatives, July 6, 2016, p. 2, <http://docs.house.gov/meetings/AS/AS03/20160706/105159/HHRG-114-AS03-Wstate-WestS-20160706.pdf> (accessed July 30, 2019).
48. Stephen Losey, "The Air Force Still Has a Serious Maintainer Staffing Problem, GAO Says—but No Strategy to Fix It," *Air Force Times*, February 8, 2019, <https://www.airforcetimes.com/news/your-air-force/2019/02/08/the-air-force-still-has-a-serious-maintainer-staffing-problem-gao-says-but-no-strategy-to-fix-it/> (accessed July 25, 2019).
49. Julian E. Barnes, "Warning Sounded on Cuts to Pilot Training," *The Wall Street Journal*, December 19, 2013, <http://www.wsj.com/articles/SB10001424052702304773104579268651994849572> (accessed July 30, 2019).
50. Lieutenant General Gina M. Grosso, Deputy Chief of Staff Manpower, Personnel and Services, United States Air Force, statement on "Military Pilot Shortage" before the Subcommittee on Personnel, Committee on Armed Services, U.S. House of Representatives, March 29, 2017, p. 2, <http://docs.house.gov/meetings/AS/AS02/20170329/105795/HHRG-115-AS02-Wstate-GrossoG-20170329.pdf> (accessed July 30, 2019).
51. Headquarters U.S. Air Force, Deputy Chief of Staff for Operations, written response to Heritage Foundation request for information on Air Force manning levels, June 10, 2018.
52. Headquarters U.S. Air Force, Deputy Chief of Staff for Operations, written response to Heritage Foundation request for information on Air Force manning levels, April 9, 2019.
53. James C. Slife, *Creech Blue: Gen Bill Creech and the Reformation of the Tactical Air Forces, 1978–1984* (Maxwell Air Force Base: Air University Press, October 2004), p. 92, [https://www.airuniversity.af.edu/Portals/10/AUPress/Books/B\\_0095\\_SLIFE\\_CREECH\\_BLUE.pdf](https://www.airuniversity.af.edu/Portals/10/AUPress/Books/B_0095_SLIFE_CREECH_BLUE.pdf) <https://www.airuniversity.af.edu/AUPress/Display/Article/1534424/creech-blue/> (accessed July 30, 2019).
54. John Venable, "A Plan for Keeping the U.S. Air Force's Best Pilots in Service," Heritage Foundation *Commentary*, November 14, 2017, <https://www.heritage.org/defense/commentary/plan-keeping-the-us-air-forces-best-pilots-service>.
55. The Honorable Heather A. Wilson, "A Budget Conversation with the Secretary of the Air Force," The Heritage Foundation, March 27, 2019, <https://www.heritage.org/defense/event/budget-conversation-the-secretary-the-air-force> (accessed July 30, 2019).
56. Slife, *Creech Blue: Gen. Bill Creech and the Reformation of the Tactical Air Forces, 1978–1984*, pp. 92–95.
57. U.S. General Accounting Office, "Air Force Maintenance: Two Level Maintenance Program Assessment," GAO/NSAID-96-86, March 1996, p. 1, <https://www.gao.gov/assets/230/222350.pdf> (accessed July 30, 2019).
58. Wilson, "A Conversation with the Secretary of the Air Force."
59. Averages for sorties and hours are based on weighted fighter manning levels for each of the five major weapons systems provided in Headquarters U.S. Air Force, Deputy Chief of Staff for Operations, written response to Heritage Foundation request for information on Air Force manning levels, July 8, 2018. The numbers were weighted based on aircraft numbers as explained in note 19, *supra*, as well as standard aircrew ratios established in Figure A8.1, "Air Force Single Flying Hour Model F-16C Example," in U.S. Air Force, "Flying Operations: Flying Hour Program Management," Air Force Instruction 11-102, August 30, 2011, p 17, [https://static.e-publishing.af.mil/production/1/af\\_a3\\_5/publication/afi11-102/afi11-102.pdf](https://static.e-publishing.af.mil/production/1/af_a3_5/publication/afi11-102/afi11-102.pdf) (accessed July 14, 2019).
60. See note 59, *supra*.
61. U.S. Air Force, "Hyten Announces Space Enterprise Vision," April 13, 2016, <http://www.af.mil/News/Article-Display/Article/719941/hyten-announces-space-enterprise-vision/> (accessed July 30, 2019).
62. Colin Clark, "Space Command Readies for War with 'Space Enterprise Vision,'" *Breaking Defense*, June 20, 2016, <http://breakingdefense.com/2016/06/space-command-readies-for-war-with-space-enterprise-vision/> (accessed July 30, 2019).
63. Venable, "Independent Capability Assessment of U.S. Air Force Reveals Readiness Level Below Carter Administration Hollow Force," p. 10.

64. Bill Gertz, "China Tests Anti-Satellite Missile," *The Washington Free Beacon*, November 9, 2015, <http://freebeacon.com/national-security/china-tests-anti-satellite-missile/> (accessed July 30, 2019); Weston Williams, "Russia Launches Anti-Satellite Weapon: A New Warfront in Space?" *The Christian Science Monitor*, December 22, 2016, <http://www.csmonitor.com/USA/Military/2016/1222/Russia-launches-anti-satellite-weapon-A-new-warfront-in-space> (accessed July 30, 2019); and Brid-Aine Parnell, "Mystery Russian Satellite: Orbital Weapon? Sat Gobbler? What?" *The Register*, November 18, 2014, [http://www.theregister.co.uk/2014/11/18/russia\\_secret\\_satellite\\_kosmos\\_2499/](http://www.theregister.co.uk/2014/11/18/russia_secret_satellite_kosmos_2499/) (accessed July 30, 2019).
65. U.S. Air Force, "Hyten Announces Space Enterprise Vision."
66. Venable, "Independent Capability Assessment of U.S. Air Force Reveals Readiness Level Below Carter Administration Hollow Force."





# U.S. Marine Corps

The U.S. Marine Corps (USMC) is the nation's expeditionary armed force, positioned and ready to respond to crises around the world. Marine units assigned aboard ships ("soldiers of the sea") or at bases abroad stand ready to project U.S. power into crisis areas. Marines also serve in a range of unique missions, from combat defense of U.S. embassies under attack abroad to operating the President's helicopter fleet.

Although Marines have a wide variety of individual assignments, the focus of every Marine is on combat: Every Marine is first a rifleman. The USMC has positioned itself for crisis response and has evolved its concepts to leverage its equipment more effectively to support operations in a heavily contested maritime environment such as the one found in the Western Pacific.

As of March 2019, according to the U.S. Navy's budget highlights document for fiscal year (FY) 2020, more than 40,000 Marines (roughly one-third of Marine Corps operating forces) were deployed around the world, "providing immediate options, assuring allies and deterring our adversaries." During the preceding year, "the Marine Corps executed 170 operations, eight amphibious operations, [and] 115 theater security cooperation events and participated in 51 exercises and relief operations for Hurricanes Maria, Florence, and Michael."<sup>1</sup>

Pursuant to the national-level and service-level strategic guidance documents that provide direction and focus for the military services,<sup>2</sup> maintaining the Marines' crisis response capability is critical. Thus, given the fiscal constraints imposed on it, the Corps has

continued to prioritize "near-term readiness" at the expense of other areas such as capacity, capability, modernization, home station readiness, and infrastructure.<sup>3</sup> However, as stated in the President's FY 2019 budget of \$43.1 billion for the Corps, the service elevated modernization as a means to improve readiness for combat.<sup>4</sup> This is consistent with and central to its readiness-recovery efforts and represents a shift to a longer-term perspective. Recapitalization and repair of legacy systems is no longer sufficient to sustain current operational requirements. New equipment is necessary.

## Capacity

The measures of Marine Corps capacity in this *Index* are similar to those used to assess the Army's: end strength and units (battalions for the Marines and brigades for the Army).

**Ground Forces.** The Marine Corps' basic combat unit is the infantry battalion, which is composed of approximately 900 Marines and includes three rifle companies, a weapons company, and a headquarters and service company.<sup>5</sup> In FY 2011, the Marine Corps maintained 27 infantry battalions in its active component at an authorized end strength of 202,100.<sup>6</sup> As budgets declined, the Corps prioritized readiness through managed reductions in capacity, including a drawdown of forces, and delays or reductions in planned procurement levels. After the Marine Corps fell to a low of 23 active component infantry battalions in FY 2015, Congress began to fund gradual increases in end strength, returning the Corps to 24 infantry battalions.<sup>7</sup>

President Donald Trump's FY 2019 budget request increased the size of the active

component Marine Corps by 1,100 Marines to an authorized level of 186,100,<sup>8</sup> sustaining enough support for 24 infantry battalions. The additional manpower backfilled existing units and helped the Marine Corps to recruit and retain individuals with critical skill sets and specialties.

One impact of reduced capacity is a strain on Marines' dwell time. Cuts in capacity—the number of units and individual Marines—enabled the Marine Corps to disperse the resources it did receive among fewer units, thus maintaining higher readiness levels throughout a smaller force. However, without a corresponding decrease in operational requirements, demand for Marine Corps units and assets has resulted in grueling deployment rates, a situation that has remained largely unchanged since 2018.<sup>9</sup> High deployment frequency exacerbates the degradation of readiness as people and equipment are used more frequently with less time to recover between deployments.

The stated ideal deployment-to-dwell (D2D) time ratio is 1:3 (seven months deployed for every 21 months at home).<sup>10</sup> This leaves more time available for training and recovery and provides support for a “ready bench,” without which readiness investments are immediately consumed. FY 2019 budget constraints support only “an approximate 1:2 D2D ratio in the aggregate”<sup>11</sup> with the roughly 5 percent increase in funding (compared to FY 2018) going toward readiness and modernization at the expense of capacity or number of units.

Infantry battalions serve as a surrogate measure for the Corps' total force. As the first to respond to many contingencies, the Marine Corps requires a large degree of flexibility and self-sufficiency, and this drives its approach to organization and deployment of operational formations that, although typically centered on infantry units, are composed of ground, air, and logistics elements. Each of these assets and capabilities is critical to effective deployment of force, and any one of them can be a limiting factor in the conduct of training and operations.

**Aviation.** Marine aviation has been particularly stressed by insufficient funding. Although operational requirements have not decreased, fewer Marine aircraft have been available for tasking or training. For example, according to its 2019 aviation plan, the USMC currently fields 16 tactical fighter squadrons, compared to 19 in FY 2017 and around 28 during Desert Storm.<sup>12</sup> Though the availability of legacy aircraft has slowly improved—the result of increased funding for spare parts and implementation of recommendations from independent readiness reviews—the Marine Corps “is still challenged with low readiness rates in specific communities,” such as F/A-18 squadrons.<sup>13</sup>

The Corps is introducing the F-35 platform into the fleet, but F/A-18 Hornets remain “the primary bridging platform to F-35B/C” and will remain in the force until 2030.<sup>14</sup> This primary tactical air (TACAIR) capability has to be carefully managed as it is no longer in production. The Navy completed its divestment of F/A-18 A-D models during FY 2019, making them available to the Marines and enabling the Corps to replace its older aircraft with planes that are less old.<sup>15</sup> To further mitigate the aging of its fleet until full transition to the F-35, the Corps is also looking to acquire F/A-18s from other countries as opportunities arise.<sup>16</sup>

The Corps will maintain five squadrons of AV-8B Harriers, introduced in 1985, until FY 2022.<sup>17</sup> In its heavy-lift rotary wing fleet, the Corps began a reset of the CH-53E in 2016 to bridge the procurement gap to the CH-53K and aims to “reset...the entire 143-aircraft fleet by FY20,” but this will still leave the service 57 aircraft short of the stated heavy-lift requirement of 200 airframes, and the Marine Corps will not have enough helicopters to meet its heavy-lift requirement without the transition to the CH-53K.<sup>18</sup>

According to the Corps' 2019 aviation plan, the transition to the MV-22 Osprey is complete, with 18 fully operational squadrons in the active component.<sup>19</sup> However, depending on the results of an ongoing requirements-based analysis, the procurement objective could increase to 380 aircraft.<sup>20</sup> The Osprey has been

called “our most in-demand aircraft,”<sup>21</sup> which means the Marine Corps has to reconcile high operational tempos (OPTEMPOs) with the objective of maintaining the platform in its inventory “for at least the next 40 years.”<sup>22</sup> At present, MV-22 readiness has plateaued at 55 percent due to a wide variety in aircraft configuration, which complicates assessing problems and ordering parts—affecting repairs—and shortfalls in maintenance personnel.<sup>23</sup> The Corps has committed to funding its Common Configuration-Readiness and Modernization (CC-RAM) and Nacelle Improvement (NI) programs to increase availability by 15 percent.<sup>24</sup>

**Amphibious Ships.** Although amphibious ships are assessed as part of the Navy’s fleet capacity, Marines operate and train aboard naval vessels. This makes “the shortage of amphibious ships...the quintessential challenge to amphibious training.”<sup>25</sup> The Navy was operating only 32 amphibious warfare ships as of August 20, 2019,<sup>26</sup> and is projected to continue operating short of the 38-ship requirement until FY 2033, thus limiting what the Marine Corps can do in operational, training, and experimentation settings.<sup>27</sup>

Because of this chronic shortfall in amphibious ships, the USMC has relied partially on land-based Special Purpose Marine Air-Ground Task Forces (SPMAGTFs). SPMAGTFs have enabled the Corps to meet Joint Force requirements, but land-based locations still “lack the full capability, capacity and strategic and operational agility that results when Marine Air-Ground Task Forces (MAGTFs) are embarked aboard Navy amphibious ships.”<sup>28</sup> The lack of variety in amphibious shipping, especially as the Corps considers the implications of evolving enemy capabilities, and concerns about the shortage of amphibious lift in general make the exploration of alternatives with the Navy an increasingly urgent need.<sup>29</sup>

The USMC continues to invest in the recapitalization of legacy platforms in order to extend platform service life and keep aircraft and amphibious vehicles in the fleet, but as these platforms age, they also become less relevant to the evolving modern operating environment.

Thus, while they do help to maintain capacity, programs to extend service life do not provide the capability enhancements that modernization programs provide. The result is an older, less-capable fleet of equipment that costs more to maintain.

## Capability

The nature of the Marine Corps’ crisis response role requires capabilities that span all domains. The USMC ship requirement is managed by the Navy and is covered in the Navy’s section of the *Index*. The Marine Corps has been focusing on “essential modernization” and emphasizing programs that “underpin our core competencies,” making the Amphibious Combat Vehicle (ACV) and F-35 JSF programs its top two priorities.<sup>30</sup> The Corps has committed nearly one-third of its overall budget—\$13.8 billion in FY 2019 and a requested \$13.9 billion for FY 2020—to force modernization.<sup>31</sup>

Of the Marine Corps’ current fleet of vehicles, its amphibious vehicles—specifically, the Assault Amphibious Vehicle (AAV-7A1) and Light Armored Vehicle (LAV)—are the oldest, with the AAV-7A1 averaging over 40 years old and the LAV averaging 26 years old.<sup>32</sup> The Corps had pursued a survivability upgrade for the AAV to extend its useful service life, but progress with the ACV program was better than expected, so the service canceled its contract with Science Applications International Corporation (SAIC) in September 2018.<sup>33</sup>

Service testimony notes that the Marine Corps is “beginning to look at a replacement” for the LAV, which will “help accelerate movement to the acquisition phase within the next four to five years.”<sup>34</sup> As noted, the average age of the LAV is 26 years. Comparatively, the Corps’ M1A1 Abrams inventory is 28 years old with an estimated 33-year life span,<sup>35</sup> while as of 2014, the newest HMMWV variant had already consumed half of its projected 15-year service life.<sup>36</sup>

All of the Corps’ main combat vehicles entered service in the 1970s and 1980s, and service life extensions, upgrades, and new

generations of designs have allowed the platforms to remain in service. However, these vehicles are rapidly becoming poorly suited to the changing threat environment. The President's FY 2020 budget seeks to provide \$13.9 billion for modernization across the service, with \$3.1 billion of this amount to be used for ground-related procurement in an effort to update key combat and combat-related systems that will extend the service utility of aging primary ground combat platforms.<sup>37</sup>

The age profiles of the Corps' aircraft are similar to those of the Navy's. In 2018, the USMC had 251 F/A-18A-Ds (including one reserve squadron) and six EA-6Bs in its primary mission aircraft inventory,<sup>38</sup> and both aircraft had already surpassed their originally intended life spans. The Marine Corps completed retirement of its EA-6B squadrons in FY 2019.<sup>39</sup>

Unlike the Navy, the Corps did not acquire the newer F/A-18 E/F Super Hornets; thus, a portion of the older F/A-18 Hornets are going through a service life extension program to extend their life span to 10,000 flight hours from the original 6,000 hours.<sup>40</sup> This is intended to bridge the gap until the F-35Bs and F-35Cs enter service to replace the Harriers and most of the Hornets.

As the Navy accelerated its transition to the Super Hornet, it transferred its "best of breed" aircraft from its F/A-18A-D inventory to the Marine Corps and scrapped the remaining for parts to help maintain the Corps' legacy fleet through FY 2030.<sup>41</sup> The AV-8B Harrier, designed to take off from the LHA and LHD amphibious assault ships, will be retired from Marine Corps service by 2026.<sup>42</sup> The AV-8B received near-term capability upgrades in 2015, which continued in 2017 in order to maintain its lethality and interoperability until the F-35 transition is completed in FY 2022.<sup>43</sup>

The Corps declared its first F-35B squadron operationally capable on July 31, 2015, after it passed an "Operational Readiness Inspection" test and has reported that the aircraft reached full operational capability in late 2018.<sup>44</sup> During FY 2019, VMFA-211 made the first full operational deployment with a Marine

Expeditionary Unit (MEU) when it sailed with the 13th MEU from September 2018 to February 2019, supporting combat operations in Afghanistan, Iraq, and Syria.<sup>45</sup> To date, three F-35B squadrons have been delivered to the Marine Corps, including two operational squadrons and one fleet replacement squadron, totaling 158 aircraft comprised of 135 F-35Bs and 23 F-35Cs.<sup>46</sup>

The Marine Corps has two Major Defense Acquisition (MDAP) vehicle programs: the Joint Light Tactical Vehicle (JLTV) and Amphibious Combat Vehicle (ACV).<sup>47</sup> The JLTV is a joint program with the Army to acquire a more survivable light tactical vehicle that was originally intended to replace a percentage of the older HMMWV fleet, introduced in 1985, although that objective changed in 2019. The Army retains overall responsibility for JLTV development through its Joint Program Office.<sup>48</sup>

Following FY 2015 plans for the JLTV, the program awarded a low-rate initial production contract, which included a future option of producing JLTVs for the Marine Corps, to defense contractor Oshkosh.<sup>49</sup> As of June 2017, despite a delay in the program's full-rate production decision and reduced procurement quantities in FY 2016 and FY 2017, the Corps expected to complete its prior acquisition objective of 5,500 by FY 2023.<sup>50</sup> In mid-August 2019, the Corps announced that it would increase its procurement of JLTVs to around 15,000, effectively enabling replacement of its 15,390-vehicle HMMWV fleet.<sup>51</sup> The JLTV program has reached sufficient production maturity that the Corps is fielding the vehicle to its first operational unit, 3rd Battalion, 8th Marines, located at MCB Camp Lejeune, North Carolina.<sup>52</sup>

The Marine Corps is replacing the AAV-7A1 with the ACV. The ACV, which took the place of the Expeditionary Fighting Vehicle (EFV), "has been structured to provide a phased, incremental capability."<sup>53</sup> The AAV-7A1 was to be replaced by the EFV, a follow-on to the cancelled Advanced AAV, but the EFV was also cancelled in 2011 as a result of technical obstacles and cost overruns. Similarly, the Corps planned to replace the LAV inventory with the Marine

Personnel Carrier (MPC), which would serve as a Light Armored Vehicle with modest amphibious capabilities but would be designed primarily to provide enhanced survivability and mobility once ashore.<sup>54</sup> However, budgetary constraints led the Corps to shelve the program, leaving open the possibility that it might be resumed in the future.

After restructuring its ground modernization portfolio, the Marine Corps determined that it would combine its efforts by upgrading 392 of its legacy AAVs and continuing development of the ACV to replace part of the existing fleet and complement its AAVs.<sup>55</sup> This would help the Corps to meet its requirement of armored lift for 10 battalions of infantry.<sup>56</sup> BAE Systems won the contract award to build the ACV 1.1 in June 2018<sup>57</sup> and is expected to deliver the first 30 vehicles by the fall of 2019, for which the FY 2019 budget provided funding. The Marine Corps plans to field 204 vehicles in the first increment—enough to support lift requirements for two infantry battalions.<sup>58</sup>

The ACV 1.1 platform is notable because it is an amphibious wheeled vehicle instead of a tracked vehicle, capable of traversing open water only with the assistance of Navy shore connectors such as Landing Craft, Air Cushion Vehicles (LCAC). Development and procurement of the ACV program will be phased so that the new platforms can be fielded incrementally alongside a number of modernized AAVs.<sup>59</sup> Plans call for a 694-vehicle program of record (a combination of upgraded AAVs and ACVs), with the first battalion to reach initial operating capability (IOC) in FY 2020, and for modernizing enough of the current AAV fleet to outfit six additional battalions, two in the first increment and four in the second. The Corps has requested \$318 million in its FY 2020 budget to fund the “first full-rate production lot of 56 vehicles,” nearly double the \$167 million it received for the ACV in FY 2019.<sup>60</sup>

Regarding aviation, Lieutenant General Brian Beaudreault, then Marine Corps Deputy Commandant for Plans, Policies, and Operations, testified in 2018 that “[t]he single most effective way to meet our NDS responsibilities,

improve overall readiness, and gain the competitive advantage required for combat against state threats is through the modernization of our aviation platforms.”<sup>61</sup> The F-35B remained the Marine Corps’ largest investment program in FY 2019. The Corps announced IOC of the F-35B variant in July 2015.<sup>62</sup> Total procurement will consist of 420 F-35s (353 F-35Bs and 67 F-35Cs), 158 of which have been acquired.<sup>63</sup> AV-8Bs and F/A-18A-Ds continue to receive interoperability and lethality enhancements in order to extend their useful service lives during the transition to the F-35.

Today, the USMC MV-22 Osprey program is operating with few problems and nearing completion of the full acquisition objective of 360 aircraft.<sup>64</sup> The Marine Corps has increased its total of MV-22 squadrons to 16 fully operational squadrons in the active component toward a final objective of 18 active and two reserve component squadrons.<sup>65</sup> The MV-22’s capabilities are in high demand from the Combatant Commanders (CCDR), and the Corps is adding capabilities such as fuel delivery and use of precision-guided munitions to the MV-22 to enhance its value to the CCDR.

The Corps continues to struggle with sustainment challenges in the Osprey fleet. Since procurement of the first MV-22 in 1999, the fleet has developed more than 70 different configurations.<sup>66</sup> This has resulted in increased logistical requirements, as maintainers must be trained to each configuration and spare parts are not all shared. The Marine Corps developed its CC-RAM program to consolidate the inventory to a common configuration at a rate of “2–23 aircraft installs per year” beginning in FY 2018.<sup>67</sup>

The USMC’s heavy-lift replacement program, the CH-53K, conducted its first flight on October 27, 2015.<sup>68</sup> The CH-53K will replace the Corps’ CH-53E, which is now 29 years old. Although “unexpected redesigns to critical components” delayed a low-rate initial production decision, the program achieved Milestone C in April 2017, and the President’s FY 2019 budget requested \$1,601.8 million for the procurement of eight aircraft in its second

year of low-rate initial production.<sup>69</sup> The Corps continued this effort by purchasing another six aircraft in FY 2020 for \$1.0 billion and determined that it would invest an additional almost \$517 million in continued engineering manufacturing development initiatives.<sup>70</sup>

The helicopter is now forecast to reach IOC in FY 2021,<sup>71</sup> six years later than initially anticipated. This is of increasing concern as the Marine Corps maintains only 138 CH-53Es and will not have enough helicopters to meet its heavy-lift requirement of 220 aircraft without the transition to the CH-53K, which even when fully implemented will still fall short by 20 aircraft.<sup>72</sup>

### Readiness

The Marine Corps' first priority is to be the military's crisis response force, which is why investment in immediate readiness has been prioritized over capacity and capability.<sup>73</sup> Although this is sustainable for a short time, concerns expressed when the Budget Control Act was passed in 2011 have proved to be impediments in the present. Modernization is now a primary inhibitor of readiness as keeping aging platforms in working order becomes increasingly challenging and aircraft are retired before they can be replaced, leaving a smaller force available to meet operational requirements and further increasing the use of remaining platforms.

With respect to training, the Marine Corps continues to prioritize training for deploying and next-to-deploy units. Marine operating forces as a whole continue to average a 1:2 deployment-to-dwell ratio.<sup>74</sup> At this pace, readiness is consumed as quickly as it is built, leaving minimal flexibility to respond to contingencies.

Marine Corps guidance identifies multiple levels of readiness that can affect the ability to conduct operations:

Readiness is the synthesis of two distinct but interrelated levels. a. unit readiness—The ability to provide capabilities required by the combatant commanders to execute

their assigned missions. This is derived from the ability of each unit to deliver the outputs for which it was designed. b. joint readiness—The combatant commander's ability to integrate and synchronize ready combat and support forces to execute his or her assigned missions.<sup>75</sup>

As noted, the availability of amphibious ships, although funded through the Navy budget, has a direct impact on the Marine Corps' joint readiness. For example, while shore-based MAGTFs can maintain unit-level readiness and conduct training for local contingencies, a shortfall in amphibious lift capabilities leaves these units without “the strategic flexibility and responsiveness of afloat forces and... constrained by host nation permissions.”<sup>76</sup>

In December 2017, a U.S. Government Accountability Office (GAO) official testified that even though deploying units completed all necessary pre-deployment training for amphibious operations, the Marine Corps was “unable to fully accomplish...home-station unit training to support contingency requirements, service-level exercises, and experimentation and concept development for amphibious operations.”<sup>77</sup> Lieutenant General Beaudreault identified the shortage of available amphibious ships as the primary factor in training limitations. Of the 32 amphibious ships in the U.S. fleet at the time, only 16 were considered “available to support current or contingency operations.”<sup>78</sup> Regrettably, conditions have not improved since then. While infantry battalions can maintain unit-level readiness requirements, their utility depends equally on their ability to deploy in defense of U.S. interests.

Marine aviation in particular is experiencing significant readiness shortfalls. Last year, the *2018 Marine Aviation Plan* found that “[a]cross all of Marine aviation, readiness is below steady-state requirements.”<sup>79</sup> With a smaller force structure and fewer aircraft available for training, aviation units were having difficulty keeping up with demanding operational requirements. Lieutenant General Stephen Rudder, Marine Corps Deputy Commandant for

Aviation, testified in December 2017 that most Marine aviation squadrons lacked the “number of ready aircraft required to ‘fight tonight.’”<sup>80</sup>

In 2019, progress has been made, but the Corps still cites challenges: “[Aviation] readiness trend lines [are] moving up,” but “our backlog of deferred readiness, procurement, and modernization requirements has grown in the last decade and a half and can no longer be ignored,” and Marine aviation is “still challenged with low readiness rates in specific communities.”<sup>81</sup> The Corps has not been explicit in citing specific readiness rates in public testimony, but it is clear that readiness problems remain

despite some improvement in Marine aviation readiness over the past few years.

The Marines Corps’ Ground Equipment Reset Strategy, developed to recover from the strain of years of sustained operations in Iraq and Afghanistan, has had a positive impact after being delayed from the end of FY 2017 to FY 2019. As of May 2019, the Marine Corps had reset approximately 99 percent of its ground equipment and “returned 72% of [its] ground equipment to the operating forces.”<sup>82</sup> Reconstituting equipment and ensuring that the Corps’ inventory can meet operational requirements are critical aspects of readiness.

## Scoring the U.S. Marine Corps

### Capacity Score: Weak

Based on the deployment of Marines across major engagements since the Korean War, the Corps requires roughly 15 battalions for one MRC.<sup>83</sup> This translates to a force of approximately 30 battalions to fight two MRCs simultaneously. The government force-sizing documents that discuss Marine Corps composition support this. Though the documents that make such a recommendation count the Marines by divisions, not battalions, they are consistent in arguing for three Active Marine Corps divisions, which in turn requires roughly 30 battalions.

With a 20 percent strategic reserve, the ideal USMC capacity for a two-MRC force-sizing construct is 36 battalions. Unless a dramatic change in circumstances were to occur, such as the onset of a major conflict, it is unlikely that the Corps will push to expand end strength to this number. In fact, the prevailing federal budget environment and the effects of nearly 20 years of operations on equipment and readiness have led the Corps to prioritize modernization and readiness over force capacity and even to consider trading capacity for improvements in the other two areas.<sup>84</sup>

Manpower is by far the biggest expense for the Marines. As requested for the Corps’ FY 2020 budget, the military personnel account

at \$14.2 billion<sup>85</sup> dwarfs both the funding requested for operations and maintenance (\$3.9 billion)<sup>86</sup> and the funding requested for procurement of new equipment (\$3.1 billion).<sup>87</sup> Nevertheless, the historical record of the use of Marine Corps forces in a major contingency argues for the larger number.

More than 33,000 Marines were deployed in Korea, and more than 44,000 were deployed in Vietnam. In the Persian Gulf, one of the largest Marine Corps missions in U.S. history, some 90,000 Marines were deployed, and approximately 66,000 were deployed for Operation Iraqi Freedom.

As the Persian Gulf War is the most pertinent example for this construct, an operating force of 180,000 Marines is a reasonable benchmark for a two-MRC force, not counting Marines that would be unavailable for deployment (assigned to institutional portions of the Corps) or that are deployed elsewhere. This is supported by government documents that have advocated a force as low as 174,000 (1993 Bottom-Up Review) and as high as 202,000 (2010 Quadrennial Defense Review), with an average end strength of 185,000 being recommended. However, as recent increases in end strength have not corresponded with deployable combat power, these government recommendations may have to be reassessed.

- **Two-MRC Level:** 36 battalions.
- **Actual 2018 Level:** 24 battalions.

Despite an increase in manpower, the Corps continues to operate with less than 67 percent of the number of battalions relative to the two-MRC benchmark. Marine Corps capacity is therefore again scored as “weak.”

**Capability Score: Marginal**

The Corps receives scores of “weak” for “Capability of Equipment,” “marginal” for “Age of Equipment” and “Health of Modernization Programs,” but “strong” for “Size of Modernization Program.” Therefore, the aggregate score for Marine Corps capability is “marginal.”

**Readiness Score: Marginal**

As in FY 2018, the Marine Corps again prioritized next-to-deploy units during FY 2019. As the nation’s crisis response force, the Corps requires that all units, whether deployed or non-deployed, must be ready. However, since most Marine Corps ground units are meeting readiness requirements only immediately before deployment and the Corps’ “ready bench” would “not be as capable as necessary” if deployed on short notice, USMC readiness is sufficient to meet ongoing commitments only at reported deployment-to-dwell ratios of 1:2. This means that only a third of the force—the deployed force—could be considered fully ready. Furthermore, in testimony provided to various committees of the House and Senate

and in its publicly available program documents, the USMC has continued to report challenges in aviation unit readiness.

Marine Corps officials have not been clear as to the status of ground component readiness during FY 2019, but in testimony to Congress during the year, as noted, they have emphasized a positive upward trend as a consequence of additional funding provided by Congress in FY 2018 and FY 2019 and a shift in focus toward high-end conventional warfare. The lack of a “ready bench” in depth (too few units and shortages of personnel in key maintenance fields) and continued challenges in readiness levels among the USMC aircraft fleet perhaps offset some of the gains made by increased effort, funding, and focus, but the *2020 Index* assesses Marine Corps readiness levels as “marginal,” an improvement over the *2019* score of “weak.”

**Overall U.S. Marine Corps Score: Marginal**

Marine Corps congressional testimony during 2019 struck an optimistic note, and increased funding for readiness and an emphasis on modernization give strong support to the Corps’ readiness-recovery efforts, but effects will take time to materialize across the force. Hence, the need for continued attention and support from the Administration and Congress. However, gains have been made over the past year, and the Marine Corps has increased its overall score to “marginal” in the *2020 Index*, which is both in line with its sister services and a welcome return from its overall assessment of “weak” in 2018 and 2019.

**U.S. Military Power: Marine Corps**

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Capacity		✓			
Capability			✓		
Readiness			✓		
<b>OVERALL</b>			✓		



# MARINE CORPS SCORES



Procurement and Spending ■ Through FY 2019 ■ Pending

## Main Battle Tank

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>M1A1 Abrams</b> Inventory: <b>447</b> Fleet age: <b>16</b> Date: <b>1990</b></p> <p>The M1A1 Abrams is the main battle tank and provides the Marine Corps with heavy-armor direct fire capabilities. It is expected to remain in service beyond 2028.</p>	2	1	None		

## Light Wheeled Vehicle

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>HMMWV</b> Inventory: <b>15,390</b> Fleet age: <b>21</b> Date: <b>1983</b></p> <p>The HMMWV is a light wheeled vehicle used to transport troops with some measure of protection against light arms, blast, and fragmentation. The expected life span of the HMMWV is 15 years. Some HMMWVs will be replaced by the Joint Light Tactical Vehicle (JLTV).</p>	2	1	<p><b>Joint Light Tactical Vehicle (JLTV)</b> Timeline: <b>2017-2022</b></p> <p>The JLTV is a vehicle program meant to replace all of the HMMWVs and improve reliability, survivability, and strategic and operational transportability. This is a joint program with the Army. Full-rate production is scheduled for early 2019. JLTVs should be at full operational capability in FY2022. The first set of JLTVs were fielded in March 2019; IOC was achieved in mid-summer 2019 with fielding at Camp Lejeune, NC</p>	5	5
			<p><b>PROCUREMENT</b></p> <p>2,515      12,485</p>	<p><b>SPENDING (\$ millions)</b></p> <p>\$1,001      \$4,999</p>	

**NOTES:** See page 452 for details on fleet ages, dates, and procurement spending. JLTV spending figures reflect the full joint program spending.

# MARINE CORPS SCORES



Procurement and Spending ■ Through FY 2019 ■ Pending

## Amphibious Assault Vehicle

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>AAV</b></p> <p>Inventory: <b>1,200</b> Fleet age: <b>41</b> Date: <b>1972</b></p> <p>The Amphibious Assault Vehicle transports troops and cargo from ship to shore. In September 2018, the USMC cancelled a survivability upgrade for this platform.</p>	1	1	<p><b>Amphibious Combat Vehicle (ACV)</b></p> <p>Timeline: <b>2018–2021</b></p> <p>The ACV is intended to replace the aging AAV. The first ACVs are expected to be fielded in 2020. Full operational capability is scheduled for 2023.</p>	3	5
<p><b>LAV-25</b></p> <p>Inventory: <b>625</b> Fleet age: <b>37</b> Date: <b>1983</b></p> <p>The LAV is a wheeled light armor vehicle with modest amphibious capability used for armored reconnaissance and highly mobile fire support. It has undergone several service life extensions (most recently in 2012) and will be in service until 2035.</p>			2	<p><b>PROCUREMENT</b></p> <p>56 148</p> <p><b>SPENDING (\$ millions)</b></p> <p>\$324 \$811</p>	

## Attack Helicopters

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>AH-1W Super Cobra</b></p> <p>Inventory: <b>77</b> Fleet age: <b>24</b> Date: <b>1986</b></p> <p>The Super Cobra is an attack helicopter that provides the Marines with close air support and armed reconnaissance. The Super Cobra will remain in service until 2021; it is being replaced by the AH-1Z.</p>	1	2	<p><b>AH-1Z</b></p> <p>Timeline: <b>2014–2022</b></p> <p>The new AH-1Z Viper program is part of a larger modification program to the H-1 platform. Replacing the AH-1W, the Z-Variant will serve as the next generation of attack aircraft. The new H-1 rotorcraft will have upgraded avionics, rotor blades, transmissions, landing gear, and structural modifications to enhance speed, maneuverability, and payload. It is scheduled for full operational capability in 2021.</p>	5	4
<p><b>AH-1Z Viper</b></p> <p>Inventory: <b>100</b> Fleet age: <b>6</b> Date: <b>2010</b></p> <p>The AH-1Z Viper is the follow on to the AH-1W Cobra attack helicopter. The Viper has greater speed, payload, and range, as well as a more advanced cockpit. It is gradually replacing the Cobra-variant and should do so fully by 2021. The expected operational life span of the Viper is 30 years.</p>			5	5	<p><b>PROCUREMENT</b></p> <p>187</p> <p><b>SPENDING (\$ millions)</b></p> <p>\$6,314 \$62</p>

NOTE: See page 452 for details on fleet ages, dates, and procurement spending.

# MARINE CORPS SCORES



Procurement and Spending ■ Through FY 2019  
■ Pending

## Airborne Electronic Attack Aircraft/ Ground Attack Aircraft

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<p><b>AV-8B</b></p> <p>Inventory: <b>110</b> Fleet age: <b>28</b> Date: <b>1985</b></p> <p>The Harrier is a vertical/short takeoff and landing aircraft designed to fly from LHA/LHDs. It provides strike and reconnaissance capabilities. The aircraft is being replaced by the F-35B and will be fully retired around 2024.</p>	5	1	<p><b>F-35B/C</b></p> <p>Timeline: <b>2007-2031</b></p> <p>The Corps is purchasing 353 F-35Bs and 67 F-35Cs. The F-35B is the USMC version of the Joint Strike Fighter program. It is meant to replace the AV-8B Harrier, completing transition by 2030. The B-Variant achieved initial operational capability in July 2015. Full operational capability for both variants is expected in the late 2020s.</p>	4	4
<p><b>F-35B</b></p> <p>Inventory: <b>61</b> Fleet age: <b>3</b> Date: <b>2015</b></p> <p>The F-35B is the Marine Corps' short takeoff and vertical landing variant replacing the AV-8B Harrier. Despite some development problems, the F-35B achieved IOC in July 2015.</p>	5	5	<p><b>PROCUREMENT</b></p> <p>98 271</p> <p><b>SPENDING (\$ millions)</b></p> <p>\$19,549 \$35,727</p>		
<p><b>F/A-18 A-D</b></p> <p>Inventory: <b>251</b> Fleet age: <b>29</b> Date: <b>1978</b></p> <p>Many aircraft in the F/A-18 fleet have logged about 8,000 hours compared with the originally intended 6,000. However, the fleet life has been extended until 2030. This is necessary to bridge the gap to when the F-35Bs and F-35Cs are available.</p>	3	2			

NOTE: See page 452 for details on fleet ages, dates, and procurement spending.

# MARINE CORPS SCORES



Procurement and Spending ■ Through FY 2019 ■ Pending

## Medium Lift

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<b>MV-22</b> Inventory: <b>306</b> Fleet age: <b>13</b> Date: <b>2007</b>  The Osprey is a vertical takeoff and landing tilt-rotor platform designed to support expeditionary assault, cargo lift, and raid operations. The program is still in production. The life expectancy of the MV-22 is 23 years.	4	5	<b>MV-22B</b>  Timeline: <b>2007–2019</b>  Fielding of the Osprey is nearly complete, and the platform is meeting performance requirements. The modernization program is not facing any serious issues. Full operational capability is expected in September 2019.	5	5
			<b>PROCUREMENT</b> 	<b>SPENDING (\$ millions)</b> 	

## Heavy Lift

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<b>CH-53E Super Stallion</b> Inventory: <b>138</b> Fleet age: <b>28</b> Date: <b>1981</b>  The CH-53E is a heavy-lift rotorcraft. The aircraft will be replaced by the CH-53K, which will have a greater lift capacity. The program life of the CH-53E is 41 years.	2	1	<b>CH-53K</b>  Timeline: <b>2017–2029</b>  The program is in development. It is meant to replace the CH-53E and provide increased range, survivability, and payload. The program still has not fully developed the critical technology necessary. The program is expected to reach initial operational capability in December 2019 and full operational capability in 2029.	5	3
			<b>PROCUREMENT</b> 	<b>SPENDING (\$ millions)</b> 	

## Tanker

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<b>KC-130J</b> Inventory: <b>45</b> Fleet age: <b>8</b> Date: <b>2005</b>  The KC-130J is both a tanker and transport aircraft. It can transport troops, provide imagery reconnaissance, and perform tactical aerial refueling. This platform is currently in production. The airframe is expected to last 38 years.	4	5	<b>KC-130J</b>  Timeline: <b>2005–2031</b>  The KC-130J is both a tanker and transport aircraft. The procurement program for the KC-130J is not facing acquisition problems.	4	4
			<b>PROCUREMENT</b> 	<b>SPENDING (\$ millions)</b> 	

**NOTES:** See Methodology for descriptions of scores. The Fleet age is the average between the last year of procurement and the first year of initial operational capability. The date is when the platform reached initial operational capability. The timeline is from the start of the platform's program to its budgetary conclusion. Spending does not include advanced procurement or research, development, test, and evaluation. The total program dollar value reflects the full F-35 joint program, including engine procurement. As part of the F-35 program, the Navy is purchasing 67 F-35Cs for the U.S. Marine Corps, which are included here. The MV-22B program also includes some costs from the U.S. Air Force procurement. The AH-1Z costs include costs of UH-1 procurement.

# U.S. Marine Corps Modernization Table Citations

## MAIN SOURCES

- U.S. Department of the Navy, *Department of Defense Fiscal Year (FY) 2020 Budget Estimates, Navy, Justification Book Volume 1 of 3: Aircraft Procurement, Navy, Budget Activities 01–04*, March 2019, [https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/APN\\_BA1-4\\_BOOK.pdf](https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/APN_BA1-4_BOOK.pdf) (accessed September 5, 2019).
- U.S. Department of the Navy, *Department of Defense Fiscal Year (FY) 2020 Budget Estimates, Navy, Justification Book Volume 2 of 3: Aircraft Procurement, Navy Budget, Activity 05*, March 2019, [https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/APN\\_BA5\\_BOOK.pdf](https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/APN_BA5_BOOK.pdf) (accessed September 5, 2019).
- U.S. Department of the Navy, *Department of Defense Fiscal Year (FY) 2020 Budget Estimates, Navy, Justification Book Volume 1 of 1: Procurement, Marine Corps*, March 2019, [https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/PMC\\_Book.pdf](https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/PMC_Book.pdf) (accessed September 6, 2019).
- U.S. Marine Corps, Concepts and Programs, “F-35B and F-35C Lightning II,” <https://www.candp.marines.mil/Programs/Focus-Area-4-Modernization-Technology/Part-5-Aviation/F-35B-and-F-35C-Lightning-II/> (accessed September 6, 2019).

## MISC. SOURCES

### M1A1 Abrams:

- “M1A2 Abrams Main Battle Tank,” Military.com, <https://www.military.com/equipment/m1a2-abrams-main-battle-tank> (accessed September 6, 2019).

### HMMWV:

- Grant Turnball, “End of an Icon: The Rise and Fall of the Humvee,” *army-technology.com*, September 30, 2014, <https://web.archive.org/web/20141030021334/http://www.army-technology.com/features/featureend-of-an-icon-the-rise-and-fall-of-the-humvee-4381884/> (accessed June 26, 2019).
- Jeff Schogol, “Why the Hell Are Marines Still Driving Humvees?” *Marine Corps Times*, November 20, 2017, <https://www.marinecorpstimes.com/news/your-marine-corps/2017/11/21/why-the-hell-are-marines-still-driving-humvees/> (accessed September 6, 2019).
- Megan Eckstein, “Marine Corps Fields First JLTV This Week; IOC Planned for July,” *U.S. Naval Institute News*, February 27, 2019, <https://news.usni.org/2019/02/27/marine-corps-fields-first-jltv-week-ioc-declaration-planned-july> (accessed September 6, 2019).
- U.S. Marine Corps, Concepts and Programs, “Joint Light Tactical Vehicle,” <https://www.candp.marines.mil/Programs/Focus-Area-4-Modernization-Technology/Part-3-Ground-Combat-Tactical-Vehicles/Joint-Light-Tactical-Vehicle-Family-of-Vehicles/> (accessed September 6, 2019).
- Todd South, “These Marine Units Are the First to Field the Newest Ground Combat Vehicle, the JLTV,” *Marine Corps Times*, February 28, 2019, <https://www.marinecorpstimes.com/news/your-marine-corps/2019/02/28/these-marine-units-are-the-first-to-field-the-newest-ground-combat-vehicle-the-jltv/> (accessed September 6, 2019).
- Matthew Cox, “Marine Corps to Increase JLTV Buy to 15,000 to Replace Its Humvee Fleet,” *Military.com*, August 15, 2019, <https://www.military.com/daily-news/2019/08/15/marine-corps-increase-jltv-buy-15000-replace-its-humvee-fleet.html> (accessed September 6, 2019).

### Amphibious Assault Vehicle:

- Andrew Feickert, “Marine Corps Amphibious Combat Vehicle (ACV): Background and Issues for Congress,” *Congressional Research Service Report for Members and Committees of Congress*, updated June 28, 2019, <https://fas.org/sgp/crs/weapons/R42723.pdf> (accessed September 6, 2019).
- Jen Judson, “US Marine Corps Kills Amphibious Assault Vehicle Upgrade Program,” *Defense News*, September 23, 2018, <https://www.defensenews.com/land/2018/09/24/us-marine-corps-kills-amphibious-assault-vehicle-upgrade-program/> (accessed September 6, 2019).
- U.S. Marine Corps, Concepts and Programs, “Amphibious Combat Vehicle 1.1,” <https://www.candp.marines.mil/Programs/Focus-Area-4-Modernization-Technology/Part-3-Ground-Combat-Tactical-Vehicles/Amphibious-Combat-Vehicle/> (accessed September 6, 2019).
- U.S. Marine Corps, “PEO Land Systems,” <https://www.marcorsyscom.marines.mil/PEOs/-PEO-LS/PM-AAA/> (accessed September 6, 2019).

### LAV-25:

- “LAV-25 Armored Reconnaissance Vehicle,” *Military-Today.com*, [http://www.military-today.com/apc/lav\\_25.htm](http://www.military-today.com/apc/lav_25.htm) (accessed September 6, 2019).

#### **AH-1W Cobra:**

- “AH-1W/AH-1Z Super Cobra Attack Helicopter,” Naval Technology, <https://www.naval-technology.com/projects/ah1w-supercobra-helicopter/> (accessed September 6, 2019).
- U.S. Marine Corps, “AH-1W Cobra,” <https://web.archive.org/web/20070816230216/http://hqinet001.hqmc.usmc.mil/AVN/documents/aircraft/rotarywing/ah1.htm> (accessed September 6, 2019).

#### **AH-1Z Viper:**

- Zaal Tchkuaseli, “AH-1Z Viper Attack Helicopter,” Military-Today.com, [http://www.military-today.com/helicopters/ah1z\\_viper.htm](http://www.military-today.com/helicopters/ah1z_viper.htm) (accessed September 6, 2019).
- John Keller, “Navy Asks Bell to Build 25 AH-1Z Viper Attack Helicopters and Avionics for Marine Corps,” *Military & Aerospace Electronics*, January 21, 2019, <https://www.militaryaerospace.com/sensors/article/16722056/navy-asks-bell-to-build-25-ah1z-viper-attack-helicopters-and-avionics-for-marine-corps> (accessed September 6, 2019).
- U.S. Marine Corps, Concepts and Programs, “H-1,” <https://www.candp.marines.mil/Programs/Focus-Area-4-Modernization-Technology/Part-5-Aviation/H-1/> (accessed September 6, 2019).

#### **AV-8B:**

- Boeing, “AV-8B Harrier II (V/STOL) Aircraft,” <https://www.boeing.com/history/products/av-8-harrier-ii.page> (accessed September 6, 2019).
- Dan Alex, “Boeing (BAE Systems / McDonnell Douglas) AV-8B Harrier II,” Military Factory, edited October 17, 2018, [https://www.militaryfactory.com/aircraft/detail.asp?aircraft\\_id=47](https://www.militaryfactory.com/aircraft/detail.asp?aircraft_id=47) (accessed September 6, 2019).

#### **F-35B:**

- Lockheed Martin, “F-35B Lightning II,” *F-35 Lightning II Lockheed Martin*, <https://www.f35.com/about/variants/f35b> (accessed September 6, 2019).

#### **F/A-18 A-D**

- Boeing, “Defense, Space & Security: F/A-18 Hornet,” last updated July 29, 2005, [https://web.archive.org/web/20120521030622/http://www.boeing.com/defense-space/military/fa18/fa18\\_milestones.htm](https://web.archive.org/web/20120521030622/http://www.boeing.com/defense-space/military/fa18/fa18_milestones.htm) (accessed September 6, 2019).

#### **MV-22**

- U.S. Marine Corps, Concepts and Programs, “MV-22B Osprey,” <https://www.candp.marines.mil/Programs/Focus-Area-4-Modernization-Technology/Part-5-Aviation/MV-22B-Osprey/> (accessed September 6, 2019).
- U.S. Marine Corps, Marine Aviation, “Tilt Rotor: V-22 Osprey,” <https://www.aviation.marines.mil/About/Aircraft/Tilt-Rotor/> (accessed September 6, 2019).

#### **CH-53E Sea Stallion:**

- “CH-53E Super Stallion,” Military.com, <https://www.military.com/equipment/ch-53e-super-stallion> (accessed September 6, 2019).
- “CH-53E Super Stallion Heavy-Lift Helicopter,” Air Force Technology, <https://www.airforce-technology.com/projects/sikorsky-ch53e-super-stallion/> (accessed September 6, 2019).
- U.S. Marine Corps, Concepts and Programs, “CH-53K King Stallion,” <https://www.candp.marines.mil/Programs/Focus-Area-4-Modernization-Technology/Part-5-Aviation/CH-53K/> (accessed September 6, 2019).

#### **KC-130J:**

- U.S. Marine Corps, Concepts and Programs, “KC-130J Hercules,” <https://www.candp.marines.mil/Programs/Focus-Area-4-Modernization-Technology/Part-5-Aviation/KC-130J/> (accessed September 6, 2019).

## Endnotes

1. U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, 2019, pp. 1-4 and 2-8, [https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/Highlights\\_book.pdf](https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/Highlights_book.pdf) (accessed August 26, 2019).
2. *National Security Strategy of the United States of America*, The White House, December 2017, p. 47 (maintain a responsive forward presence in the Indo-Pacific region) and p. 49 (provide protection from terrorist attacks in the Middle East), <https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf> (accessed August 27, 2019); James Mattis, U.S. Secretary of Defense, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge*, U.S. Department of Defense, p. 4 (key objectives highlight the need to defend, dissuade, deter, and prevent aggressors from acting against U.S. interests), <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf> (accessed August 27, 2019); and General David H. Berger, Commandant of the Marine Corps, "Commandant's Planning Guidance: 38th Commandant of the Marine Corps," p. 1 (directs the Corps to be "trained and equipped as a naval expeditionary force-in-readiness..first on the scene, first to help, first to contain a brewing crisis, and first to fight if required to do so"), [https://www.hqmc.marines.mil/Portals/142/Docs/%2038th%20Commandant%27s%20Planning%20Guidance\\_2019.pdf?ver=2019-07-16-200152-700](https://www.hqmc.marines.mil/Portals/142/Docs/%2038th%20Commandant%27s%20Planning%20Guidance_2019.pdf?ver=2019-07-16-200152-700) (accessed August 27, 2019).
3. General Joseph Dunford, Commandant, United States Marine Corps, statement on Marine Corps readiness before the Subcommittee on Defense, Committee on Appropriations, U.S. House of Representatives, February 26, 2015, p. 10, [http://www.hqmc.marines.mil/Portals/142/Docs/CMC%20Testimony%202015/USMC%20FY16%20Written%20Posture%20Statement\\_FINAL.pdf](http://www.hqmc.marines.mil/Portals/142/Docs/CMC%20Testimony%202015/USMC%20FY16%20Written%20Posture%20Statement_FINAL.pdf) (accessed August 22, 2019).
4. U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, *United States Department of Defense Fiscal Year 2019 Budget Request: Defense Budget Overview*, revised February 13, 2018, p. 3-13, [https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2019/FY2019\\_Budget\\_Request\\_Overview\\_Book.pdf](https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2019/FY2019_Budget_Request_Overview_Book.pdf) (accessed August 22, 2019).
5. To be clear, the Corps has thought of itself in terms of Marine Air Ground Task Forces (MAGTFs), a collection of ground, aviation, and logistics capabilities under a common commander, for nearly six decades, but because their size and composition vary by task, MAGTFs are not helpful as a consistent reference for capacity; thus, we use battalions as a measure that is generally understood by most students of military affairs. For an expanded discussion, see Dakota L. Wood, *Rebuilding America's Military: The United States Marine Corps*, Heritage Foundation *Special Report* No. 211, March 21, 2019, pp. 15-16, <https://www.heritage.org/defense/report/rebuilding-americas-military-the-united-states-marine-corps>.
6. U.S. Department of the Navy, *Department of the Navy Fiscal Year (FY) 2011 Budget Estimates, Justification of Estimates: Military Personnel, Marine Corps*, February 2010, p. 4, [http://www.secnav.navy.mil/fmc/fmb/Documents/11pres/MPMC\\_Book.pdf](http://www.secnav.navy.mil/fmc/fmb/Documents/11pres/MPMC_Book.pdf) (accessed August 22, 2019).
7. Table A-1, "Combat Force Structure Overview," in U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, *United States Department of Defense Fiscal Year 2016 Budget Request: Overview*, February 2015, p. A-1, [http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2016/FY2016\\_Budget\\_Request\\_Overview\\_Book.pdf](http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2016/FY2016_Budget_Request_Overview_Book.pdf) (accessed August 22, 2019).
8. U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2019 Budget*, 2018, p. 2-6, [http://www.secnav.navy.mil/fmc/fmb/Documents/19pres/Highlights\\_book.pdf](http://www.secnav.navy.mil/fmc/fmb/Documents/19pres/Highlights_book.pdf) (accessed August 22, 2019).
9. General Robert B. Neller, Commandant of the Marine Corps, statement on "The Posture of the United States Marine Corps" before the Committee on Appropriations, U.S. House of Representatives, March 7, 2018, p. 15, <https://docs.house.gov/meetings/AP/AP02/20180307/106932/HHRG-115-AP02-Wstate-NellerR-20180307.pdf> (accessed August 22, 2019).
10. General John Paxton, Assistant Commandant of the Marine Corps, statement on "U.S. Marine Corps Readiness" before the Subcommittee on Readiness, Committee on Armed Services, U.S. Senate, March 15, 2016, p. 8, [https://www.armed-services.senate.gov/imo/media/doc/Paxton\\_03-15-16.pdf](https://www.armed-services.senate.gov/imo/media/doc/Paxton_03-15-16.pdf) (accessed August 22, 2019).
11. Neller, statement on "The Posture of the United States Marine Corps," March 7, 2018, p. 16.
12. U.S. Marine Corps, *2019 Marine Corps Aviation Plan*, p. [39], <https://www.aviation.marines.mil/portals/11/2019%20avplan.pdf> (accessed August 23, 2019); U.S. Marine Corps, *2017 Marine Aviation Plan*, p. 54, [www.aviation.marines.mil/Portals/11/2017%20MARINE%20AVIATION%20PLAN.pdf](http://www.aviation.marines.mil/Portals/11/2017%20MARINE%20AVIATION%20PLAN.pdf) (accessed August 23, 2019); and testimony of Lieutenant General Jon Davis, Deputy Commandant for Aviation, U.S. Marine Corps, in Congressional Quarterly, "House Armed Services Committee Holds Hearing on Aviation Readiness," CQ Congressional Transcripts, July 6, 2016, <http://www.cq.com/doc/congressionaltranscripts-4922435?3&search=IXdIKGHk> (accessed August 23, 2019).
13. U.S. Marine Corps, *2019 Marine Corps Aviation Plan*, p. [14].
14. *Ibid.*, p. [43].

15. The Honorable James F. Geurts, Assistant Secretary of the Navy for Research, Development and Acquisition ASN(RD&A); Lieutenant General Steven Rudder, Deputy Commandant for Aviation; and Rear Admiral Scott Conn, Director Air Warfare, statement on “Department of the Navy Aviation Programs” before the Subcommittee on Seapower, Committee on Armed Services, U.S. Senate, April 10, 2019, p. 3, [https://www.armed-services.senate.gov/imo/media/doc/Geurts\\_Rudder\\_Conn\\_04-10-19.pdf](https://www.armed-services.senate.gov/imo/media/doc/Geurts_Rudder_Conn_04-10-19.pdf) (accessed August 23, 2019).
16. U.S. Marine Corps, *2019 Marine Corps Aviation Plan*, p. [45].
17. Harold C. Hutchinson, “Marines Have Been Flying the Harrier Jet for over 30 Years – Here’s Why They Still Keep It Around,” *Business Insider*, August 1, 2018, <https://www.businessinsider.com/why-marines-still-love-av-8b-harrier-after-decades-of-us-2018-8> (accessed August 23, 2019), and U.S. Marine Corps, *2019 Marine Corps Aviation Plan*, p. [51].
18. U.S. Marine Corps, *2018 Marine Aviation Plan*, p. 10, <https://www.aviation.marines.mil/Portals/11/2018%20AvPlan%20FINAL.pdf> (accessed August 23, 2019), and Lieutenant General Steven R. Rudder, Deputy Commandant for Aviation, U.S. Marine Corps, statement on “Aviation Readiness” before the Subcommittee on Readiness, Committee on Armed Services, U.S. House of Representatives, November 9, 2017, p. 7, <https://docs.house.gov/meetings/AS/AS03/20171109/106661/HHRG-115-AS03-Bio-RudderS-20171109.pdf> (accessed August 23, 2019).
19. U.S. Marine Corps, *2019 Marine Aviation Plan*, p. [69].
20. U.S. Marine Corps, *2017 Marine Aviation Plan*, pp. 70 and 76.
21. Lieutenant General Jon Davis, “Naval Aviation Reflections,” *Naval Aviation News*, Vol. 99, No. 3 (Summer 2017), p. 5, [http://navalaviationnews.navylive.dodlive.mil/files/2017/08/NAN-Summer2017\\_web.pdf](http://navalaviationnews.navylive.dodlive.mil/files/2017/08/NAN-Summer2017_web.pdf) (accessed August 23, 2019).
22. Kris Osborn, “Marines: ‘We Plan to Have the MV-22B Osprey for at Least the Next 40 Years,’” *National Interest*, May 2, 2018, <https://nationalinterest.org/blog/the-buzz/marines-%E2%80%9Cwe-plan-have-the-mv-22b-osprey-least-the-next-40-25654> (accessed August 23, 2019).
23. U.S. Marine Corps, *2019 Marine Corps Aviation Plan*, pp. 71 and 70.
24. Geurts, Rudder, and Conn, statement on “Department of the Navy Aviation Programs,” April 10, 2019, p. 8.
25. Lieutenant General Brian D. Beaudreault, Deputy Commandant, Plans, Policies, and Operations, statement on “Amphibious Warfare Readiness and Training—Interoperability, Shortfalls, and the Way Ahead” before the Subcommittee on Readiness, Committee on Armed Services, U.S. House of Representatives, December 1, 2017, p. 3, <https://docs.house.gov/meetings/AS/AS03/20171201/106681/HHRG-115-AS03-Wstate-BeaudreaultB-20171201.pdf> (accessed August 23, 2019).
26. U.S. Navy, Naval Sea Systems Command, Naval Vessel Register, “Fleet Size,” last updated August 20, 2019, <https://www.nvr.navy.mil/NVRSHIPS/FLEETSIZE.HTML> (accessed August 23, 2019).
27. On July 11, 2019, General David Berger assumed command of the U.S. Marine Corps as the 38th Commandant. A short five days later, General Berger issued his Commandant’s Planning Guidance to announce his priorities for the service. Parting with years of practice, General Berger stated that the Corps would “no longer use a ‘2.0 MEB requirement’ as the foundation for our arguments regarding amphibious ship building” and would “no longer reference the 38-ship requirement memo from 2009, or the 2016 Force Structure Assessment, as the basis for” force structure naval amphibious support requirements. Coming in the fourth quarter of FY 2019, it remains to be seen what impact this will have on the Navy’s shipbuilding program. See Megan Eckstein, “Berger Takes Command of Marine Corps, Neller Reflects on 45 Years of Service,” *U.S. Naval Institute News*, July 11, 2019, <https://news.usni.org/2019/07/11/berger-takes-command-of-marine-corps-neller-reflects-on-45-years-of-service> (accessed August 23, 2019); Berger, “Commandant’s Planning Guidance: 38th Commandant of the Marine Corps,” p. 4; and Beaudreault, statement on “Amphibious Warfare Readiness and Training,” December 1, 2017, pp. 4–5.
28. General Glenn Walters, Assistant Commandant of the Marine Corps, statement on “Marine Corps Readiness” before the Subcommittee on Readiness, Committee on Armed Services, U.S. Senate, February 8, 2017, p. 5, [https://www.armed-services.senate.gov/imo/media/doc/Walters\\_02-08-17.pdf](https://www.armed-services.senate.gov/imo/media/doc/Walters_02-08-17.pdf) (accessed August 26, 2019).
29. Berger, “Commandant’s Planning Guidance: 38th Commandant of the Marine Corps,” p. 4.
30. General John Paxton, Assistant Commandant, United States Marine Corps, statement on Marine Corps readiness and FY 2016 budget request before the Subcommittee on Readiness and Management Support, Committee on Armed Services, U.S. Senate, March 25, 2015, pp. 10–11, [http://www.armed-services.senate.gov/imo/media/doc/Paxton\\_03-25-15.pdf](http://www.armed-services.senate.gov/imo/media/doc/Paxton_03-25-15.pdf) (accessed August 26, 2019). The Corps’ emphasis on acquiring the ACV was revalidated during recent congressional testimony; see The Honorable James F. Geurts, Assistant Secretary of the Navy for Research, Development and Acquisition ASN(RD&A), and Lieutenant General David H. Berger, Deputy Commandant, Combat Development and Integration, and Commanding General, Marine Corps Combat Development Command, statement on “Fiscal Year 2020 Navy Modernization Programs” before the Subcommittee on Seapower, Committee on Armed Services, U.S. Senate, April 10, 2019, p. 5, [https://www.armed-services.senate.gov/imo/media/doc/Geurts\\_Berger\\_04-10-19.pdf](https://www.armed-services.senate.gov/imo/media/doc/Geurts_Berger_04-10-19.pdf) (accessed August 23, 2019).



31. Robert B. Neller, Commandant of the Marine Corps, statement on “The Posture of the United States Marine Corps” before the Committee on Armed Services, U.S. Senate, April 19, 2018, p. 8, [https://www.armed-services.senate.gov/imo/media/doc/Neller\\_04-19-18.pdf](https://www.armed-services.senate.gov/imo/media/doc/Neller_04-19-18.pdf) (accessed August 27, 2019), and Robert B. Neller, Commandant of the Marine Corps, statement on “The Posture of the United States Marine Corps” before the Subcommittee on Defense, Committee on Appropriations, U.S. Senate, May 1, 2019, p. [9], <https://www.appropriations.senate.gov/imo/media/doc/05.01.19--Neller%20Testimony.pdf> (accessed August 26, 2019).
32. Lieutenant General Michael Dana, Deputy Commandant, Installations and Logistics, statement on “Marine Corps Readiness” before the Subcommittee on Readiness, Committee on Armed Services, U.S. House of Representatives, March 6, 2018, p. 3, <https://docs.house.gov/meetings/AS/AS03/20180306/106942/HHRG-115-AS03-Wstate-DanaM-20180306.pdf> (accessed August 26, 2019).
33. Megan Eckstein, “Marine Corps Cancels AAV Survivability Upgrade,” U.S. Naval Institute News, September 25, 2018 <https://news.usni.org/2018/09/25/marine-corps-cancels-aav-survivability-upgrade> (accessed August 26, 2019).
34. Lieutenant General Robert S. Walsh, Deputy Commandant, Combat Development and Integration, and Commanding General, Marine Corps Combat Development Command, and Brigadier General Joseph Shrader, Commander, Marine Corps Systems Command, statement on “Fiscal Year 2019 Ground Forces Modernization Programs” before the Subcommittee on Tactical Air and Land Forces, Committee on Armed Services, U.S. House of Representatives, April 18, 2018, p. 10, <https://docs.house.gov/meetings/AS/AS25/20180418/108159/HHRG-115-AS25-Wstate-ShraderJ-20180418.pdf> (accessed August 26, 2019).
35. The average age of the M1A1 was 26 in 2016. Paxton, statement on “U.S. Marine Corps Readiness,” March 15, 2016, p. 15. No new M1A1 Abrams have been commissioned since that time, so the average age is estimated as 28 in 2018.
36. Chart, “Ground Equipment Age,” in U.S. Marine Corps, *U.S. Marine Corps Concepts and Programs*. “Ground Equipment Age,” last revised April 3, 2014, p. 261, [https://www.candp.marines.mil/Portals/216/documents/CNP%20Publications/CNP\\_2014.pdf?ver=2018-03-08-090028-247](https://www.candp.marines.mil/Portals/216/documents/CNP%20Publications/CNP_2014.pdf?ver=2018-03-08-090028-247) (accessed August 26, 2019).
37. Neller, statement on “The Posture of the United States Marine Corps,” May 1, 2019, p. [9]; U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, p. 4-13; and Walsh and Shrader, statement on “Fiscal Year 2019 Ground Forces Modernization Programs,” April 18, 2018, p. 9.
38. International Institute for Strategic Studies, *The Military Balance 2018: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2017), p. 53, and U.S. Marine Corps, *2018 Marine Aviation Plan*, p. 45.
39. U.S. Marine Corps, *2018 Marine Aviation Plan*, p. 44.
40. Geurts, Rudder, and Conn, statement on “Department of the Navy Aviation Programs,” April 10, 2019, p. 4.
41. *Ibid.*, p. 3.
42. U.S. Marine Corps, *2018 Marine Aviation Plan*, p. 56.
43. Vice Admiral Paul Grosklags, Representing Assistant Secretary of the Navy (Research, Development and Acquisition); Lieutenant General Jon Davis, Deputy Commandant for Aviation; and Rear Admiral Michael C. Manazir, Director Air Warfare, statement on “Department of the Navy’s Aviation Programs” before the Subcommittee on Seapower, Committee on Armed Services, U.S. Senate, April 20, 2016, p. 3, [http://www.armed-services.senate.gov/imo/media/doc/Grosklags-Davis-Manazir\\_04-20-16.pdf](http://www.armed-services.senate.gov/imo/media/doc/Grosklags-Davis-Manazir_04-20-16.pdf) (accessed August 23, 2019), and U.S. Marine Corps, *2018 Marine Aviation Plan*, p. 36.
44. Megan Eckstein, “Marines Declare Initial Operational Capability on F-35B Joint Strike Fighter,” U.S. Naval Institute News, July 31, 2015, <https://news.usni.org/2015/07/31/marines-declare-initial-operational-capability-on-f-35b-joint-strike-fighter> (accessed August 23, 2019), and U.S. Marine Corps, *2019 Marine Corps Aviation Plan*, p. 36.
45. Gina Harkins, “Marine F-35s Dropped a Bunch of Bombs on ISIS During 1st Middle East Deployment,” Military.com, February 25, 2019, <https://www.military.com/daily-news/2019/02/25/marine-f-35s-dropped-bunch-bombs-isis-during-1st-middle-east-deployment.html> (accessed August 23, 2019).
46. U.S. Marine Corps, *2019 Marine Corps Aviation Plan*, pp. 36 and 39.
47. U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, *United States Department of Defense Fiscal Year 2018 Budget Request: Program Acquisition Cost by Weapon System*, May 2017, pp. 3-2 and 3-9, [http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2018/fy2018\\_Weapons.pdf](http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2018/fy2018_Weapons.pdf) (accessed August 26, 2019).
48. Andrew Feickert, “Joint Light Tactical Vehicle (JLTV): Background and Issues for Congress,” Congressional Research Service *Report for Members and Committees Congress*, updated June 24, 2019, pp. 1-2, <https://fas.org/sgp/crs/weapons/RS22942.pdf> (accessed August 26, 2019).
49. Joe Gould, “Oshkosh Awaits Protest After JLTV Win,” *Defense News*, August 29, 2015, <http://www.defensenews.com/story/defense/land/vehicles/2015/08/29/oshkosh-awaits-protests-jltv-win/71325838> (accessed August 26, 2019).

50. Testimony of John M. Garner, Program Executive Office, Land Systems Marine Corps, in stenographic transcript of *Hearing to Receive Testimony on Marine Corps Ground Modernization in Review of the Defense Authorization Request for Fiscal Year 2018 and the Future Years Defense Program*, Subcommittee on Seapower, Committee on Armed Services, U.S. Senate, June 6, 2017, p. 63, [https://www.armed-services.senate.gov/imo/media/doc/17-56\\_06-06-17.pdf](https://www.armed-services.senate.gov/imo/media/doc/17-56_06-06-17.pdf) (accessed August 26, 2019).
51. Matthew Cox, “Marine Corps to Increase JLTV Buy to 15,000 to Replace Its Humvee Fleet,” *Military.com*, August 15, 2019, <https://www.military.com/daily-news/2019/08/15/marine-corps-increase-jltv-buy-15000-replace-its-humvee-fleet.html> (accessed August 26, 2019).
52. “Marine Infantry Battalion Becomes First Operational Unit to Receive JLTVs,” *Seapower*, July 24, 2019, <https://seapowermagazine.org/marine-infantry-battalion-becomes-first-operational-unit-to-receive-jltvs/> (accessed August 26, 2019).
53. U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, *United States Department of Defense Fiscal Year 2018 Budget Request: Program Acquisition Cost by Weapon System*, p. 3-9.
54. Andrew Feickert, “Marine Corps Amphibious Combat Vehicle (ACV): Background and Issues for Congress,” Congressional Research Service *Report for Members and Committees of Congress*, updated June 28, 2019, Summary, <https://www.fas.org/sgp/crs/weapons/R42723.pdf> (accessed August 26, 2019).
55. Lieutenant General Kenneth J. Glueck Jr., Deputy Commandant, Combat Development and Integration, and Commanding General, Marine Corps Combat Development Command, and Thomas P. Dee, Deputy Assistant Secretary of the Navy, Expeditionary Programs and Logistics Management, statement on “Marine Corps Modernization” before the Subcommittee on Seapower, Committee on Armed Services, U.S. Senate, March 11, 2015, pp. 8–9, [https://www.armed-services.senate.gov/imo/media/doc/Glueck-Dee\\_03-11-15.pdf](https://www.armed-services.senate.gov/imo/media/doc/Glueck-Dee_03-11-15.pdf) (accessed August 26, 2019).
56. With regard to this overall requirement—armored lift for 10 battalions of infantry—the AAV Survivability Upgrade Program would provide for four battalions, and ACV 1.1 and ACV 1.2 would account for six battalions. *Ibid.*, pp. 7–8.
57. Jen Judson, “BAE Wins Marine Corps Contract to Build New Amphibious Combat Vehicle,” *Defense News*, June 19, 2018, <https://www.defensenews.com/land/2018/06/19/bae-wins-marine-corps-contract-to-build-new-amphibious-combat-vehicle/> (accessed August 26, 2019).
58. Feickert, “Marine Corps Amphibious Combat Vehicle (ACV),” pp. 6, 7, 8, and 9.
59. Dunford, statement on Marine Corps readiness, February 26, 2015, p. 28.
60. U.S. Department of the Navy, Office of Budget, *Highlights of the Department of the Navy FY 2020 Budget*, pp. A-10 and A-14.
61. Lieutenant General Brian Beaudreault, U.S. Marine Corps, Deputy Commandant, Plans, Policies, and Operations, statement on “Marine Corps Readiness” before the Subcommittee on Readiness, Committee on Armed Services, U.S. House of Representatives, March 6, 2018, p. 5, <https://docs.house.gov/meetings/AS/AS03/20180306/106942/HHRG-115-AS03-Wstate-BeaudreaultB-20180306.pdf> (accessed August 23, 2019).
62. Grosklags, Davis, and Manazir, statement on “Department of the Navy’s Aviation Programs,” April 20, 2016, p. 7.
63. U.S. Marine Corps, *2019 Marine Corps Aviation Plan*, pp. 36 and 39.
64. U.S. Department of Defense, *Selected Acquisition Report (SAR): V-22 Osprey Joint Services Advanced Vertical Lift Aircraft (V22) as of FY 2019 President’s Budget*, RCS: DD-A&T(Q&A)823-212, March 12, 2018, p. 63, [https://www.esd.whs.mil/Portals/54/Documents/FOID/Reading%20Room/Selected\\_Acquisition\\_Reports/18-F-1016\\_DOC\\_82\\_Navy\\_V-22\\_SAR\\_Dec\\_2017.pdf](https://www.esd.whs.mil/Portals/54/Documents/FOID/Reading%20Room/Selected_Acquisition_Reports/18-F-1016_DOC_82_Navy_V-22_SAR_Dec_2017.pdf) (accessed August 26, 2019).
65. U.S. Marine Corps, *2019 Marine Corps Aviation Plan*, p. 72.
66. U.S. Marine Corps, *2018 Marine Aviation Plan*, pp. 76 and 84.
67. U.S. Marine Corps, *2019 Marine Corps Aviation Plan*, pp. 71 and 84.
68. Grosklags, Davis, and Manazir, statement on “Department of the Navy’s Aviation Programs,” April 20, 2016, p. 21.
69. U.S. Government Accountability Office, *Defense Acquisitions: Assessments of Selected Weapons Programs*, GAO-16-329SP, March 2016, p. 93, <http://www.gao.gov/assets/680/676281.pdf> (accessed August 26, 2019), and U.S. Department of Defense, Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, *United States Department of Defense Fiscal Year 2019 Budget Request: Program Acquisition Cost by Weapon System*, February 2018, p. 1-16, [https://comptroller.defense.gov/Portals/45/documents/defbudget/FY2019/FY2019\\_Weapons.pdf](https://comptroller.defense.gov/Portals/45/documents/defbudget/FY2019/FY2019_Weapons.pdf) (accessed August 26, 2019).
70. Geurts, Rudder, and Conn, statement on “Department of the Navy Aviation Programs,” April 10, 2019, p. 9.
71. U.S. Marine Corps, *2019 Marine Corps Aviation Plan*, p. 88.
72. International Institute for Strategic Studies, *The Military Balance 2019: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2019) p. 54, and U.S. Marine Corps, *2019 Marine Corps Aviation Plan*, p. 88.

73. Neller, statement on “The Posture of the United States Marine Corps,” May 1, 2019, p. [1], and reiterated in Berger, “Commandant’s Planning Guidance: 38th Commandant of the Marine Corps,” p. 1.
74. Neller, statement on “The Posture of the United States Marine Corps,” May 1, 2019, p. [15].
75. U.S. Marine Corps, *Commander’s Readiness Handbook*, May 2014, p. iv, <https://www.hqmc.marines.mil/Portals/138/HiRes%20Commanders%20Readiness%20Handbook.pdf> (accessed August 26, 2019).
76. Beaudreault, statement on “Amphibious Warfare Readiness and Training,” December 1, 2017, pp. 6 and 7.
77. Cary B. Russell, Director, Defense Capabilities and Management, U.S. Government Accountability Office, “Navy and Marine Corps Training: Further Planning Needed for Amphibious Operations Training,” GAO-18-212T, testimony before the Subcommittee on Readiness, Committee on Armed Services, U.S. House of Representatives, December 1, 2017, p. 5, <https://docs.house.gov/meetings/AS/AS03/20171201/106681/HHRG-115-AS03-Wstate-RussellC-20171201.pdf> (accessed August 23, 2019).
78. Beaudreault, statement on “Amphibious Warfare Readiness and Training,” December 1, 2017, p. 4.
79. U.S. Marine Corps, *2018 Marine Aviation Plan*, p. 8.
80. Rudder, statement on “Aviation Readiness,” November 9, 2017, p. 3.
81. U.S. Marine Corps, *2019 Marine Corps Aviation Plan*, pp. 6, 10, and 14.
82. Neller, statement on “The Posture of the United States Marine Corps,” May 1, 2019, p. [13].
83. This count is based on an average number of 1.5 divisions deployed to major wars (see Table 3, pp. 311–312) and an average of 10–11 battalions per division.
84. “Senate Armed Service[s] Committee Advance Policy Questions for Lieutenant General David Berger, USMC, Nominee for Appointment to the Grade of General and to Be Commandant of the Marine Corps,” April 30, 2019, p. 16, [https://www.armed-services.senate.gov/imo/media/doc/Berger\\_APQs\\_04-30-19.pdf](https://www.armed-services.senate.gov/imo/media/doc/Berger_APQs_04-30-19.pdf) (accessed August 26, 2019).
85. Exhibit PB-30A, “Summary of Requirements by Budget Program (Active),” in U.S. Department of the Navy, *Department of the Navy Fiscal Year (FY) 2020 Budget Estimates, Justification of Estimates: Military Personnel, Marine Corps (MPMC)*, March 2019, p. 3, [https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/MPMC\\_Book.pdf](https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/MPMC_Book.pdf) (accessed August 26, 2019).
86. Exhibit O-1, “FY 2020 President’s Budget Total Obligational Authority,” February 21, 2019, in U.S. Department of the Navy, *Department of the Navy Fiscal Year (FY) 2020 Budget Estimates, Justification of Estimates: Operations and Maintenance, Marine Corps (OMMC)*, March 2019, p. 10, [https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/OMMC\\_Book.pdf](https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/OMMC_Book.pdf) (accessed August 26, 2019).
87. U.S. Department of the Navy, *Department of Defense Fiscal Year (FY) 2020 Budget Estimates, Navy, Justification Book Volume 1 of 1: Procurement, Marine Corps*, March 2019, p. v, [https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/PMC\\_Book.pdf](https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/PMC_Book.pdf) (accessed August 26, 2019).



# U.S. Nuclear Weapons Capability

In today's rapidly changing world, the U.S. nuclear weapons enterprise must be, in the words of President Donald Trump, "*modern, robust, flexible, resilient, ready and appropriately tailored to deter 21st-century threats and reassure our allies.*"<sup>1</sup> If the U.S. detects a game-changing nuclear weapons development in another country, the nuclear weapons complex must be able to provide a timely response.

After shifting focus away from maintaining nuclear dominance following the Cold War, the U.S. nuclear enterprise must again focus on its main mission. If it is going to continue its policy of deterrence through strength and assure its allies while promoting nuclear non-proliferation, the U.S. must overcome multiple challenges: an aging nuclear stockpile, aging infrastructure, and aging experts combined with an uncertain funding environment and issues surrounding overall force readiness.

The U.S. maintains an inactive stockpile that includes near-term hedge warheads that can be put back into operational status within six to 24 months. Extended hedge warheads purportedly can be made ready within 24 to 60 months.<sup>2</sup> The U.S. preserves upload capability on its strategic delivery vehicles, which means that in principle, the nation could increase the number of nuclear warheads on each type of its delivery vehicles if contingencies warrant. For example, the U.S. Minuteman III intercontinental ballistic missile (ICBM) can carry up to three nuclear warheads, although it is currently deployed with only one.<sup>3</sup>

While the United States preserves these capabilities, increasing capacity would be not only costly, but also difficult and

time-consuming in practice. Certain modernization decisions (e.g., 12 instead of 14 *Columbia*-class ballistic missile submarines, with 16 missile tubes per submarine instead of 24) will limit upload capacity on the strategic submarine force. U.S. heavy bombers will continue to retain a robust upload capability.

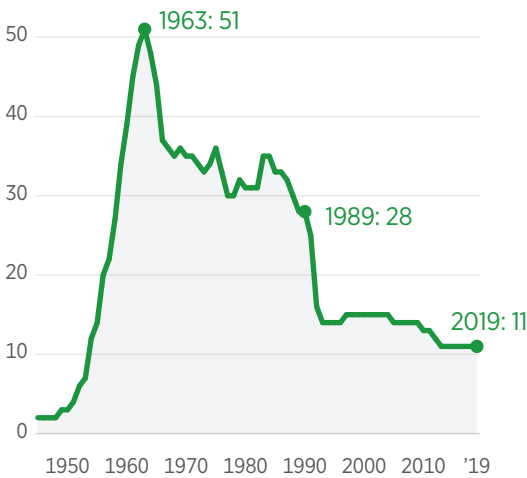
Presidential Decision Directive-15 (PDD-15) requires the U.S. "to maintain the ability to conduct a nuclear test within 24-to-36 months of direction by the President to do so."<sup>4</sup> However, successive governmental reports have noted the continued deterioration of technical and diagnostics equipment and the inability to fill technical positions supporting nuclear testing readiness.<sup>5</sup> A lack of congressional support for improvements in technical readiness further undermines efforts by the National Nuclear Security Administration (NNSA) to comply with the directive.

The nuclear weapons labs face demographic challenges of their own. Most scientists and engineers with practical hands-on experience in nuclear weapon design or testing experience (or both) are retired. This means that the U.S. must rely on the scientific judgment of designers and engineers who were involved neither in nuclear tests nor in weapons design and development and who must now continue to certify weapons designed and tested over 30 years ago.

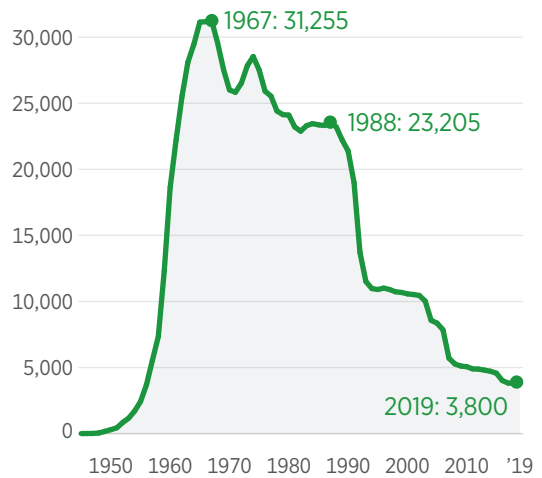
Not all of the existing inactive stockpile will go through life-extension programs (LEPs). Hence, the U.S.'s ability to respond to contingencies by uploading weapons kept in an inactive status will decline with the passage of time. This means that even with LEPs, the U.S. may not be able to sustain the necessary reliability.

## A Smaller and Less Diverse Nuclear Arsenal

TYPES OF WARHEADS IN THE U.S. NUCLEAR STOCKPILE



TOTAL WARHEADS IN THE U.S. NUCLEAR STOCKPILE



**SOURCES:** Robert S. Norris and Hans M. Kristensen, “U.S. Nuclear Warheads, 1945–2009,” *Bulletin of the Atomic Scientists*, 2009, <https://www.tandfonline.com/doi/full/10.2968/065004008> (accessed April 20, 2018); U.S. Department of Energy, *Report to Congress, “Stockpile Stewardship and Management Plan,”* November 2017, [https://www.energy.gov/sites/prod/files/2017/11/f46/fy18ssmp\\_final\\_november\\_2017%5B1%5D\\_0.pdf](https://www.energy.gov/sites/prod/files/2017/11/f46/fy18ssmp_final_november_2017%5B1%5D_0.pdf) (accessed April 23, 2018); U.S. Department of Energy, “Restricted Data Declassification Decisions, 1946 to the Present,” <https://fas.org/sgp/library/rdd-5.html> (accessed April 23, 2018); U.S. Department of Defense, “Stockpile Numbers,” [http://open.defense.gov/Portals/23/Documents/frddwg/2017\\_Tables\\_UNCLASS.pdf](http://open.defense.gov/Portals/23/Documents/frddwg/2017_Tables_UNCLASS.pdf) (accessed April 23, 2018); Hans M. Kristensen and Matt Korda, “United States Nuclear Forces, 2019,” *Bulletin of the Atomic Scientists*, April 29, 2019, <https://www.tandfonline.com/doi/pdf/10.1080/00963402.2019.1606503?needAccess=true> (accessed July 11, 2019); and Hans M. Kristensen and Matt Korda, “Status of World Nuclear Forces,” May 2019, <https://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/> (accessed July 11, 2019).

heritage.org

After the end of the Cold War, the shift in emphasis away from the nuclear mission caused the nuclear laboratories to lose a sense of purpose. They felt compelled to reorient and broaden their mission focus. According to a number of studies, their relationship with the government also evolved in ways that reduced output and increased costs. The NNSA was supposed to address these problems but has largely failed in this task, partly because “the relationship with the NNSA and the National security labs appears [to] be broken.”<sup>6</sup>

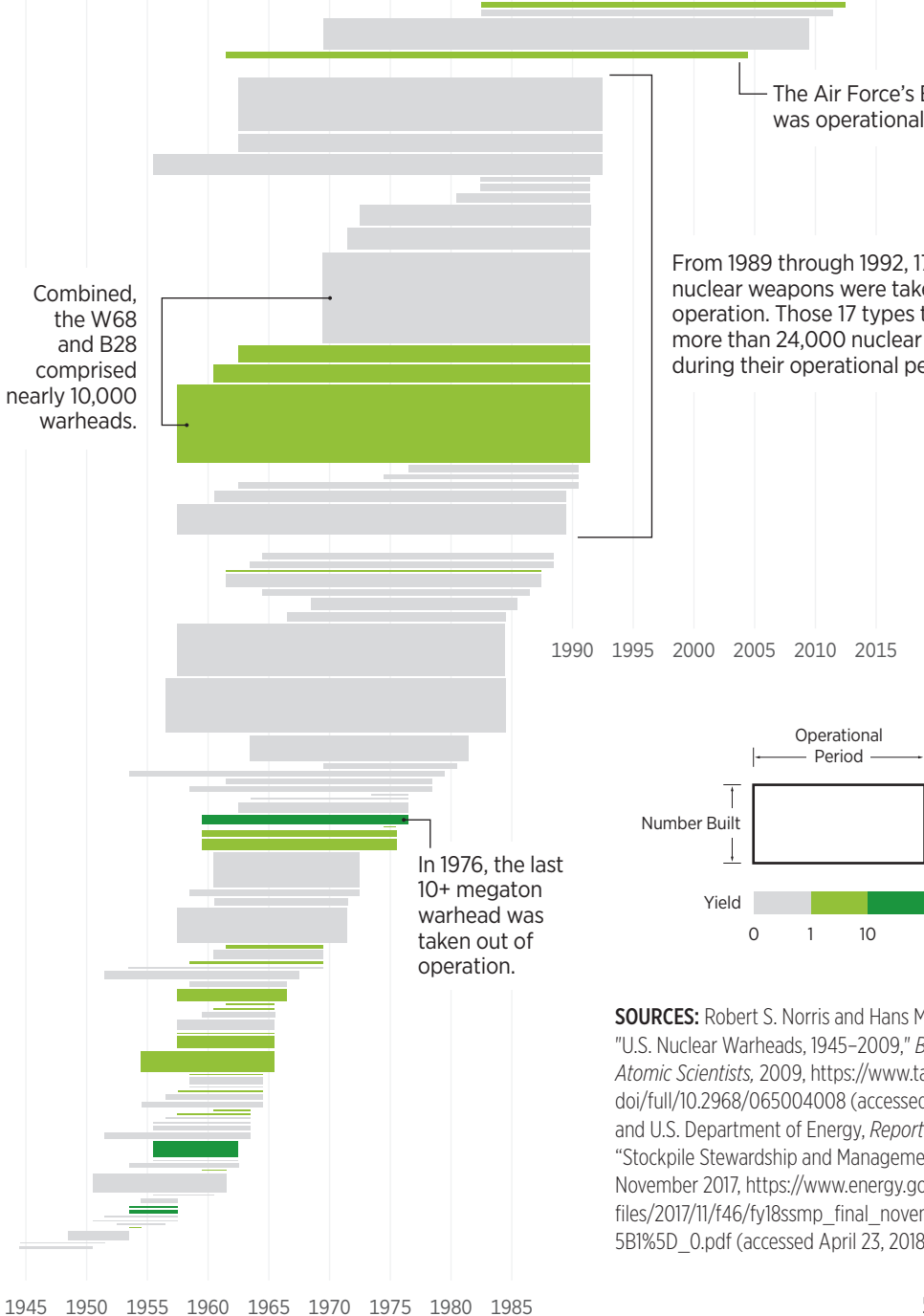
In 1999, the Commission on Maintaining U.S. Nuclear Weapons Expertise concluded

that 34 percent of the employees supplying critical skills to the weapons program were more than 50 years old. Almost 19 percent of the NNSA’s workforce is eligible for retirement, and the number will likely increase to 38.5 percent in fiscal year (FY) 2023.<sup>7</sup> On average, the U.S. high-technology industry has a more balanced employee age distribution.<sup>8</sup>

Both the lack of resources and the lack of sound, consistent policy guidance have undermined workforce morale. The Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise recommended fundamental changes in the nuclear weapons

# A Brief History of the Shrinking U.S. Nuclear Arsenal

1945 1950 1955 1960 1965 1970



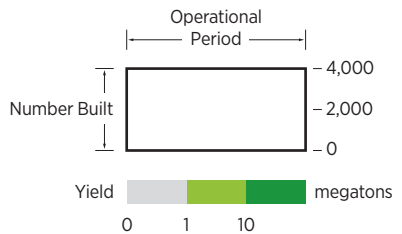
The bulk of the current nuclear arsenal was first developed in the 1980s.

The Air Force's B53 bomb was operational for 43 years.

From 1989 through 1992, 17 types of nuclear weapons were taken out of operation. Those 17 types totaled more than 24,000 nuclear warheads during their operational periods.

Combined, the W68 and B28 comprised nearly 10,000 warheads.

In 1976, the last 10+ megaton warhead was taken out of operation.



**SOURCES:** Robert S. Norris and Hans M. Kristensen, "U.S. Nuclear Warheads, 1945–2009," *Bulletin of the Atomic Scientists*, 2009, <https://www.tandfonline.com/doi/full/10.2968/065004008> (accessed April 20, 2018), and U.S. Department of Energy, *Report to Congress, "Stockpile Stewardship and Management Plan,"* November 2017, [https://www.energy.gov/sites/prod/files/2017/11/f46/fy18ssmp\\_final\\_november\\_2017%5B1%5D\\_0.pdf](https://www.energy.gov/sites/prod/files/2017/11/f46/fy18ssmp_final_november_2017%5B1%5D_0.pdf) (accessed April 23, 2018).

enterprise's culture, business practices, project management, and organization. Others proposed moving the NNSA to the Department of Defense (DOD).<sup>9</sup>

The U.S. nuclear laboratories must rediscover their mission focus so that they can be ready to meet the challenges that lie ahead.

The readiness of forces that operate U.S. nuclear systems is another important indication of the health of the overall force. Despite the changes instituted by the Air Force following mishaps in 2006 and 2007, success was limited, as evidenced by further mishaps. In January 2014, for example, the Air Force discovered widespread cheating on nuclear proficiency exams and charged over 100 officers with misconduct. The Navy had a similar problem, albeit on a smaller scale.<sup>10</sup>

The DOD conducted two nuclear enterprise reviews, one internal and one external. Both reviews identified a lack of leadership attention, a lack of resources with which to modernize the atrophied infrastructure, and unduly burdensome implementation of the personnel reliability program as some of the core challenges preventing a sole focus on accomplishing the nuclear mission.<sup>11</sup>

In 2014, the Secretary of Defense created the Nuclear Deterrent Enterprise Review Group (NDERG) to ensure the long-term health of the nuclear enterprise by addressing resourcing, personnel, organizational, and enterprise policy issues. In the past several years, the DOD has significantly improved morale throughout the nuclear weapons enterprise by forcefully stating (and at the highest levels) that nuclear deterrence is the DOD's "number one job" and that related modernization programs still receive the highest priority. Recently, the Government Accountability Office found that the DOD not only has made significant progress in implementing the recommendations from the 2014 nuclear enterprise reviews and a 2015 NC3 review, but also has improved its tracking and evaluation of this progress.<sup>12</sup>

Among other things, the ICBM Force Improvement Program was initiated and mostly implemented throughout 2014 and into 2015,

and the Air Force shifted over \$160 million to address problems, modernize certain facilities, and generally improve morale. The Air Force also has seen an increase in badly needed manpower, although not enough of an increase to alleviate manpower concerns. If changes in the nuclear enterprise are to be effective, leaders across the executive and legislative branches must continue to provide the resources and attention needed to mitigate readiness and morale issues within the force.

In the past, fiscal uncertainty and a steady decline in resources for the nuclear weapons enterprise have had a negative effect on the nuclear deterrence mission. As David Trachtenberg, Deputy Under Secretary of Defense for Policy, testified in March 2019:

For decades, the United States led the world in efforts to reduce the role and number of nuclear weapons.... Overall, the U.S. nuclear weapons stockpile has drawn down by more than 85 percent from its Cold War high.

Unfortunately Russia and China have chosen a different path and have increased the role of nuclear weapons in their strategies and actively increased the size and sophistication of their nuclear forces.

For this reason, a robust and modern U.S. nuclear deterrent helps ensure the United States competes from a position of strength and can deter nuclear attack and prevent large-scale conventional warfare between nuclear-armed states for the foreseeable future.<sup>13</sup>

In recent years, bipartisan congressional support for the nuclear mission has been strong, and additional funding has been provided for nuclear modernization. It is critical that this bipartisan consensus be preserved as these programs mature and begin to introduce modern nuclear systems to the force.

The Trump Administration has inherited an insufficiently funded comprehensive



modernization program for nuclear forces: warheads, delivery systems, and command and control. The Obama Administration included this program in its budget requests, and Congress has funded it to some extent while constraining the ability of the enterprise to execute its mission (e.g., by allocating inadequate funding for pit production). Because such modernization activities require consistent, stable, long-term funding commitments, it is essential that Congress continue to invest in the cornerstone of our nation's security.

The Trump Administration's 2018 NPR recognized worsening security conditions, the rise of competition with a revisionist and resurgent Russia, an increasingly threatening China, and other growing strategic threats.<sup>14</sup> It also called for the tailoring of U.S. nuclear deterrence strategies and rearticulated the importance of deterring any large-scale attack against the U.S., its allies, or partners as a key priority of U.S. nuclear weapons policy. To that end, the 2018 NPR called for modernization of nuclear weapons and the nuclear weapons complex, as well as significant reinvestments in the nuclear triad (intercontinental-range ballistic missiles, *Columbia*-class submarines, bombers, and associated infrastructure), and proposed two additional nuclear capabilities: a low-yield warhead for strategic submarine-launched ballistic missiles (SLBMs) in the near term and a low-yield, nuclear-armed, sea-launched cruise missile in the longer term.

### Implications for U.S. National Security

U.S. nuclear forces are not designed to shield the nation from all types of attacks from all adversaries. They are designed to deter large-scale attacks that threaten America's sovereignty, allies, and forward-deployed troops and to assure our allies and partners.

U.S. nuclear forces play an absolutely essential role in underpinning the broad non-proliferation regime by providing security guarantees that assure allies, including NATO, Japan, and South Korea, that they can forgo development of nuclear capabilities. In part, U.S. deterrence capabilities also enable the United

Kingdom and France to limit their numbers of nuclear weapons to levels to which they might not otherwise agree.

North Korea has demonstrated that a country with limited intellectual and financial resources can develop a nuclear weapon. Despite U.S. and international pressure, Iran appears to be continuing on a path that largely retains its ability to develop a nuclear weapon capability. In such an international climate, U.S. nuclear assurances to allies and partners become ever more important. If the credibility of American nuclear forces continues to degrade, for example, countries like Japan or South Korea could choose to pursue an independent nuclear option, adding to instability across the region.

Several negative trends could undermine the overall effectiveness of U.S. nuclear deterrence if not addressed. Adversaries—particularly Russia and China—are modernizing their nuclear forces. Additional challenges include increasingly aged nuclear warheads; an aging and crumbling nuclear weapons infrastructure; an aging workforce; and the need to fully recapitalize all three legs (land, air, and sea) of the nuclear triad, including the systems for nuclear command and control, while also conducting timely and cost-efficient life-extension programs—all while maintaining the nation's commitment to a testing moratorium under the signed (but rejected by the Senate) Comprehensive Test Ban Treaty.

The 2018 NPR notes a rapid deterioration of the threat environment since 2010 and identifies four enduring roles for U.S. nuclear capabilities:

- Deterring nuclear and non-nuclear attack;
- Assuring allies and partners;
- Achieving U.S. objectives if deterrence fails; and
- Providing the capacity to hedge against an uncertain future.<sup>15</sup>

Recognizing that capabilities can vary, the 2018 NPR emphasizes the need for tailored deterrence strategies to deal with each U.S. adversary. For example, Russia is engaged in an aggressive nuclear buildup, having added several new modern nuclear systems to its arsenal since 2010. According to General John Hyten, Commander, U.S. Strategic Command (STRATCOM), “Russia started their modernization program in 2006. They’re about 80 percent through completing the modernization of their triad. They’ll be pretty close to being through by about 2020.”<sup>16</sup> Concurrently, Russia is using its dual-capable (nuclear/conventional-capable) platforms to threaten the sovereignty of U.S. allies in Eastern Europe and the Baltics.

China is engaging in a similarly provocative nuclear buildup as it attempts to project power into the South China Sea, in part through illegally created islands on which China has installed offensive capabilities. North Korea “has accelerated its provocative pursuit of nuclear weapons and missile capabilities.”<sup>17</sup> Iran “retains the technological capability and much of the capacity necessary to develop a nuclear weapon within one year of a decision to do so” and is the world’s principal state sponsor of terrorism.<sup>18</sup>

Deterrence is an intricate interaction between U.S. conventional and nuclear forces and the psychological perceptions of both allies and adversaries with respect to the willingness of the U.S. to use such forces to defend its own interests and those of its allies and partners. Nuclear deterrence must reflect and be attuned to the mindset of any particular adversary that the U.S. seeks to deter. If an adversary believes that he can fight and win a limited nuclear war, the task for U.S. leaders

is to convince that adversary otherwise. The U.S. nuclear portfolio must be structured in terms of capacity, capability, variety, flexibility, and readiness to achieve these objectives. In addition, military roles and requirements for nuclear weapons will be inherently different depending on which actor is being deterred, what that actor values, and what kinds of action the U.S. is seeking to deter.

Due to the complex interplay among strategy, policy, and actions that any given state may take, as well as other actors’ perceptions of the world around them, it is not possible to know whether and when a nuclear deterrent or conventional forces provided by U.S. forces might be perceived as insufficient. Nuclear weapon capabilities take years or decades to develop, as does the infrastructure supporting them—an infrastructure that the U.S. has neglected for decades. We can be reasonably certain that a robust, well-resourced, focused, and reliable nuclear enterprise is much more likely to maintain the sense of the U.S. as a deterring force than is one that is outdated, questionable, or both.

The U.S. has demonstrated that it is capable of incredible mobilization when danger materializes. Today’s nuclear threat environment is evolving, dynamic, and proliferating in unpredictable ways, with new actors and resurgent old actors developing new capabilities. Meanwhile, the U.S. enterprise remains largely static (despite the promise of additional funding) and likely at a technological disadvantage.

This posture is worrisome and must be changed. Unless it is fixed, the implications, both for the security of the United States and for the security of its allies and the free world, are extremely serious.

## Scoring U.S. Nuclear Weapons Capabilities

The U.S. nuclear weapons enterprise is composed of several key elements that include warheads; delivery systems; nuclear command and control; intelligence, surveillance, and

reconnaissance (ISR); aerial refueling; and the physical infrastructure that designs, manufactures, and maintains U.S. nuclear weapons. The nuclear enterprise also includes and must

sustain the talent of its people, from nuclear designers to engineers, manufacturing personnel, securers, planners, maintainers, and operators, all of whom can help to ensure a nuclear deterrent that is second to none.

At the same time, assessing whether any one piece of this enterprise is sufficiently funded, focused, and/or effective with regard to the U.S. nuclear mission presents several challenges.

*First*, the United States is not taking full advantage of technologically available developments to field modern (often incorrectly referred to as “new”) warheads that could be designed to be safer, more secure, and more effective and that could give the United States better options for strengthening a credible deterrent. Rather the U.S. has elected to largely maintain aging nuclear warheads—based on designs from the 1960s, 1970s, and 1980s—that were in the stockpile when the Cold War ended.

*Second*, the lack of detailed publicly available data about the readiness of nuclear forces, their capabilities, and weapon reliability makes analysis difficult.

*Third*, the U.S. nuclear enterprise has many components, some of which are also involved in supporting other conventional military and extended deterrence missions. For example:

- Dual-capable bombers no longer fly airborne alert with nuclear weapons as they routinely did in the 1960s (although they are capable of resuming the practice if necessary).
- The three key national security laboratories (Los Alamos National Laboratory, Lawrence Livermore National Laboratory, and Sandia National Laboratories) no longer focus solely on the nuclear weapons mission. Although this remains their primary mission, they also perform extensive national security research related to nuclear nonproliferation, counterproliferation, intelligence, biological/medical research, threat reduction, and countering nuclear terrorism, including a variety of nuclear-related detection activities.

- The Nuclear Command, Control, and Communications (NC3) system “performs five crucial functions: detection, warning, and attack characterization; adaptive nuclear planning; decision-making conferencing; receiving Presidential orders; and enabling the management and direction of forces.”<sup>19</sup>

The factors listed and explained below are the most important elements of the nuclear weapons complex. They are judged on a five-grade scale according to which “very strong” means that a sustainable, viable, and funded plan is in place and “very weak” means that the U.S. is not meeting its security requirements and has no program in place to redress the shortfall—a situation that if left uncorrected could seriously damage vital national interests. The other three possible scores are “strong,” “marginal,” and “weak.”

### **Current U.S. Nuclear Stockpile Score: Strong**

U.S. warheads must be safe, secure, effective, and reliable. The Department of Energy (DOE) defines reliability as “the ability of the weapon to perform its intended function at the intended time under environments considered to be normal” and as “*the probability of achieving the specified yield, at the target, across the Stockpile-to-Target Sequence of environments, throughout the weapon’s lifetime, assuming proper inputs.*”<sup>20</sup> In the years since the cessation of nuclear testing in 1993, reliability has been determined through an intensive warhead surveillance program; non-nuclear experiments (that is, without the use of experiments producing nuclear yield); sophisticated calculations using high-performance computing; and related annual assessments and evaluations.

The reliability of nuclear warheads and delivery systems becomes even more important as the number and diversity of nuclear weapons in the stockpile decrease. Possession of fewer types of nuclear weapons means a smaller margin for error in the event that all of one

type is affected by a technical problem that might cause that type of weapon, its delivery system, or both to be decommissioned. Less diversity also means that a problem is more likely to affect multiple systems. America and its allies must have high confidence that U.S. nuclear warheads will perform as expected.

As warheads age, our uncertainty about their ability to perform their mission as expected could increase, significantly complicating military planning. Despite the impressive knowledge about nuclear weapons physics and materials chemistry that it has amassed, the U.S. could find itself surprised by unanticipated long-term effects on aging components of nuclear weapons. “The scientific foundation of assessments of the nuclear performance of US weapons is eroding as a result of the moratorium on nuclear testing,” argue John Hopkins, nuclear physicist and a former leader of the Los Alamos National Laboratory’s nuclear weapons program, and David Sharp, former Laboratory Fellow and a guest scientist at Los Alamos National Laboratory.<sup>21</sup>

The United States currently has the world’s safest and most secure stockpile, but concerns about overseas storage sites, potential problems introduced by improper handling, or the unanticipated effects of aging could compromise the integrity and reliability of U.S. warheads. In addition, nuclear warheads themselves contain security measures that are designed to make it difficult, if not impossible, to detonate a weapon without proper authorization.

**Grade:** The Department of Energy and Department of Defense are required to produce annual assessments of the nuclear stockpile’s reliability. Each of the three nuclear weapons labs (Los Alamos National Laboratory, Lawrence Livermore National Laboratory, and Sandia National Laboratories) reports its findings on the safety, security, and reliability of the nation’s nuclear warheads to the DOE and the DOD, which in turn brief the President. Detailed classified reports are also provided to Congress. While these assessments do not include the nuclear weapons delivery systems,

U.S. STRATCOM does assess the overall reliability of the U.S. nuclear weapons system, including both warheads and delivery platforms.

Absent nuclear weapons testing, the national laboratories’ assessment of weapons reliability, based on the full range of surveillance, scientific, and technical activities carried out in the NNSA’s stockpile stewardship program, depends on the expert judgment of the laboratory directors, which, although it is based on experience and non-nuclear experimentation and extensive modeling and simulation, is inherently subjective. While certainly a well-educated opinion, it cannot substitute for objective data obtained through direct nuclear testing.

Nuclear testing was used in the past to diagnose potential problems with warheads and to certify the effectiveness of fixes to those problems. It was also used originally to certify today’s nuclear warheads, as well as to detect potential problems and to confirm the effectiveness of fixes to those problems. Given that modern simulation is based on nuclear tests that were conducted primarily in the 1950s and 1960s, using testing equipment from that era, there is a great deal more that more modern nuclear testing and detection equipment could teach us about nuclear weapons physics.

In 2005, according to one authoritative account, “two DoD study teams, each looking at options for the future nuclear stockpile, reached similar conclusions—the U.S. approach to sustain its existing nuclear warhead stockpile needed to be redirected.”<sup>22</sup>

Continuing:

Both studies expressed concern over the prospect of long-term success of the plan to sustain the Cold War-era nuclear stockpile indefinitely through periodic refurbishments (e.g., life extension programs). The indefinite refurbishment plan will be extremely difficult to execute (because many warhead components can not [*sic*] be replicated as originally built), and would result in modifications on top of other modifications that will be

increasingly difficult to certify without nuclear testing. Both studies concluded that the Reliable Replacement Warhead (RRW) concept, if feasible, would be a preferred alternative to the indefinite refurbishment strategy.<sup>23</sup>

When the U.S. did conduct nuclear tests, it frequently found that small changes in a weapon's tested configuration had a dramatic impact on weapons performance. In fact, the 1958–1961 testing moratorium resulted in the introduction of weapons with serious problems into the U.S. stockpile.<sup>24</sup> These problems were discovered only after the resumption of U.S. nuclear weapons testing after the Soviet Union's unannounced breakout from the 1962 agreed moratorium.

America's commitment to sustaining its nuclear stockpile without nuclear testing creates inherent uncertainty concerning the adequacy of "fixes" to the stockpile when problems are found. The number of additional uncertainties is growing and includes updates made to correct problems that were found in the weapons or changes in the weapons resulting from life-extension programs. It is simply impossible to duplicate exactly weapons that were designed and built many decades ago. According to Dr. Stephen Younger, Director of Sandia National Laboratories, "[we have had to fix] a number of problems that were never anticipated" by using "similar but not quite identical parts."<sup>25</sup>

One of the results of having to certify weapons without nuclear testing, at least to date, has been fewer types of weapons (i.e., reduced diversity in the stockpile) and, consequently, a greater potential impact across the inventory of warheads should there be an unknown or misidentified error in the certification process. Loss of diversity in the stockpile also increases the risk that "common-mode" failure might affect multiple systems simultaneously, making the push for commonality with potential single points of failure in U.S. warheads worrisome.

"To be blunt," warned Secretary of Defense Robert Gates in October 2008, "there is absolutely no way we can maintain a credible

deterrent *and* reduce the number of weapons in our stockpile *without* either resorting to testing our stockpile or pursuing a modernization program."<sup>26</sup>

The U.S. is pursuing warhead life-extension programs that replace aging components before they can cause reliability problems. The number and scope of LEPs being carried out over the next two decades will stress the NNSA's warhead design and production complex and remains a concern, particularly given uncertainties regarding the congressional budget process. In spite of these concerns, in FY 2018 and FY 2019, the NNSA continued to assert that the stockpile "remains safe, secure, and reliable" (FY 2018) and "safe, secure, and effective" (FY 2019).<sup>27</sup>

In light of our overall assessment, we grade the U.S. stockpile conditionally as "strong," subject to continued strong support from Congress and the Administration.

### **Reliability of U.S. Delivery Platforms Score: Marginal**

Reliability encompasses not only the warhead, but strategic delivery vehicles as well. For ICBMs and SLBMs, in addition to a successful missile launch, this includes the separation of missile boost stages, performance of the missile guidance system, separation of the reentry vehicles from the missile post-boost vehicle, and accuracy of the final reentry vehicle in reaching its target.<sup>28</sup>

The U.S. conducts flight tests of ICBMs and SLBMs every year to ensure the reliability of its delivery systems with high-fidelity "mock" warheads. Anything from faulty electrical wiring to booster separations could degrade the reliability and safety of the U.S. strategic deterrent. U.S. strategic long-range bombers also regularly conduct continental United States and intercontinental exercises and receive upgrades to sustain a demonstrated high level of combat readiness. Nevertheless, challenges are on the horizon as platforms have to be modernized and replaced simultaneously and with little margin for error to allow for already significantly diminished gaps in capabilities.

**Grade:** The Air Force picked up the pace of its ICBM testing last year relative to the previously covered period. With four successes during the covered period, the Air Force also suffered its first unsuccessful ICBM test since 2001. The SLBM tests were successful in 2018 and 2019. To the extent that data from these tests are publicly available, they provide objective evidence of the delivery systems' reliability and send a message to U.S. allies and adversaries alike that the U.S. system works and the nuclear deterrent is ready if needed. The aged systems, however, occasionally have reliability problems, as evidenced by a July 2018 failed Minuteman III launch.<sup>29</sup>

Overall, this factor earns a grade of "marginal," the same grade as the previous year's score.

### **Nuclear Warhead Modernization Score: Marginal**

During the Cold War, the United States maintained a strong focus on developing new nuclear warhead designs, both to counter Soviet advances and modernization efforts and to leverage advances in the physics, chemistry, and design of nuclear weapons. Today, although it also seeks to retain the skills and capabilities required to design, develop, and produce new warheads, the United States is focused on sustaining its aging stockpile rather than on fielding new nuclear warheads. This could increase the risk of failure due to aging components and signal to adversaries that the United States is less committed to nuclear deterrence.

In FY 2016, the United States established the Stockpile Responsiveness Program (SRP) and charged it with building up and exercising all capabilities needed to "conceptualize, study, design, develop, engineer, certify, produce, and deploy nuclear weapons."<sup>30</sup> The Administration requested \$34 million for the SRP in FY 2019.

New weapon designs could allow American engineers and scientists to improve previous designs and devise more effective ways to address existing military requirements (e.g., the need to destroy deeply buried and hardened

targets) that have emerged in recent years. Future warheads could improve reliability (e.g., by remedying such ongoing aging concerns as the need to replace aged nuclear components) while also enhancing the safety and security of American weapons.

Working on new weapon design options would help to ensure that America's nuclear experts remain engaged and knowledgeable, would help to attract the best talent to the nuclear enterprise, and would help the nation gain additional insights into adversaries' nuclear weapons programs. Merely updating Cold War designs is not enough to constrain potential adversaries and current and future proliferators of nuclear technology, all of whom can seek designs apart from those of the U.S.

As the Panel to Assess the Reliability, Safety, and Security of the United States Nuclear Stockpile noted, "Only through work on advanced designs will it be possible to train the next generation of weapon designers and producers. Such efforts are also needed to exercise the DoD/NNSA weapon development interface."<sup>31</sup> The nuclear enterprise was able to display improved flexibility when it produced a low-yield version of the W76-2 warhead designed to counter Russia's perception of an exploitable gap within the U.S. nuclear force posture within a year. Other nations maintain their levels of proficiency by having their scientists work on new nuclear warheads and possibly by conducting very low-yield nuclear weapons tests.<sup>32</sup>

**Grade:** Despite continued nuclear policy restrictions and a preference for life-extension programs, U.S. efforts under the SRP and the NNSA's demonstrated ability to produce a low-yield version of the W76-2 warhead in a timely manner warrant improving this score to "marginal" this year. The success of the SRP will be an important consideration in future assessments.

### **Nuclear Delivery Systems Modernization Score: Strong**

Today, the United States fields a triad of nuclear forces with delivery systems that are

safe and reliable, but as these systems age, the risk of a significantly negative impact on operational capabilities increases, and any allowance for delay of platform replacement is significantly diminished. Age degrades reliability by increasing the potential for systems to break down or fail to respond correctly. The older weapons systems are, the more at risk they are that faulty components, malfunctioning equipment, or technological developments will limit their reliability in the operating environment.

Corrupted systems, defective electronics, or performance degradation due to long-term storage defects (including for nuclear warheads) can have serious implications for American deterrence and assurance. Because it cannot be assumed (especially with respect to systems approaching end of life) that a strategic delivery vehicle will always operate reliably, that vehicle's deterrence and assurance value may be significantly reduced, with consequent impact on the deterrence perceptions of both allies and adversaries.

The U.S. Air Force and Navy plan to modernize or replace each leg of the nuclear triad in the next few decades, but fiscal constraints, inconsistent levels of funding, and issues related to "continuing resolutions" will make such efforts difficult at best. Sustained leadership focus is imperative if the modernization program is to succeed.

The Navy is fully funding its programs to replace the *Ohio*-class submarine with the *Columbia*-class submarine, but issues early in the program that were identified last year have caused the margin for slippage in the overall schedule of the program itself to decrease.<sup>33</sup> The Air Force is funding the B-21 Raider long-range bomber. Existing ICBMs and SLBMs are expected to remain in service until 2032 and 2042, respectively.

Remanufacturing some weapon parts is difficult and expensive either because the manufacturers are no longer in business or because the materials that constituted the original weapons are no longer available (e.g., due to environmental restrictions). Modernization of the U.S. triad is a requirement validated by all

four of the NPRs since the end of the Cold War and will remain a must in all future deterrence scenarios. Plans for modernization of U.S. nuclear weapons benefited from the predictability associated with the FY2018/FY 2019 budget deal, but the return of sequestration threatens this progress.

The ability of the U.S. to produce sufficient numbers of solid-fuel rocket engines and possible U.S. dependence on Russia as a source of such engines are other significant long-range concerns.<sup>34</sup>

**Grade:** U.S. nuclear platforms are in dire need of recapitalization. Plans for modernization of the nuclear triad are in place, and Congress and the services have largely sustained funding for these programs, notwithstanding difficulties caused by the Budget Control Act of 2011. This demonstration of commitment to nuclear weapons modernization earns this indicator a grade of "strong," although possible delays in modernization could cause this score to be downgraded in the near future.

## Nuclear Weapons Complex Score: Marginal

Maintaining a reliable and effective nuclear stockpile depends in large part on the facilities where U.S. devices and components are developed, tested, and produced. These facilities constitute the foundation of our strategic arsenal and include the:

- Los Alamos National Laboratory,
- Lawrence Livermore National Laboratory,
- Sandia National Laboratories,
- Nevada National Security Site,
- Pantex Plant,
- Kansas City Plant,
- Savannah River Site, and
- Y-12 National Security Complex.

In addition to these government sites, the defense industrial base supports the development and maintenance of American delivery platforms.

These complexes design, develop, test, and produce the weapons in the U.S. nuclear arsenal, and their maintenance is of critical importance. As the 2018 NPR states:

An effective, responsive, and resilient nuclear weapons infrastructure is essential to the U.S. capacity to adapt flexibly to shifting requirements. Such an infrastructure offers tangible evidence to both allies and potential adversaries of U.S. nuclear weapons capabilities and thus contributes to deterrence, assurance, and hedging against adverse developments. It also discourages adversary interest in arms competition.<sup>35</sup>

Maintaining a safe, secure, effective, and reliable nuclear stockpile requires modern facilities, technical expertise, and tools both to repair any malfunctions quickly, safely, and securely and to produce new nuclear weapons if required to do so. The existing nuclear weapons complex, however, is not fully functional. The United States, for example, has not had a substantial plutonium-pit production capability since 1993. A plutonium pit is the heart of a nuclear weapon, and the NNSA currently plans to produce no fewer than 80 pits a year by 2030—a challenge by its own admission.<sup>36</sup> In 2005, it was reported that the U.S. cannot “serially produce many crucial components of our nuclear weapons.”<sup>37</sup>

If the facilities are not properly funded, the U.S. will gradually lose the ability to conduct the required high-quality experiments that are needed to ensure the stockpile’s reliability without nuclear testing. In addition to demoralizing the workforce and hampering recruitment, old and/or obsolete facilities and poor working environments make maintaining a safe, secure, reliable, and militarily effective nuclear stockpile difficult. Upwards of 50 percent of the NNSA’s facilities are more than 40

years old, nearly 30 percent date to the Manhattan Project of the 1940s, and 12 percent are considered excess or no longer needed.<sup>38</sup> The NNSA reported \$2.5 billion in deferred maintenance as of February 2019.<sup>39</sup>

The U.S. currently retains over 5,000 old plutonium pits in strategic reserve in addition to pits for use in future LEPs. There are disagreements as to the effect of aging on plutonium pits and on how long the U.S. will be able to depend on them before replacement. In 2006, then-NNSA Administrator Linton Brooks estimated that the life span of warhead plutonium is “somewhere between 45 and 60 years,” which means that in the near future, the United States may have to start replacing core components of its nuclear warheads.<sup>40</sup>

Current capacities to do so are insufficient because the U.S. has demonstrated an ability to produce only about 10 plutonium pits a year at the Los Alamos PF-4 facility. If executed as planned, infrastructure modernization plans for PF-4 as mandated by the 2018 NPR will boost that number to about 30 by the middle of the next decade.

A second plutonium-pit production facility is being planned to exploit the Mixed Oxide Fuel (MOX) facility that until last year was under construction at the Savannah River Plant in Tennessee. The MOX building is being repurposed for a production capacity of no fewer than 50 plutonium pits per year to be achieved by 2030 for an overall requirement of no fewer than 80 pits per year. The challenge of achieving this timeline is exacerbated by the fact that the NNSA is embarking on the most ambitious warhead sustainment program since the end of the Cold War, overhauling some five warhead types and stressing the demands on both workforce and facilities.

Manufacturing non-nuclear components can be extremely challenging either because some materials may no longer exist or because manufacturing processes have been forgotten and must be retrieved. There is a certain element of art to building a nuclear weapon, and such a skill can be acquired and maintained only through hands-on experience.



**Grade:** On one hand, the U.S. maintains some of the world’s most advanced nuclear facilities. On the other, some parts of the complex—importantly, the plutonium and highly enriched uranium component manufacturing infrastructure—have not been modernized since the 1950s. Plans for long-term infrastructure recapitalization remain essential, even as the NNSA is embarking upon an aggressive warhead life-extension effort. Sustaining and/or increasing critically essential tritium gas is likewise essential because tritium gas is subject to deterioration, and a delay in production increases the amount that must be produced to cover our baseline needs.

Significant progress has been made over the past year, however, both in recapitalizing uranium infrastructure and in getting funded plans in place to recapitalize plutonium-pit production capacity. The infrastructure is improved and therefore receives a grade of “marginal.”

## Personnel Challenges Within the National Nuclear Laboratories

### Score: Marginal

Combined with nuclear facilities, U.S. nuclear weapons scientists and engineers are critical to the health of the complex and the stockpile. The 2018 NPR emphasizes that:

The nuclear weapons infrastructure depends on a highly skilled, world-class workforce from a broad array of disciplines, including engineering, the physical sciences, mathematics, and computer science. Maintaining the necessary critical skills and retaining personnel with the needed expertise requires sufficient opportunities to exercise those skills.<sup>41</sup>

The ability to maintain and attract a high-quality workforce is critical to assuring the future of the American nuclear deterrent, and hiring the best and brightest is especially challenging in a strong employment atmosphere. Today’s weapons designers and

engineers are first-rate, but they also are aging and retiring, and their knowledge must be passed on to the next generation of experts. This means that young designers need meaningful and challenging warhead design and development programs to hone their skills.

The SRP offers one visible means by which to address such concerns. The NNSA and its weapons labs understand this problem and, with the support of Congress, are beginning to take the necessary steps through SRP and foreign weapon assessment to mentor the next generation. To continue this progress, SRP funding will need to be sustained and ideally increased from the current rate of about \$30 million a year.

The U.S. currently relies on non-yield-producing laboratory experiments, flight tests, and the judgment of experienced nuclear scientists and engineers, using robust modeling and simulation, to ensure continued confidence in the safety, security, effectiveness, and reliability of its nuclear deterrent. Without their experience, the nuclear weapons complex could not function. Few of today’s remaining scientists or engineers at the NNSA weapons labs have had the experience of taking a warhead from initial concept to a “clean sheet” design, engineering development, production, and fielding. The SRP is helping to remedy some of these shortfalls by having the workforce exercise most of the skills required for nuclear weapons design and engineering.

The average age of the NNSA’s workforce decreased slightly to 47.8 years as of September 2018.<sup>42</sup> Still worrisome, however, is that over a third of this workforce will be eligible for retirement in the next four years. Given the distribution of workforce by age, these retirements will create a significant knowledge and experience gap.

**Grade:** In addition to employing world-class experts, the NNSA labs have had some success in attracting and retaining talent. As many scientists and engineers with practical nuclear weapon design and testing experience retire, the annual assessment and certification of nuclear weapons will rely increasingly on

the judgments of people who have never tested or designed a nuclear weapon. In light of these issues, the complex earns a score of “marginal,” albeit with signs of improvement.

### **Readiness of Forces Score: Strong**

The people and units that operate U.S. delivery platforms are essential to the successful operation of America’s strategic forces. The military personnel operating the three legs of the nuclear triad must be properly trained and equipped, and the crews responsible for the nuclear mission must be maintained in an appropriate state of readiness.

During FY 2019, the services have continued to align resources in order to preserve strategic capabilities in the short term. Nevertheless, a return to sequestration could have major negative effects on the timely execution of programs. U.S. general-purpose forces help to ensure the overall effectiveness of our nuclear forces by, among other things, providing a pool of qualified candidates to operate nuclear weapon delivery systems. Changes prompted in part by the 2014 Navy and Air Force cheating scandals have addressed most morale issues and have recast the role of forces supporting the nuclear deterrent by providing additional funding for equipment purchases, creating more mid-career billets to help career-field continuity, focusing leadership attention, and changing training to focus on mission in the field rather than on a theoretical ideal. Sustained attention to the situation in the nuclear enterprise is critical.

**Grade:** Despite uncertainties regarding the future impact of budgetary shortfalls, the young men and women who secure, maintain, plan for, and operate U.S. nuclear forces are of extremely high caliber. Force readiness thus receives a grade of “strong.”

### **Allied Assurance Score: Strong**

The credibility of U.S. nuclear deterrence is one of the most important components of allied assurances. U.S. allies that already have nuclear weapons can coordinate actions with the United States or act independently. During

the Cold War, the U.S. and the United Kingdom cooperated to the point where joint targeting was included. France maintains its independent nuclear arsenal. The U.S. also deploys nuclear gravity bombs in Europe as a visible manifestation of its commitment to its NATO allies.

Similarly, the U.S. has an enduring extended deterrence role with its Asian allies. The United States provides nuclear assurances to Japan and South Korea, both of which are technologically advanced industrial economies that face aggressive nuclear-armed regional adversaries such as China, Russia, and North Korea. Continued assurances and guarantees of U.S. nuclear deterrence must therefore be perceived as credible. Both Japan and South Korea have the capability and basic know-how to build their own nuclear weapons (even quickly) should they chose to do so. That would be a major setback for U.S. nonproliferation policies.

The 2018 NPR took a step in the right direction when it placed “[a]ssurance of allies and partners” second on its list of four “critical roles” (immediately following “[d]eterrence of nuclear and non-nuclear attack”) that nuclear forces play in America’s national security strategy. The 2018 NPR proposed two supplements to existing capabilities—a low-yield SLBM warhead and a new nuclear sea-launched cruise missile—as important initiatives to strengthen assurance, along with the Obama and Trump Administrations’ initiatives to bolster conventional forces in NATO. Work on the low-yield warhead is progressing, and deployment of this capability will be an important factor in deterring aggression against America’s Asian and NATO allies in the years ahead.

**Grade:** At this time, most U.S. allies are not seriously considering developing their own nuclear weapons. European members of NATO continue to express their commitment to and appreciation of NATO as a nuclear alliance even as they worry about the impact of Russia’s violations of the Intermediate Nuclear Forces Treaty and the regional implications of other arms control treaties, including the New Strategic Arms Reduction Treaty. Because uncertainties surrounding the purchase and

modernization of NATO's dual-capable aircraft and the time line for replacing existing U.S. nuclear weapons with the B61-12, as well as NATO's seeming lack of attention to the nuclear mission and its intellectual underpinnings, do not justify a score of "very strong," allied assurance receives a score of "strong."

### **Nuclear Test Readiness Score: Weak**

In the past, nuclear testing was one of the key elements of a safe, secure, effective, and reliable nuclear deterrent. Today, even though the U.S. is under a self-imposed nuclear testing moratorium, it is still required to maintain a low level of nuclear test readiness at the Nevada National Security Site (formerly Nevada Test Site).

"Test readiness" refers to a single test or a very short series of tests, not a sustained nuclear testing program, reestablishment of which would require significant additional resources. Specifically, under President Bill Clinton's 1993 PDD-15, "[i]n order to resume underground nuclear tests, a capability to conduct a nuclear test within 6 months up to FY 1996, and to conduct a nuclear test within 2–3 years after that time will be assumed by the Department of Energy [now NNSA]."<sup>43</sup> Because of a shortage of resources, the NNSA has been unable to achieve this goal. The test readiness program is supported by experimental programs at the Nevada National Security Site, nuclear laboratory experiments, and advanced diagnostics development.<sup>44</sup>

The ability of the U.S. to conduct yield-producing experiments in a timely manner if it should discover a flaw in one or more types of its nuclear weapons that requires experimentation to correct seems questionable. The U.S. might need to test to assure certain weapon characteristics that could possibly be validated only by nuclear testing and to verify render-safe procedures. The ability to conduct yield-producing experiments rapidly is likewise important, especially if the U.S. needs to react strongly to another nation's nuclear weapons tests and/or communicate unquestioned resolve.

As noted, current law requires that the U.S. must maintain a capability to conduct a nuclear test within 24 to 36 months of a presidential decision to do so. The NNSA states in its *Fiscal Year 2018 Stockpile Stewardship and Management Plan* that its "fundamental approach taken to achieve test readiness has also changed" and lists a general time frame of six to 10 months for a simple test with waivers and simplified processes.<sup>45</sup> The time frame "for a fully instrumented test to address stockpile needs with the existing stockpile" is 24 to 36 months, and "a test to develop a new capability" would take 60 months.<sup>46</sup> A test within 18 months might be possible, "but only if 'some domestic regulations, agreements and laws' were to be waived."<sup>47</sup> Because the United States is rapidly losing its remaining practical nuclear testing experience, including instrumentation of very sensitive equipment, "there is essentially no test readiness," and "[t]he whole testing process—whether to conduct one test or many—would in essence have to be reinvented, not simply resumed."<sup>48</sup>

**Grade:** As noted, the U.S. can meet the legally required readiness requirement through the NNSA only if certain domestic regulations, agreements, and laws are waived. In addition, the U.S. is not prepared to sustain testing activities beyond a few limited experiments because it no longer retains the deep drilling technology in Nevada and has only a few "holes" capable of containing a nuclear test if required. Thus, testing readiness earns a grade of "weak."

### **Overall U.S. Nuclear Weapons Capability Score: "Marginal" Trending Toward "Strong"**

It should be emphasized that "trending toward 'strong'" assumes that the U.S. maintains its commitment to modernization of the entire enterprise, from warheads to platforms to personnel to infrastructure, and allocates needed resources accordingly. Absent this commitment, this overall score will degrade rapidly to "weak." Continued attention to this mission is therefore critical.

Although a bipartisan commitment has led to continued progress on the modernization of U.S. nuclear forces and sustainment of warheads, these programs remain seriously threatened by potential future fiscal uncertainties. The infrastructure that supports nuclear programs is very aged, and nuclear test readiness has revealed troubling problems within the forces.

On the plus side, the 2018 NPR strongly articulates a core nuclear weapons policy grounded in the reality of today’s threats and growing international development concerns.

The 2018 NPR clearly and strongly articulates our continued commitment to extended deterrence. The commitment to warhead life-extension programs, the exercise of skills that are critical for the development of new nuclear warheads under the SRP, and the just-in-time modernization of nuclear delivery platforms represent a positive trend that must be maintained.

Averaging the subscores across the nuclear enterprise in light of our concerns about the future results in an overall score of “marginal.”

### U.S. Military Power: Nuclear

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Nuclear Stockpile				✓	
Delivery Platform Reliability			✓		
Warhead Modernization			✓		
Delivery Systems Modernization				✓	
Nuclear Weapons Complex			✓		
National Labs Talent			✓		
Force Readiness				✓	
Allied Assurance				✓	
Nuclear Test Readiness		✓			
<b>OVERALL</b>			✓		

## Endnotes

1. Quoted in U.S. Department of Defense, Office of the Secretary of Defense, *Nuclear Posture Review 2018*, February 2018, p. 1, <https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF> (accessed June 27, 2019).
2. “U.S. Nuclear Forces,” Chapter 3 in U.S. Department of Defense, Office of the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs, *The Nuclear Matters Handbook, Expanded Edition*, 2011, p. 39, [https://www.ipndv.org/wp-content/uploads/2017/10/Nuclear\\_Matters\\_Handbook\\_2011.pdf](https://www.ipndv.org/wp-content/uploads/2017/10/Nuclear_Matters_Handbook_2011.pdf) (accessed June 27, 2019).
3. Center for Strategic and International Studies, Missile Defense Project, “Minuteman III,” *Missile Threat*, last updated June 15, 2018, <https://missilethreat.csis.org/missile/minuteman-iii/> (accessed June 27, 2019).
4. “Test Readiness,” in Chapter 1, “Safety, Security, and Reliability of the U.S. Nuclear Weapons Stockpile,” in National Research Council, Committee on Reviewing and Updating Technical Issues Related to the Comprehensive Nuclear Test Ban Treaty, *The Comprehensive Nuclear Test Ban Treaty: Technical Issues for the United States* (Washington: National Academies Press, 2012), p. 30, [http://www.nap.edu/openbook.php?record\\_id=12849&page=30](http://www.nap.edu/openbook.php?record_id=12849&page=30) (accessed June 27, 2019).
5. Memorandum, “Report on the ‘Follow-up Audit of the Test Readiness at the Nevada Test Site,’” U.S. Department of Energy, Office of Inspector General, *Audit Report* No. OAS-L-10-02, October 21, 2009, <http://energy.gov/sites/prod/files/igprod/documents/OAS-L-10-02.pdf> (accessed June 27, 2019).
6. Dr. Charles V. Shank, Senior Fellow, Howard Hughes Medical Institute, and Co-chair, National Research Council Committee on Review of the Quality of the Management and of the Science and Engineering Research at the DOE’s National Security Laboratories—Phase 1, statement in *Hearing to Receive Testimony on National Nuclear Security Administration Management of Its National Security Laboratories*, Subcommittee on Strategic Forces, Committee on Armed Services, U.S. Senate, April 18, 2012, p. 5, <http://www.armed-services.senate.gov/imo/media/doc/12-28%20-%204-18-12.pdf> (accessed June 13, 2017).
7. Table, “Retirement Eligibility,” in U.S. Department of Energy, National Nuclear Security Administration, “National Nuclear Security Administration as of September 30, 2018,” <https://www.energy.gov/sites/prod/files/2019/01/f58/201809%20NNSA%20workforce%20diversity%20statistics%20report.pdf> (accessed April 10, 2019).
8. See chart, “Median Age of Employees Working at Selected Tech and Online Companies as of April 2016 (in Years),” Statista, last edited May 31, 2016, <https://www.statista.com/statistics/653789/average-age-of-tech-company-employees/> (accessed July 26, 2019), and Robert Allen, “Average Age of Tech Company’s Employees [#ChartoftheDay],” Smart Insights, May 31, 2016, <https://www.smartinsights.com/manage-digital-transformation/average-age-tech-companys-employees-chartoftheday/> (accessed July 26, 2019).
9. The report also recommends that the Department of Energy be renamed the “Department of Energy and Nuclear Security” to “highlight the prominence and importance of the Department’s nuclear security mission.” Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise, *A New Foundation for the Nuclear Enterprise: Report of the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise*, November 2014, p. xii, [http://cdn.knoxblogs.com/atomiccity/wp-content/uploads/sites/11/2014/12/Governance.pdf?\\_ga=1.83182294.1320535883.1415285934](http://cdn.knoxblogs.com/atomiccity/wp-content/uploads/sites/11/2014/12/Governance.pdf?_ga=1.83182294.1320535883.1415285934) (accessed June 27, 2019).
10. Kevin Liptak, “U.S. Navy Discloses Nuclear Exam Cheating,” CNN, updated February 4, 2014, <http://www.cnn.com/2014/02/04/us/navy-cheating-investigation/index.html> (accessed June 27, 2019).
11. See Section IV, “Underlying Issues: Leadership Focus, the Nuclear Enterprise Culture, Command Oversight, Investment—Visible Support, the Security Burden, and the Personnel Reliability Program,” in U.S. Department of Defense, *Independent Review of the Department of Defense Nuclear Enterprise*, June 2, 2014, pp. 21–38, <https://dod.defense.gov/Portals/1/Documents/pubs/Independent-Nuclear-Enterprise-Review-Report-30-June-2014.pdf> (accessed June 27, 2019).
12. U.S. Government Accountability Office, *Defense Nuclear Enterprise: DOD Continues to Address Challenges but Needs to Better Define Roles and Responsibilities and Approaches to Collaboration*, GAO-19-29, November 2018, <https://www.gao.gov/assets/700/695197.pdf> (accessed June 27, 2019).
13. David J. Trachtenberg, Deputy Under Secretary of Defense for Policy, statement in hearing, *Fiscal Year 2020 Priorities for Department of Defense Nuclear Priorities*, Subcommittee on Strategic Forces, Committee on Armed Services, U.S. House of Representatives, March 28, 2019, p. 1, <https://armedservices.house.gov/hearings?ID=FA8DBDAB-5585-4437-AF88-61FBB1B7D428> (accessed June 27, 2019). In 2012, it was estimated that Russia can produce “about 2,000 new warheads each year.” Robert G. Joseph, “Second to One,” *National Review*, July 2, 2012, <http://www.nationalreview.com/article/304310/second-one-robert-g-joseph> (accessed June 28, 2019). According to an assessment published 10 years earlier, “a worst-case analysis (from the U.S. point of view) is that Russia could make 7,000 new warheads per year in a surge production.” Oleg Bukharin, “A Breakdown of Breakout: U.S. and Russian Warhead Production Capabilities,” Arms Control Association, October 2002, [http://www.armscontrol.org/act/2002\\_10/bukharinoct02](http://www.armscontrol.org/act/2002_10/bukharinoct02) (accessed June 28, 2019).

14. See, for example, Section II, “An Evolving and Uncertain International Security Environment,” in U.S. Department of Defense, Office of the Secretary of Defense, *Nuclear Posture Review 2018*, pp. 5–14.
15. U.S. Department of Defense, *Nuclear Posture Review*, p. VII.
16. Testimony of General John E. Hyten, Commander, United States Strategic Command, in transcript, “U.S. Strategic Command and U.S. Northern Command SASC [Senate Armed Services Committee] Testimony,” U.S. Strategic Command, March 1, 2019, <https://www.stratcom.mil/Media/Speeches/Article/1771903/us-strategic-command-and-us-northern-command-sasc-testimony/> (accessed June 28, 2019).
17. U.S. Department of Defense, *Nuclear Posture Review*, p. 11.
18. *Ibid.*, p. 13.
19. U.S. Department of Defense, Office of the Secretary of Defense, *Nuclear Posture Review 2018*, p. XIII.
20. R. L. Bierbaum, J. J. Cashen, T. J. Kerschen, J. M. Sjulin, and D. L. Wright, “DOE Nuclear Weapon Reliability Definition: History, Description, and Implementation,” Sandia National Laboratories, *Sandia Report* No. SAND99-8240, April 1999, pp. 7–8, <http://www.wslfweb.org/docs/usg/reli99.pdf> (accessed June 28, 2019). Emphasis in original.
21. John C. Hopkins and David H. Sharp, “The Scientific Foundation for Assessing the Nuclear Performance of Weapons in the US Stockpile Is Eroding,” *Issues in Science and Technology*, Vol. XXXV, No. 2 (Winter 2019), p. 23, <https://issues.org/wp-content/uploads/2019/01/Hopkins-Sharp-The-Scientific-Foundation-23-25-Winter-2019.pdf> (accessed June 28, 2019).
22. Thomas Scheber, *Reliable Replacement Warheads: Perspectives and Issues*, United States Nuclear Strategy Forum Publication No. 0005 (Fairfax, VA: National Institute Press, 2007), p. 3, <http://www.bits.de/NRANEU/docs/RRW07.pdf> (accessed June 28, 2019).
23. *Ibid.*, p. 4.
24. National Institute for Public Policy, *The Comprehensive Test Ban Treaty: An Assessment of the Benefits, Costs, and Risks* (Fairfax, VA: National Institute Press, 2011), pp. 24–25, <http://www.nipp.org/wp-content/uploads/2014/12/CTBT-3.11.11-electronic-version.pdf> (accessed June 28, 2019).
25. Stephen M. Younger, *The Bomb: A New History* (New York: HarperCollins, 2009), p. 192.
26. Robert M. Gates, speech delivered at Carnegie Endowment for International Peace, Washington, DC, October 28, 2008, <http://archive.defense.gov/Speeches/Speech.aspx?SpeechID=1305> (accessed June 28, 2019). Emphasis in original.
27. U.S. Department of Energy, National Nuclear Security Administration, *Report to Congress: Fiscal Year 2018 Stockpile Stewardship and Management Plan*, November 2017, p. v, [https://www.nukewatch.org/importantdocs/resources/fy18ssmp\\_final\\_november\\_2017.pdf](https://www.nukewatch.org/importantdocs/resources/fy18ssmp_final_november_2017.pdf) (accessed June 28, 2019), and U.S. Department of Energy, National Nuclear Security Administration, *Report to Congress: Fiscal Year 2019 Stockpile Stewardship and Management Plan—Biennial Plan Summary*, October 2018, p. 1-8, <https://www.energy.gov/sites/prod/files/2018/10/f57/FY2019%20SSMP.pdf> (accessed June 28, 2019).
28. Robert W. Nelson, “What Does Reliability Mean?” in “If It Ain’t Broke: The Already Reliable U.S. Nuclear Arsenal,” Arms Control Association, corrected online August 29, 2008, [https://www.armscontrol.org/act/2006\\_04/ReliableFeature](https://www.armscontrol.org/act/2006_04/ReliableFeature) (accessed June 28, 2019).
29. Joe Pappalardo, “The Air Force Destroyed an Unarmed Minuteman III ICBM During a Test Gone Wrong,” *Popular Mechanics*, July 31, 2018, <https://www.popularmechanics.com/military/weapons/a22604568/air-force-minuteman-iii-icbm-test/> (accessed July 26, 2019).
30. U.S. Department of Energy, National Nuclear Security Administration, *Report to Congress: Fiscal Year 2019 Stockpile Stewardship and Management Plan—Biennial Plan Summary*, p. 1-16.
31. Panel to Assess the Reliability, Safety, and Security of the United States Nuclear Stockpile, *Expectations for the U.S. Nuclear Stockpile Program: FY 2001 Report of the Panel to Assess the Reliability, Safety, and Security of the United States Nuclear Stockpile*, 2002, p. 9, <http://fas.org/programs/ssp/nukes/testing/fosterprnlrpt01.pdf> (accessed June 28, 2019).
32. See, for example, Congressional Commission on the Strategic Posture of the United States, *America’s Strategic Posture. The Final Report of the Congressional Commission on the Strategic Posture of the United States*, 2009, p. 83, [https://www.usip.org/sites/default/files/America’s\\_Strategic\\_Posture\\_Auth\\_Ed.pdf](https://www.usip.org/sites/default/files/America’s_Strategic_Posture_Auth_Ed.pdf) (accessed June 28, 2019).
33. “Officers Send Conflicting Signals on Columbia Sub Margin,” *ExchangeMonitor*, February 27, 2019, <https://www.exchangemonitor.com/officers-send-conflicting-signals-columbia-margin/> (accessed April 15, 2019). Subscription required.
34. Sydney J. Freedberg Jr., “Fading Solid Fuel Engine Biz Threatens Navy’s Trident Missile,” *Breaking Defense*, June 16, 2014, <http://breakingdefense.com/2014/06/fading-solid-fuel-engine-biz-threatens-navys-trident-missile/> (accessed June 28, 2019).
35. U.S. Department of Defense, *Nuclear Posture Review Report*, February 2018, p. xiv.

36. Rick Perry, Secretary of Energy, and Lisa E. Gordon-Hagerty, Under Secretary for Nuclear Security and Administrator of the National Nuclear Security Administration, U.S. Department of Energy, statement in hearing, *Department of Energy's Atomic Energy Defense Programs*, Committee on Armed Services, U.S. Senate, March 28, 2019, p. 2, <https://www.armed-services.senate.gov/hearings/19-03-28-department-of-energys-atomic-energy-defense-programs> (accessed June 28, 2019).
37. John S. Foster, Jr., "Nuclear Weapons and the New Triad," in conference proceedings, *Implementing the New Triad: Nuclear Security in Twenty-First Century Deterrence, Final Report*, Institute for Foreign Policy Analysis and International Security Studies Program of the Fletcher School, Tufts University, December 14–15, 2005, p. 69. See also Amy F. Woolf, "Defense Primer: Strategic Nuclear Forces," Congressional Research Service *In Focus* No. 10519, updated December 11, 2018, <https://crsreports.congress.gov/product/pdf/IF/IF10519> (accessed July 26, 2019), p. 15., and Amy F. Woolf and James D. Werner, "The U.S. Nuclear Weapons Complex: Overview of Department of Energy Sites," Congressional Research Service *Report for Members and Committees of Congress*, updated September 6, 2018, pp. 1 and 8, <https://fas.org/sgp/crs/nuke/R45306.pdf> (accessed July 26, 2019).
38. U.S. Department of Energy, National Nuclear Security Administration, *Prevent, Counter, and Respond—A Strategic Plan to Reduce Global Nuclear Threats, FY 2017–FY 2021*, March 2016, [https://nnsa.energy.gov/sites/default/files/nnsa/inlinefiles/NPCR%20FINAL%203-31-16%20\(with%20signatures\).pdf](https://nnsa.energy.gov/sites/default/files/nnsa/inlinefiles/NPCR%20FINAL%203-31-16%20(with%20signatures).pdf) (accessed June 13, 2017).
39. U.S. Department of Energy, National Nuclear Security Administration, "Infrastructure Modernization," February 2019, <https://www.energy.gov/sites/prod/files/2019/02/f59/2019-02-14-FACTSHEET-Infrastructure-Modernization.pdf> (accessed June 28, 2019).
40. David Ruppe, "Research Suggests Warhead Plutonium Pits Last Longer," Nuclear Threat Initiative, March 2, 2006, <https://www.nti.org/gsn/article/research-suggests-warhead-plutonium-pits-last-longer/> (accessed June 28, 2019).
41. U.S. Department of Defense, *Nuclear Posture Review*, p. 63.
42. Table, "Age," in U.S. Department of Energy, National Nuclear Security Administration, "National Nuclear Security Administration as of September 30, 2018."
43. Presidential Decision Directive/NSC-15, "U.S. Policy on Stockpile Stewardship Under an Extended Moratorium and a Comprehensive Test Ban," November 3, 1993, p. 5, <https://fas.org/irp/offdocs/pdd/pdd-15.pdf> (accessed June 29, 2019).
44. U.S. Department of Energy, National Nuclear Security Administration, Nevada National Security Site, "Stockpile Stewardship Program," January 10, 2019, <https://www.nnss.gov/pages/programs/StockpileStewardship.html> (accessed June 29, 2019).
45. U.S. Department of Energy, National Nuclear Security Administration, *Report to Congress: Fiscal Year 2018 Stockpile Stewardship and Management Plan*, p. 3-26.
46. *Ibid.*
47. National Research Council, Committee on Reviewing and Updating Technical Issues Related to the Comprehensive Nuclear Test Ban Treaty, *The Comprehensive Nuclear Test Ban Treaty: Technical Issues for the United States*, p. 30.
48. John C. Hopkins, "Nuclear Test Readiness: What Is Needed? Why?" *National Security Science*, December 2016, p. 10, [http://www.lanl.gov/discover/publications/national-security-science/2016-december/\\_assets/docs/NSS-dec2016\\_nuclear-test-readiness.pdf](http://www.lanl.gov/discover/publications/national-security-science/2016-december/_assets/docs/NSS-dec2016_nuclear-test-readiness.pdf) (accessed June 29, 2019).





# Missile Defense

**M**issile defense is a critical component of the U.S. national security architecture.<sup>1</sup> It can protect critical infrastructure, ranging from population and industrial centers to politically and historically important sites; strengthen U.S. diplomatic and deterrence efforts; and provide both time and options to senior decision-makers amid crises that involve missiles flying on ballistic and non-ballistic trajectories (e.g., hypersonic weapons).

Missiles remain a weapon of choice for many of America's adversaries because of such important attributes as their extraordinarily high speed (against which the U.S. has a limited ability to defend) and relative cost-effectiveness compared to other types of conventional attacks.<sup>2</sup> As the number of states that possess missiles continues to increase, so will the sophistication of these weapons as modern technologies become cheaper and more widely available. In April 2019, Under Secretary of Defense for Policy John Rood testified before the Senate Armed Services Subcommittee on Strategic Forces that:

Potential adversaries are developing sophisticated ballistic and cruise missile systems with increased speed, range, accuracy, and lethality.

Over the past decade, North Korea and Iran have accelerated efforts to develop and field missiles capable of threatening U.S. strategic interests. While North Korea has not tested a nuclear-capable missile in over a year, it possesses a range of systems including road-mobile

intercontinental-range ballistic missiles, solid-propellant medium-range ballistic missiles, and submarine-launched ballistic missiles.

Iran continues to improve its missile capabilities and develop space launch vehicles which provide knowledge to develop an intercontinental-range ballistic missile. Iran already possesses the largest stockpile of regional missiles in the Middle East. It is now enhancing their precision while developing cruise missiles and anti-ship ballistic missiles.

We also see the re-emergence of long-term, strategic competition by revisionist powers in Russia and China. Russia and China are expanding and modernizing a wide range of offensive missile capabilities.<sup>3</sup>

**An additional concern is ballistic missile cooperation between state and non-state actors. Such cooperation furthers the spread of sophisticated technologies and compounds challenges to U.S. defense planning.<sup>4</sup>**

To deter an enemy from attacking, one must be able to convince him that his attack will fail, that the cost of carrying out a successful attack is prohibitively high, or that the consequences of an attack will be so painful that they will outweigh any perceived benefit. A U.S. missile defense system strengthens deterrence by offering a degree of protection to the American people, as well as the economic base on which their well-being depends, and making it harder

for an adversary to threaten forward-deployed troops and allies with ballistic missiles.

In addition, a missile defense system gives a decision-maker a significant political advantage: By protecting key elements of U.S. well-being, it mitigates an adversary's ability to intimidate the United States into conceding important security, diplomatic, or economic interests. Missile defense systems also enable U.S. and allied conventional operations.

A missile defense system gives decision-makers more time to choose the most de-escalatory course of action from an array of options that can range from preemptively attacking an adversary to attacking his ballistic missiles on launch pads or even conceding to an enemy's demands or actions. Though engaging in a preemptive attack would likely be seen as an act of war by adversaries and could result in highly escalatory scenarios, the United States would do so if there was a substantiated concern that an adversary was about to attack the United States with a nuclear-armed missile. The United States would have an option to back down, thus handing a "win" to the enemy, but at the cost of losing credibility in its many alliance relationships.

Backing down could also undermine U.S. nonproliferation efforts. More than 30 allies around the world rely on U.S. nuclear security guarantees, and questioning the U.S. commitment to allied safety in the face of a ballistic missile threat would translate into questioning the U.S. commitment to allied nuclear safety in the most fundamental sense. Robust missile defense systems would affect the dynamics of decision-making, creating additional options and providing more time to sort through them and their implications to arrive at the option that best serves U.S. security interests. The effect could well be profoundly stabilizing.

Missile defense is an important enabler in nonproliferation efforts and alliance management. Many U.S. allies have the technological capability and expertise to produce their own nuclear weapons. They have not done so because of their belief in U.S. assurances to protect them. U.S. missile defense systems are

seen as an integral part of America's visible commitment to its allies' security.

The U.S. missile defense system comprises three critical physical parts: sensors, interceptors, and command and control infrastructure that provides data from sensors to interceptors. Of these, interceptors receive much of the public's attention because of their very visible and kinetic nature. Different physical components of a ballistic missile defense system are designed with the phase of flight in which an intercept occurs in mind, although some of them—for example, the command and control infrastructure or radars—can support intercepts in various phases of a ballistic missile flight. Interceptors can shoot down an adversary's missile in the boost, ascent, midcourse, or terminal phase of its flight.

Another way to consider ballistic missile defense systems is by the range of an incoming ballistic missile (short-range, medium-range, intermediate-range, or long-range) that an interceptor is designed to shoot down. The length of the interceptor's flight time determines how much time is available to conduct an intercept and where the various components of a defense system must be placed to improve the probability of such an intercept. With long-range ballistic missiles, the United States has no more than 33 minutes to detect the missile, track it, provide the information to the missile defense system, come up with the most optimal firing solution, launch an interceptor, and shoot down an incoming missile, ideally with enough time to fire another interceptor if the first attempt fails. The time frame is shorter when it comes to medium-range and short-range ballistic missiles.

Finally, missile defense can be framed by the origin of interceptor launch. At present, U.S. interceptors are launched from the ground or from the sea. In the past, the United States explored concepts to launch interceptors from the air or from space, but limited efforts have been made on that front since the U.S. withdrawal from the Anti-Ballistic Missile Treaty in 2002.<sup>5</sup> There is renewed interest in boost-phase missile defense concepts within

the Trump Administration, although the fiscal year (FY) 2020 budget submission for the Missile Defense Agency (MDA) allocates only about \$34 million for boost-phase missile defense systems, which is certainly not enough to develop and deploy a boost-phase missile defense system anytime soon.

The current U.S. missile defense system is a result of investments made by successive U.S. Administrations. President Ronald Reagan's vision for the program was to have a layered ballistic missile defense system that would render nuclear weapons "impotent and obsolete," including ballistic missile defense interceptors in space.<sup>6</sup> These layers would include boost, ascent, midcourse, and terminal interceptors, including directed-energy interceptors, so that the United States would have more than one opportunity to shoot down an incoming missile.

The United States stopped far short of this goal, even though the Strategic Defense Initiative (SDI) program resulted in tremendous technological advances and benefits.<sup>7</sup> Instead of a comprehensive layered system, the U.S. has no boost-phase ballistic missile defense systems and is unable to handle more qualitatively and quantitatively advanced ballistic missile threats like those from China or Russia.

Regrettably, the volatility and inconsistency of priority and funding for ballistic missile defense by successive Administrations and Congresses controlled by both major political parties have led to the current system, which is numerically and technologically limited and cannot address more sophisticated or more numerous long-range ballistic missile attacks. Until the 2017 National Defense Authorization Act (NDAA), U.S. policy was one of protection only from a "limited" ballistic missile attack.<sup>8</sup> The 2017 NDAA dropped the word "limited" that had been a fixture of policy since enactment of the National Missile Defense Act of 1999<sup>9</sup> even as it continued to focus on ballistic missiles.

In the future, as technological trends progress and modern technologies become cheaper and more widely available, North Korean or

Iranian ballistic missiles may rival in sophistication if not numbers those of Russia or China. Consequently, the U.S. must remain aware of how such threats are evolving and alter its missile defense posture accordingly.

In January 2019, the Trump Administration published its congressionally mandated *Missile Defense Review* (MDR), a statement of policy intended to guide the Administration's missile defense programs. The MDR endorses a space-based sensor layer,<sup>10</sup> which is needed to make existing missile defense systems more effective, but the Administration failed to request resources for such a sensor layer in the MDA's FY 2020 budget. In FY 2020, the Trump Administration requested \$9,431 billion for the MDA, the government agency with primary responsibility for developing, testing, fielding, and integrating a layered ballistic missile defense system. The request is a decrease of \$1.06 billion from the FY 2019 enacted budget.<sup>11</sup>

## Interceptors

A limited U.S. missile defense system has been supported by Administrations and Congresses controlled by both major political parties, Republican and Democrat, as all have found such a system to be of immense importance in dealing with some of the most challenging national security problems of our time, including the North Korean and Iranian ballistic missile threats. That said, different types of interceptors have been emphasized over the years, and the composition of today's U.S. missile defense reflects these choices.

Ballistic missile defense interceptors are designed to intercept ballistic missiles in three different phases of their flight.

- **The boost phase** lasts from the launch of a missile from its platform until its engines stop thrusting.
- **The midcourse phase** is the longest and thus offers a unique opportunity to intercept an incoming threat and, depending on other circumstances like the trajectory of the incoming threat and quality of U.S.

tracking data, even a second shot at it if the first intercept attempt fails.

- **The terminal phase** is less than one minute long and offers a very limited opportunity to intercept a ballistic missile threat.

**Boost-Phase Interceptors.** The United States currently has no capability to shoot down ballistic missiles in their boost phase. Boost-phase intercept is the most challenging option technologically because of the very short time frame in which a missile is boosting, the missile's extraordinary rate of acceleration during this brief window of time, and the need to have the interceptor close to the launch site.<sup>12</sup> It is, however, also the most beneficial time to strike. A boosting ballistic missile is at its slowest speed compared to other phases; it is therefore not yet able to maneuver evasively and has not yet deployed decoys that complicate the targeting and intercept problem.

In the past, the United States pursued several boost-phase programs, including the Airborne Laser; the Network Centric Air Defense Element (NCADE); the Kinetic Energy Interceptor (KEI); and the Air Launched Hit-to-Kill (ALHK) missile. Each of these programs was eventually cancelled because of insurmountable technical challenges, unworkable operational concepts, or unaffordable costs. As stated in the MDR, the Trump Administration is exploiting an option of incorporating the F-35 initially as a sensor platform and later potentially as an interceptor platform for boost-phase intercepts.<sup>13</sup>

The MDA is working to leverage unmanned and space-based sensor technologies to utilize existing SM-3 interceptors (typically carried aboard ships for long-range anti-aircraft defense) for a boost-phase ballistic missile intercept, but these sensors are years from being deployed. In addition, the current budget environment does not adequately fund research into future missile defense technologies and is barely enough to keep the existing missile defense programs going or enable even their marginal improvement.

**Midcourse-Phase Interceptors.** The United States deploys two systems that can shoot down incoming ballistic missiles in the midcourse phase of flight. This phase offers more predictability as to where the missile is headed than is possible in the boost phase, but it also allows the missile time to deploy decoys and countermeasures that are designed to complicate interception by confusing sensors and radars.

The Ground-Based Midcourse Defense (GMD) system is the only system capable of shooting down a long-range ballistic missile headed for the U.S. homeland. The Trump Administration decided to increase the number of GMD interceptors in Alaska and California from 44 to 64 early in its term to keep up with the advancing ballistic missile threat. At about \$70 million apiece, the GMD interceptors may be rather expensive, but they are also a lot cheaper than a successful ballistic missile attack. In March 2019, the MDA conducted a groundbreaking and successful GMD test against a target simulating an intercontinental-range ballistic missile.

The Aegis defense system is a sea-based component of the U.S. missile defense system that is designed to address the threat of short-range; medium-range (1,000–3,000 kilometers); and intermediate-range (3,000–5,500 kilometers) ballistic missiles. It utilizes different versions of the Standard Missile-3 (SM-3) depending on the threat and other considerations like ship location and quality of tracking data. The U.S. Navy is planning to increase the number of BMD-capable ships “from 38 at the end of FY2018 to 59 at the end of FY2024.”<sup>14</sup> This planned increase reflects an increase in demands for these assets.

The Aegis-Ashore system in Romania and one being deployed to Poland will relieve some of the stress on the fleet because missile defense-capable cruisers and destroyers are multi-mission and are used for other purposes, such as anti-piracy operations, when released from ballistic missile missions by the shore-based systems. The Aegis-Ashore site is meant to protect U.S. European allies and

U.S. forces in Europe from the Iranian ballistic missile threat.

In order to increase the probability of an intercept, the United States has to shoot multiple interceptors at each incoming ballistic missile. At present, because its inventory of ballistic missile defense interceptors is limited, the United States can shoot down only a handful of ballistic missiles that have relatively unsophisticated countermeasures. Different technological solutions will have to be found to address more comprehensive and advanced ballistic missile threats like those from China or Russia.

**Terminal-Phase Interceptors.** The United States currently deploys three terminal-phase missile defense systems: Terminal High Altitude Area Defense (THAAD); Patriot Advanced Capability-3 (PAC-3); and Aegis BMD.

The THAAD system is capable of shooting down short-range and intermediate-range ballistic missiles inside and just outside of the atmosphere.<sup>15</sup> It consists of a launcher, interceptors, AN/TPY-2 radar, and fire control. The system is transportable and rapidly deployable. THAAD batteries have been deployed to such countries as Japan, South Korea, Israel, and the United Arab Emirates. The United States has also been planning to deploy a THAAD battery to Romania in support of NATO ballistic missile defense in the summer of 2019.<sup>16</sup>

The PAC-3 is an air-defense and short-range ballistic missile defense system. A battery is comprised of a launcher, interceptors, AN/MPQ-53/65 radar, an engagement control station, and diesel-powered generator units. The system is transportable, and the United States currently deploys it in several theaters around the world.<sup>17</sup> The system is the most mature of the U.S. missile defense systems.

The predecessor of the PAC-3 system, the Patriot, played a critical role in allied assurance during the First Gulf War when it was deployed to Israel. The purpose was to assure Israeli citizens by protecting them from Iraqi missiles, thereby decreasing the pressure on Israel's government to enter the war against Iraq. The

U.S. sought to prevent Israel from joining the U.S. coalition against Saddam Hussein's forces in Iraq, which would have fractured the Arab coalition.

The Aegis defense system also provides terminal capability against short-range and medium-range ballistic missiles, aerial threats, and cruise missiles, among others.<sup>18</sup>

## Sensors

The space sensor component of the U.S. missile defense system is distributed across three major domains—land, sea, and space—that are meant to provide the U.S. and its allies with the earliest possible warning of a launch of enemy ballistic missiles. Sensors can also provide information about activities preceding the launch itself, but from the intercept perspective, those are less relevant for the missile defense system.

Additionally, new threats are not flying on ballistic (and therefore relatively more predictable) trajectories, and U.S. sensors are not well equipped to handle these developments. Sensors do this by detecting the heat generated by a missile's engine, or booster. They can detect a missile launch, acquire and track a missile in flight, and even classify the type of projectile, its speed, and the target against which the missile has been directed. The sensors relay this information to the command and control stations that operate interceptor systems like Aegis (primarily a sea-based system) or THAAD (a land-based system).

On land, the major sensor installations are the upgraded early warning radars (UEWRs), which are concentrated along the North Atlantic and Pacific corridors that present the most direct flight path for a missile aimed at the U.S. This includes the phased array early warning radars based in California, the United Kingdom, and Greenland that scan objects up to 3,000 miles away.<sup>19</sup> These sensors focus on threats that can be detected starting in the missile's boost or launch phase when the release of exhaust gases creates a heat trail that is "relatively easy for sensors to detect and track."<sup>20</sup>

A shorter-range (2,000-mile) radar is based in Shemya, Alaska. Two additional sites, one in Cape Cod, Massachusetts, and the other in Clear, Alaska, are being modernized for use in the layered ballistic missile defense system.<sup>21</sup>

The other land-based sensors are mobile. These sensors are known as the Army Navy/Transportable Radar Surveillance and Control Model 2 (AN/TPY-2) and can be forward-deployed for early threat detection or retained closer to the homeland to track missiles in their terminal phase. Of the United States' 12 AN/TPY-2 systems, five are forward-deployed with U.S. allies.<sup>22</sup>

In March 2017, in cooperation with the Republic of Korea, the United States deployed a THAAD missile system to the Korean peninsula. This system was then accompanied in April by an AN/TPY-2. The THAAD deployment was heavily criticized by China for allegedly destabilizing China's nuclear deterrence credibility because the system would allegedly be able to shoot down any Chinese nuclear-tipped missiles after a U.S. first strike.<sup>23</sup> However, the THAAD system deployed in South Korea for the purposes of intercepting North Korean missiles is not set up in a way that could track or shoot down Chinese ICBMs directed toward the United States, which calls into question why China would be so opposed.<sup>24</sup>

There are two types of sea-based sensors. The first is the Sea-Based X-band (SBX) radar mounted on an oil-drilling platform, which can be relocated to different parts of the globe as threats evolve.<sup>25</sup> SBX is used primarily in the Pacific. The second is the SPY-1 radar system that is mounted on all 85 U.S. Navy vessels equipped with the Aegis Combat system, which means they can provide data that can be utilized for ballistic missile missions. Of these 85 ships, 38 are BMD-capable vessels that carry missile defense interceptors.<sup>26</sup>

The final domain in which U.S. missile defense operates is space. In a July 2017 conference call with reporters, the head of U.S. Strategic Command, General John Hyten, stated that space-based sensors are "the most important thing for [the U.S. government] to invest in right

now."<sup>27</sup> Control of the space BMD system is divided between the MDA and the U.S. Air Force. Regrettably, as noted, the Trump Administration largely failed to request funding for a space-based sensor layer in the MDA's FY 2020 budget.

The oldest system that contributes to the missile defense mission is the Defense Support Program (DSP) constellation of satellites, which use infrared sensors to identify heat from booster and missile plumes. The DSP satellite system is set to be replaced by the Space-Based Infrared Radar System (SBIRS) to improve the delivery of missile defense and battlefield intelligence.<sup>28</sup> One of the advantages of SBIRS is its ability to scan a wide swath of territory while simultaneously tracking a specific target, making it a good scanner for observing tactical, or short-range, ballistic missiles.<sup>29</sup> However, congressional funding delays have left SBIRS underfunded and hampered the system's full development and deployment.<sup>30</sup>

Finally, the MDA operates the Space Tracking and Surveillance System-Demonstrators (STSS-D) satellite system. Two STSS-D satellites were launched into orbit in 2009 to track ballistic missiles that exit and reenter the Earth's atmosphere during the midcourse phase.<sup>31</sup> Although still considered an experimental system, STSS-D satellites provide operational surveillance and tracking capabilities and have the advantage of a variable waveband infrared system to maximize their detection capabilities. Data obtained by STSS-D have been used in ballistic missile defense tests.

## Command and Control

The command and control architecture established for the U.S. ballistic missile defense system brings together data from U.S. sensors and relays them to interceptor operators to enable them to destroy incoming missile threats against the U.S. and its allies. The operational hub of missile defense command and control is assigned to the Joint Functional Component Command for Integrated Missile Defense (JFCC IMD) housed at Schriever Air Force Base, Colorado.

Under the jurisdiction of U.S. Strategic Command, JFCC IMD brings together Army, Navy, Marine Corps, and Air Force personnel. It is co-located with the MDA's Missile Defense Integration and Operation Center (MDIOC). This concentration of leadership from across the various agencies helps to streamline decision-making for those who command and operate the U.S. missile defense system.<sup>32</sup>

Command and control operates through a series of data collection and communication relay nodes between military operators, sensors, radars, and missile interceptors. The first step is the Ground-based Midcourse Defense Fire Control (GFC) process, which involves assimilating data on missile movement from the United States' global network of sensors.

Missile tracking data travel through the Defense Satellite Communications System (DSCS), which is operated from Fort Greeley, Alaska, and Vandenberg Air Force Base, or through ground-based redundant communication lines to the Command Launch Equipment (CLE) software that develops fire response options, telling interceptors where and when to fire. Once U.S. Strategic Command, in consultation with the President, has determined the most effective response to a missile threat, the CLE fire response option is relayed to the appropriate ground-based interceptors in the field. When the selected missiles have been fired, they maintain contact with an In-Flight Interceptor Communications System (IFICS) Data Terminal (IDT) to receive updated flight correction guidance to ensure that they hit their target.<sup>33</sup>

Overlaying the command and control operation is the Command and Control, Battle Management and Communication (C2BMC) program. Through its software and network systems, C2BMC feeds information to and synchronizes coordination between the multiple layers of the ballistic missile defense system.<sup>34</sup> More than 70 C2BMC workstations are distributed throughout the world at U.S. military bases.<sup>35</sup> C2BMC has undergone multiple technical upgrades since 2004.

## Conclusion

By successive choices of post-Cold War Administrations and Congresses, the United States does not have in place a comprehensive set of missile defense systems that would be capable of defending the homeland and allies from robust ballistic missile threats. U.S. efforts have focused on a limited architecture protecting the homeland and on deploying and advancing regional missile defense systems.

The pace of the development of missile threats, both qualitative and quantitative, outpaces the speed of missile defense research, development, and deployment. To make matters worse, the United States has not invested sufficiently in future ballistic missile defense technologies, has canceled future missile defense programs like the Airborne Laser and the Multiple Kill Vehicle, and has never invested in space-based interceptors that would make U.S. defenses more robust and comprehensive.

## Endnotes

1. Following missile threat developments, Congress mandated that the Trump Administration conduct a review of missile threats to the U.S. and its interests, as opposed to the Obama Administration's mandate to focus on ballistic missiles only. This section of the *Index* has been updated to reflect these developments.
2. U.S. Air Force, National Air and Space Intelligence Center (NASIC), and Defense Intelligence Ballistic Missile Analysis Committee (DIBMAC), *2017 Ballistic and Cruise Missile Threat*, NASIC-1031-0985-17, June 2017, pp. 38–39, [http://www.nasic.af.mil/Portals/19/images/Fact%20Sheet%20Images/2017%20Ballistic%20and%20Cruise%20Missile%20Threat\\_Final\\_small.pdf?ver=2017-07-21-083234-343](http://www.nasic.af.mil/Portals/19/images/Fact%20Sheet%20Images/2017%20Ballistic%20and%20Cruise%20Missile%20Threat_Final_small.pdf?ver=2017-07-21-083234-343) (accessed August 25, 2019).
3. John Rood, Undersecretary of Defense for Policy, statement on missile defense policy, posture, and budget before the Subcommittee on Strategic Forces, Committee on Armed Services, U.S. Senate, April 3, 2019, p. 1, <https://www.armed-services.senate.gov/hearings/19-04-03-missile-defense-policies-and-programs> (accessed August 23, 2019).
4. “Moreover, these potentially peer strategic competitors [Russia and China] are ‘root sources’ for enabling rogue states and non-state armed groups that are developing asymmetrical strategies and capabilities to employ cyber and EMP attacks to disrupt or destroy critically important space systems and essential civil infrastructure, such as electric power grids, communication, financial, transportation, and food distribution systems—as well as key military systems. Such an attack would represent the ultimate asymmetrical act by a smaller state or terrorists against the United States.” Henry F. Cooper, Malcolm R. O’Neil, Robert L. Pfaltzgraff, Jr., and Rowland H. Worrell, “Missile Defense: Challenges and Opportunities for the Trump Administration,” Institute for Foreign Policy Analysis, Independent Working Group on Missile Defense *White Paper*, 2016, pp. 12–13, <http://www.ifpa.org/pdf/IWGWhitePaper16.pdf> (accessed August 24, 2019).
5. The platform carrying air-launched ballistic missile interceptors has to be close to the launch area, aloft, oriented in a proper way, and generally within the range of enemies’ anti-access/area-denial systems because of payload limits on airborne platforms themselves. These requirements make airborne intercepts particularly challenging.
6. Ronald Reagan, “Address to the Nation on National Security,” March 23, 1983, <https://millercenter.org/the-presidency/presidential-speeches/march-23-1983-address-nation-national-security> (accessed August 24, 2019).
7. For example, SDI Organization investment contributed to making certain electronic and optical components cheaper and more effective. It helped to reduce the cost per pixel on a display screen by a factor of 20. Additional advances were made in areas of sensor technology, communications, and computers. For more information, see James A. Abrahamson and Henry F. Cooper, *What Did We Get for Our \$30-Billion Investment in SDI/BMD?* National Institute for Public Policy, September 1993, pp. 9–11, [http://www.nipp.org/wp-content/uploads/2014/11/What-for-30B\\_.pdf](http://www.nipp.org/wp-content/uploads/2014/11/What-for-30B_.pdf) (accessed August 24, 2019).
8. National Defense Authorization Act for Fiscal Year 2017, Public Law 114–328, 114th Cong., December 23, 2016, <https://www.congress.gov/114/plaws/publ328/PLAW-114publ328.pdf> (accessed August 24, 2019). The understanding of the word “limited” itself changed over time, from scaling a missile defense system to shoot down about 200 reentry vehicles right after the end of the Cold War (because that is how many a rogue Soviet commander was believed to be able to launch from a submarine) to only a handful of relatively less sophisticated North Korean or Iranian ballistic missiles. For more information, see Independent Working Group on Missile Defense, the Space Relationship, and the Twenty-First Century, *2009 Report*, Institute for Foreign Policy Research and Analysis, 2009, p. 17, <http://www.ifpa.org/pdf/IWG2009.pdf> (accessed August 24, 2019).
9. National Missile Defense Act of 1999, Public Law 106–38, 106th Cong., July 22, 1999, <https://www.congress.gov/106/plaws/publ38/PLAW-106publ38.pdf> (accessed August 25, 2019).
10. U.S. Department of Defense, Missile Defense Agency, *2019 Missile Defense Review*, p. VII, [https://www.defense.gov/Portals/1/Interactive/2018/11-2019-Missile-Defense-Review/The%202019%20MDR\\_Executive%20Summary.pdf](https://www.defense.gov/Portals/1/Interactive/2018/11-2019-Missile-Defense-Review/The%202019%20MDR_Executive%20Summary.pdf) (accessed August 25, 2019).
11. U.S. Department of Defense, Missile Defense Agency, *Missile Defense Agency Fiscal Year (FY) 2020 Budget Estimates: Overview*, approved for public release March 7, 2019, p. 2, <https://www.mda.mil/global/documents/pdf/budgetfy20.pdf> (accessed August 24, 2019).
12. See Chapter 4, “Comparison of Utility, Maturity, and Cost-Effectiveness,” in National Research Council of the National Academies, Committee on an Assessment of Concepts and Systems for U.S. Boost-Phase Missile Defense in Comparison to Other Alternatives, Division on Engineering and Physical Sciences, *Making Sense of Ballistic Missile Defense: An Assessment of Concepts and Systems for U.S. Boost-Phase Missile Defense in Comparison to Other Alternatives* (Washington: National Academies Press, 2012), pp. 107–129, <https://www.nap.edu/read/13189/chapter/6> (accessed August 25, 2019).
13. U.S. Department of Defense, Missile Defense Agency, *2019 Missile Defense Review*, pp. XIII–XIV.
14. Ronald O’Rourke, “Navy Aegis Ballistic Missile Defense (BMD) Program: Background and Issues for Congress,” Congressional Research Service *Report for Members and Committees of Congress*, updated July 24, 2019, p. 7, <https://crsreports.congress.gov/product/pdf/RL/RL3745> (accessed August 24, 2019).



15. Fact Sheet, "Terminal High Altitude Area Defense," U.S. Department of Defense, Missile Defense Agency, approved for public release September 24, 2018, <https://www.mda.mil/global/documents/pdf/thaad.pdf> (accessed August 24, 2019), and Phil Stewart and Idrees Ali, "U.S. THAAD Missile Defenses Hit Test Target as North Korea Tension Rises," Reuters, July 11, 2017, <https://www.reuters.com/article/us-northkorea-missiles-usa-defenses/u-s-thaad-missile-defenses-hit-test-target-as-north-korea-tension-rises-idUSKBN19W15R> (accessed August 24, 2019).
16. David Axe, "Russia Won't Like This: THAAD Missile Defense System Headed to Europe," *The National Interest*, April 14, 2019, <https://nationalinterest.org/blog/buzz/russia-wont-thaad-missile-defense-system-headed-europe-52437> (accessed August 24, 2019).
17. Fact Sheet, "Patriot Advanced Capability-3," U.S. Department of Defense, Missile Defense Agency, approved for public release July 18, 2016, <https://www.mda.mil/global/documents/pdf/pac3.pdf> (accessed August 24, 2019).
18. Fact Sheet, "Aegis Ballistic Missile Defense," U.S. Department of Defense, Missile Defense Agency, approved for public release July 28, 2016, <https://www.mda.mil/global/documents/pdf/aegis.pdf> (accessed August 24, 2019).
19. Fact Sheet, "Upgraded Early Warning Radars, AN/FPS-132," U.S. Department of Defense, Missile Defense Agency, approved for public release July 28, 2016, <https://www.mda.mil/global/documents/pdf/uewr1.pdf> (accessed August 24, 2019).
20. Cooper, O'Neill, Pfaltzgraff, and Worrell, "Missile Defense: Challenges and Opportunities for the Trump Administration," p. 23, note 47.
21. Fact Sheet, "Cobra Dane," U.S. Department of Defense, Missile Defense Agency, approved for public release July 28, 2016, <https://www.mda.mil/global/documents/pdf/cobradane.pdf> (accessed August 24, 2019).
22. Fact Sheet, "Army Navy/Transportable Radar Surveillance (AN/TYP-2)," approved for public release July 28, 2016, [https://www.mda.mil/global/documents/pdf/an\\_tpy2.pdf](https://www.mda.mil/global/documents/pdf/an_tpy2.pdf) (accessed August 24, 2019).
23. Ankit Panda, "THAAD and China's Nuclear Second-Strike Capability," *The Diplomat*, March 8, 2017, <https://thediplomat.com/2017/03/thaad-and-chinas-nuclear-second-strike-capability/> (accessed August 24, 2019).
24. Bruce Klingner, "South Korea Needs THAAD Missile Defense," Heritage Foundation *Backgrounder* No. 3024, June 12, 2015, <http://www.heritage.org/defense/report/south-korea-needs-thaad-missile-defense>.
25. Fact Sheet, "Sea-Based X-Band Radar," U.S. Department of Defense, Missile Defense Agency, approved for public release February 1, 2018, <https://www.mda.mil/global/documents/pdf/sbx.pdf> (accessed August 24, 2019).
26. Thomas Karako, Ian Williams, and Wes Rumbaugh, *Missile Defense 2020: Next Steps for Defending the Homeland*, Center for Strategic and International Studies, Missile Defense Project, April 2017, [https://missilethreat.csis.org/wp-content/uploads/2017/04/170406\\_Karako\\_MissileDefense2020\\_Web.pdf](https://missilethreat.csis.org/wp-content/uploads/2017/04/170406_Karako_MissileDefense2020_Web.pdf) (accessed August 24, 2019); Fact Sheet, "Aegis Ballistic Missile Defense," and Missile Defense Advocacy Alliance, "AN/SPY-1 Radar," <http://missiledefenseadvocacy.org/missile-defense-systems-2/missile-defense-systems/u-s-deployed-sensor-systems/anspy-1-radar/> (accessed August 24, 2019).
27. Wilson Brissett, "U.S. Missile Defense Needs Space-Based Sensors, Hyten Says," *Air Force Magazine*, July 27, 2017, <http://www.airforcemag.com/Features/Pages/2017/July%202017/US-Missile-Defense-Needs-Space-Based-Sensors-Hyten-Says.aspx> (accessed August 24, 2019).
28. U.S. Air Force, Air Force Space Command, "Space Based Infrared System," published March 22, 2017, current as of April 2019, <http://www.afspc.af.mil/About-Us/Fact-Sheets/Display/Article/1012596/space-based-infrared-system/> (accessed on August 24, 2019).
29. Center for Strategic and International Studies, Missile Defense Project, "Space-based Infrared System (SBIRS)," last updated June 15, 2018, <https://missilethreat.csis.org/defsys/sbirs/> (accessed August 24, 2019).
30. Sandra Erwin, "Production of New Missile Warning Satellites Likely Delayed by Budget Impasse," *SpaceNews*, October 20, 2017, <http://spacenews.com/production-of-new-missile-warning-satellites-likely-delayed-by-budget-impasse/> (accessed August 24, 2019).
31. Fact Sheet, "Space Tracking and Surveillance System," U.S. Department of Defense, Missile Defense Agency, approved for public release March 27, 2017, <https://www.mda.mil/global/documents/pdf/stss.pdf> (accessed August 24, 2019).
32. U.S. Strategic Command, "Joint Functional Component Command for Integrated Missile Defense (JFCC IMD)," current as of February 2016, <http://www.stratcom.mil/Portals/8/Documents/JFCC%20IMD%20Fact%20Sheet.pdf> (accessed August 24, 2019).
33. Karako, Williams, and Rumbaugh, *Missile Defense 2020: Next Steps for Defending the Homeland*, pp. 101-103.
34. Fact Sheet, "Command and Control, Battle Management, and Communications," U.S. Department of Defense, Missile Defense Agency, approved for public release July 28, 2016, <https://www.mda.mil/global/documents/pdf/c2bmc.pdf> (accessed August 24, 2019).
35. "C2BMC: Putting the 'System' in Ballistic Missile Defense," *Defense Industry Daily*, May 11, 2017, <https://www.defenseindustrydaily.com/c2bmc-putting-the-system-in-ballistic-missile-defense-06323/> (accessed August 24, 2019).



# Conclusion: U.S. Military Power

The Active Component of the U.S. military is two-thirds the size it should be, operates equipment that is older than should be the case, and is burdened by readiness levels that are problematic. Accordingly, this *Index* assesses the:

- **Army as “Marginal.”** The Army’s score remains “marginal” in the *2020 Index*. The Army has continued to increase its readiness, earning the score of “very strong” with 77 percent of its brigade combat teams assessed as ready. However, it continues to struggle to rebuild end strength and modernization for improved readiness in some units for current operations.
- **Navy as “Marginal.”** The Navy’s overall score remains “marginal” in the *2020 Index*. The Navy’s emphasis on restoring readiness and increasing its capacity signals that its overall score could improve in the near future if needed levels of funding are sustained. However, manpower presents a potential problem as the Navy looks to increase the size of the fleet.
- **Air Force as “Marginal.”** This score has trended downward over the past few years largely because of a drop in “capacity” that has not effectively changed and a readiness score of “weak.” Shortages of pilots and flying time have degraded the ability of the Air Force to generate the air power that would be needed to meet wartime requirements.
- **Marine Corps as “Marginal.”** The Marine Corps has improved from “weak” to “marginal” in the *2020 Index*. This change is based on an improvement in readiness following increased investment of funds and focus on high-end warfare. Capacity issues remain an issue because the force still falls well below the recommended number of battalions.
- **Nuclear Capabilities as “Marginal.”** The U.S. nuclear complex is “trending toward strong,” but this assumes that the U.S. maintains its commitment to modernization and allocates needed resources accordingly. Although bipartisan attention has led to continued progress on U.S. nuclear forces modernization and warhead sustainment, these programs remain threatened by potential future fiscal uncertainties, as do the infrastructure, testing regime, and manpower pool on which the nuclear enterprise depends.

**In the aggregate, the United States’ military posture is rated “marginal.” The *2020 Index* concludes that the current U.S. military force is likely capable of meeting the demands of a single major regional conflict** while also attending to various presence and engagement activities but that it would be very hard-pressed to do more and certainly would be ill-equipped to handle two nearly simultaneous major regional contingencies (MRCs).

The military services have prioritized readiness and have seen improvement over the

past couple of years. However, modernization programs continue to suffer as resources are redirected toward current operations and sustainment of readiness levels. The services have also normalized the reduction in size and number of military units, and the forces remain well below the level they need to meet the two-MRC benchmark.

Congress and the Administration took positive steps to stabilize funding for FY 2018 and FY 2019 through the Bipartisan

Budget Agreement of 2018 and, through the Bipartisan Budget Act of 2019, managed to sustain such support for funding above the caps imposed by the Budget Control Act of 2011 (BCA). While this allays the most serious concerns about a return to the damaging levels of the BCA, more will be needed in the years to come to ensure that the U.S. military is properly sized, equipped, trained, and ready to meet the missions that the services are called upon to fulfill.

### U.S. Military Power: Army

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Capacity		✓			
Capability			✓		
Readiness					✓
<b>OVERALL</b>			✓		

### U.S. Military Power: Navy

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Capacity		✓			
Capability			✓		
Readiness			✓		
<b>OVERALL</b>			✓		

### U.S. Military Power: Air Force

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Capacity			✓		
Capability			✓		
Readiness			✓		
<b>OVERALL</b>			✓		

## U.S. Military Power: Marine Corps

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Capacity		✓			
Capability			✓		
Readiness			✓		
<b>OVERALL</b>			✓		

## U.S. Military Power: Nuclear

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Nuclear Stockpile				✓	
Delivery Platform Reliability			✓		
Warhead Modernization			✓		
Delivery Systems Modernization				✓	
Nuclear Weapons Complex			✓		
National Labs Talent			✓		
Force Readiness				✓	
Allied Assurance				✓	
Nuclear Test Readiness		✓			
<b>OVERALL</b>			✓		

## U.S. Military Power

	VERY WEAK	WEAK	MARGINAL	STRONG	VERY STRONG
Army			✓		
Navy			✓		
Air Force			✓		
Marine Corps			✓		
Nuclear			✓		
<b>OVERALL</b>			✓		



# Glossary of Abbreviations

## A

<b>A2/AD</b>	anti-access/area-denial
<b>AAMDS</b>	Aegis Ashore Missile Defense System
<b>AAV</b>	Amphibious Assault Vehicle
<b>ABM</b>	Ansar Bayt al-Maqdis
<b>ACF</b>	Army contingency force
<b>ACV</b>	Amphibious Combat Vehicle
<b>ADIZ</b>	Air Defense Identification Zone
<b>AEHF</b>	Advanced Extremely High Frequency (satellite system)
<b>AEW</b>	airborne early warning
<b>AFAFRICA</b>	U.S. Air Forces Africa
<b>AFP</b>	Armed Forces of the Philippines
<b>AFRICOM</b>	U.S. Africa Command
<b>AFSOC</b>	U.S. Air Force Special Operations Command
<b>AIP</b>	Air Independent Propulsion
<b>AIT</b>	American Institute in Taiwan
<b>AMDR</b>	Air and Missile Defense Radar
<b>AMPV</b>	Armored Multipurpose Vehicle
<b>ANSF</b>	Afghan National Security Forces
<b>AN/TPY-2</b>	Army Navy/Transportable Radar Surveillance
<b>ANZUS</b>	Australia–New Zealand–U.S. Security Treaty
<b>AUSMIN</b>	Australia–United States Ministerial
<b>AOR</b>	area of responsibility
<b>APC</b>	armored personnel carrier
<b>APS</b>	Army Prepositioned Stocks
<b>AQAP</b>	Al-Qaeda in the Arabian Peninsula
<b>AQI</b>	Al-Qaeda in Iraq
<b>AQIM</b>	Al-Qaeda in the Islamic Maghreb
<b>ARG</b>	amphibious ready group
<b>ASBM</b>	Anti-ship ballistic missile
<b>ASEAN</b>	Association of Southeast Asian Nations
<b>ASW</b>	anti-submarine warfare
<b>ASUW</b>	anti-surface warfare
<b>AW</b>	air warfare

# B

<b>BBA</b>	Bipartisan Budget Act of 2015
<b>BCA</b>	Budget Control Act of 2011
<b>BCT</b>	brigade combat team
<b>BDCA</b>	border defense cooperation agreement
<b>BJP</b>	Bharatiya Janata Party
<b>BMD</b>	ballistic missile defense
<b>BUR</b>	Bottom-Up Review
<b>BVR</b>	beyond visual recognition

# C

<b>C2</b>	command and control
<b>C4ISR</b>	command, control, communications, computers, intelligence, surveillance, and reconnaissance
<b>CA</b>	civil affairs
<b>CAB</b>	combat aviation brigade
<b>CBO</b>	Congressional Budget Office
<b>CCDR</b>	Combatant Commander
<b>CCMD</b>	Combatant Command
<b>CCT</b>	Combat Controller
<b>CELAC</b>	Community of Latin American and Caribbean States
<b>CENTCOM</b>	U.S. Central Command
<b>CFC</b>	Combined Forces Command (South Korea-U.S.)
<b>CIA</b>	Central Intelligence Agency
<b>CJTF-HOA</b>	Combined Joint Task Force-Horn of Africa
<b>CLF</b>	Combat Logistics Force
<b>CMRR</b>	Chemistry and Metallurgy Research Replacement
<b>CMT</b>	combat mission team
<b>CONUS</b>	continental United States
<b>CPMIEC</b>	China Precision Machinery Import-Export Corporation
<b>CPT</b>	Cyber Protection Team
<b>CSF</b>	coalition support funds
<b>CSG</b>	carrier strike group
<b>CSO</b>	Critical Skills Operator
<b>CT</b>	counterterrorism
<b>CTC</b>	Combat Training Centers
<b>CTF</b>	Combined Task Force
<b>CTIC</b>	Counter Terrorism Information Center



<b>CVN</b>	Aircraft Carriers
<b>CVW</b>	carrier air wing
<b>CW</b>	chemical warfare
<b>CYBERCOM</b>	U.S. Cyber Command

## D

<b>D2D</b>	deployment-to-dwell
<b>DA-KKV</b>	direct-ascent kinetic-kill vehicle
<b>DDPR</b>	Deterrence and Defense Posture Review
<b>DIME</b>	diplomatic, informational, military, and economic
<b>DMZ</b>	demilitarized zone
<b>DNI</b>	Director of National Intelligence
<b>DOD</b>	U.S. Department of Defense
<b>DOE</b>	U.S. Department of Energy
<b>DOS</b>	denial of service
<b>DDOS</b>	distributed denial of service
<b>DPRK</b>	Democratic People's Republic of Korea (North Korea)
<b>DTTI</b>	Defense Trade and Technology Initiative
<b>DSG</b>	Defense Strategic Guidance
<b>DSR</b>	Defense Strategic Review

## E

<b>EAS</b>	European Activity Set
<b>EBO</b>	effects-based operations
<b>ECP</b>	engineering change proposal
<b>EDCA</b>	Enhanced Defense Cooperation Agreement
<b>EEZ</b>	exclusive economic zone
<b>EFV</b>	Expeditionary Fighting Vehicle
<b>EOD</b>	explosive ordnance disposal
<b>EMD</b>	engineering and manufacturing development
<b>EMP</b>	electromagnetic pulse
<b>ERI</b>	European Reassurance Initiative
<b>ESG</b>	Expeditionary Strike Group
<b>EUCOM</b>	U.S. European Command
<b>EW</b>	electronic warfare

## F

<b>FATA</b>	Federally Administered Tribal Areas
<b>FCS</b>	Future Combat Systems
<b>FOC</b>	full operational capability
<b>FONOPS</b>	freedom of navigation exercises
<b>FTA</b>	free trade agreement

## G

<b>GAO</b>	Government Accountability Office (formerly General Accounting Office)
<b>GATOR</b>	Ground/Air Task Oriented Radar
<b>GCC</b>	geographic combatant commander
<b>GCC</b>	Gulf Cooperation Council
<b>GCV</b>	Ground Combat Vehicle
<b>GDP</b>	Gross Domestic Product
<b>GFMAP</b>	Global Force Management Allocation Plan
<b>GEO</b>	geosynchronous orbit
<b>GPF</b>	general purpose forces
<b>GPS</b>	Global Positioning System

## H

<b>HA/DR</b>	humanitarian assistance/disaster relief
<b>HEO</b>	highly elliptical orbit
<b>HMMWV</b>	High Mobility Multipurpose Wheeled Vehicle (“HUMVEE”)
<b>HVE</b>	homegrown violent extremist

## I

<b>ICBM</b>	intercontinental ballistic missile
<b>ICS</b>	industrial control systems
<b>IDF</b>	Israel Defense Forces
<b>IED</b>	Improvised Explosive Device
<b>IFV</b>	infantry fighting vehicle
<b>IMF</b>	International Monetary Fund
<b>INEW</b>	Integrated Network Electronic Warfare
<b>INF</b>	Intermediate-Range Nuclear Forces (treaty)
<b>IOC</b>	initial operating capability

<b>IRGC</b>	Islamic Revolutionary Guard Corps
<b>ISAF</b>	International Security Assistance Force
<b>ISIL</b>	Islamic State of Iraq and the Levant
<b>ISIS</b>	Islamic State of Iraq and Syria
<b>ISR</b>	intelligence, surveillance, and reconnaissance

## J

<b>JOAC</b>	Joint Operational Access Concept
<b>JeM</b>	Jaish-e-Mohammed
<b>JP</b>	joint publication
<b>JSF</b>	Joint Strike Fighter (F-35 Lightning II)
<b>JSOC</b>	Joint Special Operations Command
<b>JSTAR</b>	Joint Surveillance and Target Attack Radar System
<b>JLTV</b>	Joint Light Tactical Vehicle
<b>JTF North</b>	Joint Task Force North
<b>JuD</b>	Jamaat-ud-Dawa

## K

<b>KATUSA</b>	Korean Augmentees to the United States Army
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## L

<b>LAC</b>	Line of Actual Control
<b>LAF</b>	Lebanese Armed Forces
<b>LAV</b>	Light Armored Vehicle
<b>LCAC</b>	Landing Craft Air Cushion Vehicle
<b>LCS</b>	Littoral Combat Ship
<b>LeT</b>	Lashkar-e-Taiba
<b>LHA</b>	landing helicopter assault (amphibious ship)
<b>LHD</b>	landing helicopter dock (amphibious ship)
<b>LNG</b>	liquefied natural gas
<b>LoC</b>	Line of Control
<b>LPD</b>	landing platform/dock or amphibious transport dock (amphibious ship)
<b>LRA</b>	Lord's Resistance Army
<b>LRS-B</b>	Long-Range Strike Bomber
<b>LRIP</b>	Low-Rate Initial Production
<b>LSD</b>	landing ship, dock (amphibious ship)

# M

<b>MAGTF</b>	Marine Air-Ground Task Force
<b>MANPADS</b>	man-portable air-defense systems
<b>MARCENT</b>	U.S. Marine Corps Forces Central Command
<b>MARFORAF</b>	U.S. Marine Corps Forces Africa
<b>MARFOREUR</b>	U.S. Marine Corps Forces Europe and Africa
<b>MARFORPAC</b>	U.S. Marine Corps Forces, Pacific
<b>MARSOC</b>	U.S. Marine Corps Special Operations Command
<b>MCM</b>	mine countermeasure (ship)
<b>MCO</b>	major combat operation (see MRC, MTW)
<b>MCMV</b>	mine countermeasure vessel (ship)
<b>MDAP</b>	Major Defense Acquisition Program
<b>MEB</b>	Marine Expeditionary Brigade
<b>MEF</b>	Marine Expeditionary Force
<b>MISO</b>	Military Information Special Operations
<b>MNLA</b>	National Movement for the Liberation of Azawad
<b>MNLF</b>	Moro National Liberation Front
<b>MNNA</b>	major non-NATO ally
<b>MOJWA</b>	Movement for Oneness and Jihad in West Africa
<b>MPC</b>	Marine Personnel Carrier
<b>MPS</b>	Maritime Prepositioning Ships
<b>MRC</b>	major regional conflict (see MTW, MCO)
<b>MRAP</b>	Mine-Resistant Ambush-Protected (vehicle)
<b>MRBM</b>	medium-range ballistic missile
<b>MRF</b>	Marine Rotational Force
<b>MTW</b>	major theater war (see MCO, MRC)

# N

<b>NAP</b>	National Action Plan
<b>NATO</b>	North Atlantic Treaty Organization
<b>NAVAF</b>	U.S. Naval Forces Africa
<b>NAVEUR</b>	U.S. Naval Forces Europe
<b>NDN</b>	Northern Distribution Network
<b>NDAA</b>	National Defense Authorization Act
<b>NDP</b>	National Defense Panel
<b>New START</b>	New Strategic Arms Reduction Treaty
<b>NNSA</b>	National Nuclear Security Administration

<b>NPR</b>	Nuclear Posture Review
<b>NPRIS</b>	Nuclear Posture Review Implementation Study
<b>NSC</b>	National Security Council
<b>NSR</b>	Northern Sea Route
<b>NSWC</b>	Naval Special Warfare Command

## O

<b>OAS</b>	Organization of American States
<b>OCO</b>	overseas contingency operations
<b>OEF</b>	Operation Enduring Freedom
<b>OIF</b>	Operation Iraqi Freedom
<b>O-FRP</b>	Optimized Fleet Response Plan
<b>ONA</b>	Office of Net Assessment
<b>ONE</b>	Operation Noble Eagle
<b>OPCON</b>	operational control
<b>OPLAN</b>	operational plan
<b>OPTEMPO</b>	operational tempo
<b>OSCE</b>	Organization for Security and Co-operation In Europe

## P

<b>PACAF</b>	U.S. Pacific Air Forces
<b>PACFLT</b>	U.S. Pacific Fleet
<b>PACOM</b>	U.S. Pacific Command
<b>PAF</b>	Philippine Air Force
<b>PDD-15</b>	Presidential Decision Directive-15
<b>PIM</b>	Paladin Integrated Management
<b>PLFP</b>	Popular Front for the Liberation of Palestine
<b>PLFP-GC</b>	Popular Front for the Liberation of Palestine–General Command
<b>PKO</b>	peacekeeping operation
<b>PLA</b>	People’s Liberation Army
<b>PLAAF</b>	People’s Liberation Army Air Force
<b>PLAN</b>	People’s Liberation Army Navy
<b>PLO</b>	Palestine Liberation Organization
<b>PNI</b>	Presidential Nuclear Initiative
<b>PNT</b>	positioning, navigation, and timing
<b>PRC</b>	People’s Republic of China

<b>PRT</b>	Provisional Reconstruction Team
<b>PSA</b>	Port of Singapore Authority
<b>PSF</b>	Peninsula Shield Force

## Q

<b>QDR</b>	Quadrennial Defense Review
<b>QNSTR</b>	Quadrennial National Security Threats and Trends

## R

<b>RAF</b>	Royal Air Force
<b>RBA</b>	Ready Basic Aircraft
<b>RCOH</b>	refueling and complex overhaul (nuclear-powered ship)
<b>RDJTF</b>	Rapid Deployment Joint Task Force
<b>RFP</b>	Request for Proposals
<b>RMA</b>	revolution In military affairs
<b>ROK</b>	Republic of Korea (South Korea)
<b>RP</b>	Republic of the Philippines

## S

<b>SAARC</b>	South Asia Association of Regional Cooperation
<b>SAM</b>	surface-to-air missile
<b>SAR</b>	search and rescue
<b>SBIRS</b>	Space-Based Infrared System (satellite system)
<b>SCN</b>	Shipbuilding and Conversion, Navy (budget category)
<b>SEAL</b>	Sea Air Land operator (Navy)
<b>SEATO</b>	Southeast Asia Treaty Organization
<b>SFA</b>	Strategic Framework Agreement
<b>SIGINT</b>	signals intelligence
<b>SLBM</b>	submarine-launched ballistic missile
<b>SMU</b>	special mission unit
<b>SOCAFRICA</b>	U.S. Special Operations Command Africa
<b>SOCCENT</b>	U.S. Special Operations Command Central
<b>SOCEUR</b>	U.S. Special Operations Command Europe
<b>SOCPAC</b>	U.S. Special Operations Command Pacific
<b>SOF</b>	U.S. Special Operations Forces
<b>SOP</b>	Standard Operating Procedure

<b>SORT</b>	Strategic Offensive Reductions Treaty
<b>SOTFE</b>	Support Operations Task Force Europe
<b>SPE</b>	Sony Pictures Entertainment
<b>SPMAGTF</b>	Special-Purpose Marine Air-Ground Task Force-Crisis Response-Africa
<b>SRBM</b>	short-range ballistic missile
<b>SSBN</b>	ballistic missile submarine, nuclear-powered
<b>SSGN</b>	guided missile submarine, nuclear-powered
<b>SSN</b>	attack submarine, nuclear-powered
<b>SSP</b>	Stockpile Stewardship Program
<b>STRATCOM</b>	U.S. Strategic Command
<b>SUW</b>	surface warfare

## T

<b>TACAIR</b>	tactical air
<b>TAI</b>	total active inventory
<b>TANAP</b>	Trans-Anatolian Natural Gas Pipeline
<b>TAP</b>	Trans-Adriatic Pipeline
<b>TCO</b>	transnational criminal organization
<b>TPP</b>	Trans-Pacific Partnership
<b>TTP</b>	Tehrik-e-Taliban Pakistan
<b>TLAM/N</b>	Tomahawk Land Attack Missile/Nuclear
<b>TMP</b>	technical modernization program
<b>TNW</b>	tactical nuclear weapon
<b>TRA</b>	Taiwan Relations Act
<b>TRANSCOM</b>	U.S. Transportation Command
<b>TSOC</b>	Theater Special Operations Command

## U

<b>UAV</b>	unmanned aerial vehicle
<b>UAE</b>	United Arab Emirates
<b>UCLASS</b>	Unmanned Carrier-Launched Airborne Surveillance and Strike
<b>UNASUR</b>	Unión de Naciones Suramericanas (Union of South American Nations)
<b>UNC</b>	United Nations Council
<b>USAF</b>	U.S. Air Force
<b>USAFCENT</b>	U.S. Air Forces Central
<b>USAFE</b>	U.S. Air Forces Europe
<b>USARAF</b>	U.S. Army Africa

<b>USARCENT</b>	U.S. Army Central
<b>USARPAC</b>	U.S. Army Pacific
<b>USAREUR</b>	U.S. Army Europe
<b>USASOC</b>	U.S. Army Special Operations Command
<b>USFJ</b>	U.S. Forces Japan
<b>USFK</b>	U.S. Forces Korea
<b>USNAVCENT</b>	U.S. Naval Forces Central
<b>USNORTHCOM</b>	U.S. Northern Command
<b>USSOCOM</b>	U.S. Special Operations Command
<b>USSOUTHCOM</b>	U.S. Southern Command
<b>USW</b>	undersea warfare

## V

<b>VEO</b>	violent extremist organizations
<b>VLS</b>	vertical launching system

## W

<b>WGS</b>	Wideband Global SATCOM (satellite system)
<b>WMD</b>	weapons of mass destruction
<b>WRM</b>	wartime readiness materials
<b>WWTA</b>	Worldwide Threat Assessment



# Methodology

The assessment portion of the *Index of U.S. Military Strength* is composed of three major sections that address America’s military power, the environments within or through which it must operate, and threats to U.S. vital national interests.

The authors of this study used a five-category scoring system that ranged from “very poor” to “excellent” or “very weak” to “very strong” as appropriate to each topic. This particular approach was selected to capture meaningful gradations while avoiding the appearance that a high level of precision was possible given the nature of the issues and the information that was publicly available.

Some factors are quantitative and lend themselves to discrete measurement; others are very qualitative in nature and can be assessed only through an informed understanding of the material that leads to a judgment call. Further, conditions in each of the areas assessed are changing throughout the year, so any measurement is based on the information at hand and must necessarily be viewed as a snapshot in time. While this is not entirely satisfactory when it comes to reaching conclusions on the status of a given matter, especially the adequacy of military power, and will doubtless be quite unsatisfactory for some readers, we understand that senior officials in decision-making positions will never have a comprehensive set of inarguable hard data on which to base a decision.

Purely quantitative measures alone tell only part of the story when it comes to the relevance, utility, and effectiveness of hard power. In fact, using only quantitative metrics to

assess military power or the nature of an operating environment can lead to misinformed conclusions. Raw numbers are a very important component, but they tell only a part of the story of war. Similarly, experience and demonstrated proficiency are often decisive factors in war, but they are nearly impossible to measure.

In assessing the *global operating environment*, this *Index* focused on three key regions—Europe, the Middle East, and Asia—because of their importance relative to U.S. vital security interests.

For *threats to U.S. vital interests*, the *Index* identifies the countries that pose the greatest current or potential threats to U.S. vital interests based on two overarching factors: the behavior and capability of those countries. The classic definition of “threat” considers the combination of intent and capability, but intent is not susceptible to clear measurement, so “observed behavior” is used as a reasonable surrogate because it is the clearest manifestation of intent. The selection of threat countries is based on their historical behavior and explicit policies or formal statements vis-à-vis U.S. interests, scoring them in two areas: the degree of provocative behavior that they exhibited during the year and their ability to pose a credible threat to U.S. interests irrespective of intent.

Finally, the *status of U.S. military power* is addressed in three areas: capability (or modernity), capacity, and readiness. All three are fundamental to success even if they are not de facto determinants of success (something we explain further in the section). Also addressed is the condition of the United States’ nuclear

weapons capability, assessing it in areas that are unique to this military component and critical to understanding its real-world viability and effectiveness as a strategic deterrent.

## Assessing the Global Operating Environment

Not all of the factors that characterize an operating environment are equal, but each contributes to the degree to which a particular operating environment is favorable or unfavorable to future U.S. military operations. Our assessment of the operating environment employed a five-point scale ranging from “very poor” to “excellent” conditions and covering four regional characteristics of greatest relevance to the conduct of military operations:

1. **Very Poor.** Significant hurdles exist for military operations. Physical infrastructure is insufficient or nonexistent, and the region is politically unstable. The U.S. military is poorly placed or absent, and alliances are nonexistent or diffuse.
2. **Unfavorable.** A challenging operating environment for military operations is marked by inadequate infrastructure, weak alliances, and recurring political instability. The U.S. military is inadequately placed in the region.
3. **Moderate.** A neutral to moderately favorable operating environment is characterized by adequate infrastructure, a moderate alliance structure, and acceptable levels of regional political stability. The U.S. military is adequately placed.
4. **Favorable.** A favorable operating environment includes good infrastructure, strong alliances, and a stable political environment. The U.S. military is well placed in the region for future operations.
5. **Excellent.** An extremely favorable operating environment includes well-established and well-maintained

infrastructure; strong, capable allies; and a stable political environment. The U.S. military is exceptionally well placed to defend U.S. interests.

The key regional characteristics consisted of:

- a. **Alliances.** Alliances are important for interoperability and collective defense as allies would be more likely to lend support to U.S. military operations. Various indicators provide insight into the strength or health of an alliance. These include whether the U.S. trains regularly with countries in the region, has good interoperability with the forces of an ally, and shares intelligence with nations in the region.
- b. **Political Stability.** Political stability brings predictability for military planners when considering such things as transit, basing, and overflight rights for U.S. military operations. The overall degree of political stability indicates whether U.S. military actions would be hindered or enabled and considers, for example, whether transfers of power in the region are generally peaceful and whether there have been any recent instances of political instability in the region.
- c. **U.S. Military Positioning.** Having military forces based or equipment and supplies staged in a region greatly facilitates the ability of the United States to respond to crises and, presumably, achieve successes in critical “first battles” more quickly. Being routinely present in a region also assists in maintaining familiarity with its characteristics and the various actors that might try to assist or thwart U.S. actions. With this in mind, we assessed whether or not the U.S. military was well positioned in the region. Again, indicators included bases, troop presence, prepositioned equipment, and recent examples of military operations (including

training and humanitarian) launched from the region.

**d. Infrastructure.** Modern, reliable, and suitable infrastructure is essential to military operations. Airfields, ports, rail lines, canals, and paved roads enable the U.S. to stage, launch, and logistically sustain combat operations. We combined expert knowledge of regions with publicly available information on critical infrastructure to arrive at our overall assessment of this metric.

### Assessing Threats to U.S. Vital Interests

To make the threats identified herein measurable and relatable to the challenges of operating environments and adequacy of American military power, *Index* staff and outside reviewers evaluated separately the threats according to their level of provocation (i.e., their observed behavior) and their actual capability to pose a credible threat to U.S. interests on a scale of 1 to 5, with 1 representing a very high threat capability or level of belligerency. This scale corresponds to the tone of the five-point scales used to score the operating environment and military capabilities in that 1 is bad for U.S. interests and 5 is very favorable.

Based on these evaluations, provocative behavior was characterized according to five descending categories: benign (5); assertive (4); testing (3); aggressive (2); and hostile (1). Staff also characterized the capabilities of a threat actor according to five categories: marginal (5); aspirational (4); capable (3); gathering (2); and formidable (1). Those characterizations—behavior and capability—form two halves of the overall threat level.

### Assessing U.S. Military Power

Also assessed is the adequacy of the United States' defense posture as it pertains to a conventional understanding of "hard power," defined as the ability of American military forces to engage and defeat an enemy's forces in battle at a scale commensurate with the vital national interests of the U.S. The assessment

draws on both quantitative and qualitative aspects of military forces, informed by an experience-based understanding of military operations and the expertise of the authors and internal and external reviewers.

It is important to note that military effectiveness is as much an art as it is a science. Specific military capabilities represented in weapons, platforms, and military units can be used individually to some effect. Practitioners of war, however, have learned that combining the tools of war in various ways and orchestrating their tactical employment in series or simultaneously can dramatically amplify the effectiveness of the force committed to battle.

The point is that a great number of factors make it possible for a military force to locate, close with, and destroy an enemy, but not many of them are easily measured. The scope of this specific project does not extend to analysis of everything that makes hard power possible; it focuses on the status of the hard power itself.

This *Index* assesses the state of military affairs for U.S. forces in three areas: capability, capacity, and readiness.

**Capability.** Capability is scored based on the current state of combat equipment. This involves four factors: the age of key platforms relative to their expected life span; whether the required capability is being met by legacy or modern equipment; the scope of improvement or replacement programs relative to the operational requirement; and the overall health and stability (financial and technological) of modernization programs.

This *Index* focused on primary combat units and combat platforms (such as tanks, ships, and airplanes) and elected not to include the array of system and component upgrades (such as a new radar, missile, or communications suite) that keep an older platform viable over time. New technologies grafted onto aging platforms ensure that U.S. military forces keep pace with technological innovations relevant to the modern battlefield, but at some point, the platforms themselves are no longer viable and must be replaced. Modernized sub-systems and components do not entirely

substitute for aging platforms, and it is the platform itself that is usually the more challenging item to field. In this sense, primary combat platforms serve as representative measures of force modernity just as combat forces are a useful surrogate measure for the overall military that includes a range of support units, systems, and infrastructure.

In addition, it is assumed that modernization programs should replace current capacity at a one-to-one ratio. Less than a one-to-one replacement assumes risk, because even if the newer system is presumably better than the older, until it is proven in actual combat, having fewer systems lessens the capacity of the force, which is an important factor if combat against a peer competitor carries with it the likelihood of attrition. For modernization programs, only Major Defense Acquisition Programs (MDAPs) are scored.

The capability score uses a five-grade scale. Each service receives one capability score that is a non-weighted aggregate of scores for four categories: Age of Equipment, Modernity of Capability, Size of Modernization Program, and Health of Modernization Program. General criteria for the capability categories are as follows:

### Age of Equipment

- **Very Weak:** Equipment age is past 80 percent of expected life span.
- **Weak:** Equipment age is 61 percent–80 percent of expected life span.
- **Marginal:** Equipment age is 41 percent–60 percent of expected life span.
- **Strong:** Equipment age is 21 percent–40 percent of expected life span.
- **Very Strong:** Equipment age is 20 percent or less of expected life span.

### Capability of Equipment

- **Very Weak:** Majority (over 80 percent) of capability relies on legacy platforms.

- **Weak:** 60 percent–79 percent of capability relies on legacy platforms.
- **Marginal:** 40 percent–59 percent of capability relies on legacy platforms.
- **Strong:** 20 percent–39 percent of capability relies on legacy platforms.
- **Very Strong:** Less than 20 percent of capability relies on legacy platforms.

### Size of Modernization Program

- **Very Weak:** Modernization program is significantly too small or inappropriate to sustain current capability or program in place.
- **Weak:** Modernization programs are smaller than current capability size.
- **Marginal:** Modernization programs are appropriate to sustain current capability size.
- **Strong:** Modernization programs will increase current capability size.
- **Very Strong:** Modernization programs will vastly expand capability size.

### Health of Modernization Program

- **Very Weak:** Modernization programs facing significant problems; too far behind schedule (five-plus years); cannot replace current capability before retirement; lacking sufficient investment to advance; cost overruns including Nunn–McCurdy breach. (A Nunn–McCurdy breach occurs when the cost of a new item exceeds the most recently approved amount by 25 percent or more or if it exceeds the originally approved amount by 50 percent or more. See 10 U.S. Code § 2433, Unit Cost Reports.)
- **Weak:** Facing procurement problems; behind schedule (three–five years); difficult

to replace current equipment on time or insufficient funding; cost overruns enough to trigger an Acquisition Program Baseline (APB) breach.

- **Marginal:** Facing few problems; behind schedule by one–two years but can replace equipment with some delay or experience some funding cuts; some cost growth but not within objectives.
- **Strong:** Facing no procurement problems; can replace equipment with no delays; within cost estimates.
- **Very Strong:** Performing better than DOD plans, including lower actual costs.

**Capacity.** To score capacity, the service’s size (be it end strength or number of platforms) is compared to the force size required to meet a simultaneous or nearly simultaneous two-war or two–major regional contingency (MRC) benchmark. This benchmark consists of the force needed to fight and win two MRCs and a 20 percent margin that serves as a strategic reserve. A strategic reserve is necessary because deployment of 100 percent of the force at any one time is highly unlikely. Not only do ongoing requirements like training or sustainment and maintenance of equipment make it infeasible for the entirety of the force to be available for deployment, but committing 100 percent of the force would leave no resources available to handle unexpected situations.

Thus, a “marginal” capacity score would exactly meet a two-MRC force size, a “strong” capacity score would equate to a 10-plus percent margin for strategic reserve, and a “very strong” score would equate to a 20 percent margin.

### Capacity Score Definitions

- **Very Weak:** 0 percent–37 percent of the two-MRC benchmark.
- **Weak:** 38 percent–74 percent of the two-MRC benchmark.

- **Marginal:** 75 percent–82 percent of the two-MRC benchmark.
- **Strong:** 83 percent–91 percent of the two-MRC benchmark.
- **Very Strong:** 92 percent–100 percent of the two-MRC benchmark.

**Readiness.** The readiness scores are from the military services’ own assessments of readiness based on their requirements. These are not comprehensive reviews of all readiness input factors, but rather rely on the public statements of the military services regarding the state of their readiness.

It should be noted that even a “strong” or “very strong” score does not indicate that 100 percent of the force is ready; it simply indicates that the service is meeting 100 percent of its own readiness requirements. Often, these requirements assume that a percentage of the military at any one time will not be fit for deployment. Because of this, even if readiness is graded as “strong” or “marginal,” there is still a gap in readiness that will have significant implications for immediate combat effectiveness and the ability to deploy quickly. Thus, anything short of meeting 100 percent of readiness requirements assumes risk and is therefore problematic.

Further, a service’s assessment of its readiness occurs within its size or capacity at that time and as dictated by the Defense Strategic Guidance, National Military Strategy, and related top-level documents generated by the Administration and senior Defense officials. It does not account for the size-related “readiness” of the force to meet national security requirements assessed as needed by this *Index*.

Thus, for a service to be assessed as “very strong” would mean that 80 percent–100 percent of the existing force in a service meets that service’s requirements for being “ready” even if the size of the service is less than the size required to meet the two-MRC benchmark. Therefore, it is important for the reader to keep this in mind when considering the actual

readiness of the force to protect U.S. national security interests against the challenges presented by threats around the world.

### Readiness Score Definitions

- **Very Weak:** 0 percent–19 percent of service’s requirements.
- **Weak:** 20 percent–39 percent of service’s requirements.
- **Marginal:** 40 percent–59 percent of service’s requirements.
- **Strong:** 60 percent–79 percent of service’s requirements.
- **Very Strong:** 80 percent–100 percent of service’s requirements.

# Victor Davis Hanson

**Victor Davis Hanson** is the Martin and Illie Anderson Senior Fellow in Residence in Classics and Military History at the Hoover Institution, Stanford University, and a Professor of Classics Emeritus at California State University, Fresno.

Dr. Hanson is the author or editor of 24 books and hundreds of articles, reviews, and editorials, but it is his lifelong study of warfare and its impact on civilizations for which we recognize him with this edition of the *Index*. His approach to telling the stories of the great wars of our past and the leaders, peoples, cultures, and political systems involved in them has made the lessons of history accessible to the widest possible audience. War places extraordinary demands on the breadth and depth of society and calls upon us to be serious about

leadership, strategy, and “providing for the common defense.” Dr. Hanson’s insights into Western military history have helped millions to develop a greater appreciation of the timeless principles of warfare.

Getting national defense right preserves and protects everything that makes our country the symbol of freedom, prosperity, and opportunity it has been and is to so many around the world. Conversely, neglecting the fundamentals of military power, competency and accountability in high office, and the involvement of citizens in the workings of their government can have the most tragic of consequences.

We are delighted to honor Professor Hanson and his body of work with this edition of the *Index of U.S. Military Strength*.











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