

# U.S. Navy

Brent D. Sadler

The U.S. Navy, Marine Corps, and Coast Guard (known collectively as the sea services) have enabled America to project power across the oceans, controlling activities on the seas when and where needed. In testimony before the Senate Armed Services Committee, the Secretary of the Navy has stated that:

[The Navy] will invest [its] resources through a concise, clear, and transparent strategy centered on three primary lines of effort:

1. Strengthen Maritime Dominance.
2. Empower Our People.
3. Expand Strategic Partnerships.<sup>1</sup>

To these ends, President Joseph Biden's proposed \$180.5 billion Navy budget for FY 2023 "represents a \$9.1 billion increase over our FY 2022 enacted President's Budget (including supplementals for disaster relief funding, Red Hill, and Operation Allies Welcome funding)" and an overall increase of 4.8 percent.<sup>2</sup> While this increase is much needed, it is doubtful that this level of investment can deliver on the Secretary's goals given a rapidly modernizing and expanding Chinese fleet and inflation that is well above 7 percent.

The Navy remains under immense strain to maintain readiness for combat while also conducting the daily peacetime operations that are necessary to compete with the activities of China and Russia. In the year since publication of the *2022 Index of U.S. Military Strength*, there have been several significant developments that are important to the Navy:

- As of June 22, 2022, "3,371 active component and 3,448 Ready Reserve service members

remain[ed] unvaccinated," and there "[had] been 1,229 separations for refusing the COVID-19 vaccine."<sup>3</sup>

- Russia invaded Ukraine on February 24, 2022, and since then has lost several warships to anti-ship missiles launched from shore.<sup>4</sup>
- Submarine *Connecticut* ran into an uncharted seamount on October 2, 2021, in the South China Sea, sustaining significant damage that led to its eventual stateside dry-docking where it remained as of May 24, 2022.<sup>5</sup>
- President Biden announced the Australia–U.K.–U.S. (AUKUS) partnership on September 15, 2021, with the goal of developing an Australian nuclear submarine program.<sup>6</sup> While important if successful, it will also place an added burden on the Navy's limited nuclear shipbuilding intellectual and industrial capacity.
- On September 9, 2021, the Navy's Fifth Fleet, based in Bahrain, established Task Force 59 to integrate and accelerate operational employment of naval unmanned systems.<sup>7</sup>

**Strategic Framework.** To address today's maritime competition more effectively, the sea services have released a new naval strategy, *Advantage at Sea*. If the new strategy is fully executed, the Navy will be conducting more assertive forward presence operations to challenge Chinese and Russian maritime coercion.<sup>8</sup> To this end, the Navy appears to be adjusting its deployment patterns to meet new demands caused by the war in Ukraine and increasing tensions in Asia: Two carrier strike groups have been

sustained in the western Pacific and eastern Mediterranean since December 2021.<sup>9</sup>

As the U.S. military's primary maritime arm, the Navy is charged to provide the enduring forward global presence required of this strategy while retaining war-winning forces. The Navy therefore continues to focus its investments in several functional areas: power projection, control of the seas, maritime security, strategic deterrence, and domain access. This approach is informed by several key documents:

- The 2021 *Interim National Security Strategic Guidance*;<sup>10</sup>
- The December 2020 *Advantage at Sea* naval strategy;<sup>11</sup>
- The 2022 *National Defense Strategy* (NDS) (as this edition of the *Index* was being prepared, only an unclassified fact sheet had been released to the public);<sup>12</sup> and
- The Global Force Management Allocation Plan (GFMAP).<sup>13</sup>

U.S. official strategic guidance requires the Navy to act beyond the demands of conventional warfighting. China and Russia use their fleets to establish a physical presence in regions that are important to their economic and security interests in order to influence the policies of other countries. To counter their influence, the U.S. Navy similarly sails ships in these waters to reassure allies of U.S. commitments and signal to competitors that they do not have a free hand to impose their will. This means that the Navy must balance two key missions: ensuring that it has a fleet that is ready for war while also using that fleet for peacetime "presence" operations. Both missions require crews and ships that are materially ready for action and a fleet that is large enough to maintain presence and marshal enough combat power to win in battle.

On July 26, 2022, the Chief of Naval Operations (CNO) released a new Navigation Plan 2022 (NAVPLAN 2022) to provide guidance for the Navy's contribution to the execution of the National Defense Strategy. In this latest edition, the CNO continues his emphasis on forward presence in the United States' daily competition with rivals like China and prioritizes investments in key capabilities like defense against anti-ship missiles and other forms

of attack, logistical support capabilities that remain viable in combat, and the ability to share information even when the enemy is targeting. NAVPLAN 2022 also emphasizes weapons with increased range, new deception capabilities, and improved abilities to make time-critical decisions.<sup>14</sup>

All of this reflects a continuation of demands stemming from the Distributed Maritime Operations concept that has been deemed critical to defeating Chinese anti-access and area denial capabilities. However, NAVPLAN 2022 lacks a clear timeline either for delivering these capabilities or for ensuring that the fleet is able to employ them in what the CNO acknowledges is a dangerous decade. NAVPLAN 2022 also adds to the several fleet-sizing plans offered by the Navy in recent years, calling for a fleet of 350 manned and 150 unmanned warships along with 3,000 naval aircraft—but without clearly explaining how it will achieve results in a way that the other plans could not. Whether this plan will deliver a fleet with new capabilities in time to deter an increasingly aggressive China remains highly questionable just as it was with its predecessors.

This *Index* focuses on the following elements as the primary criteria by which to measure U.S. naval strength:

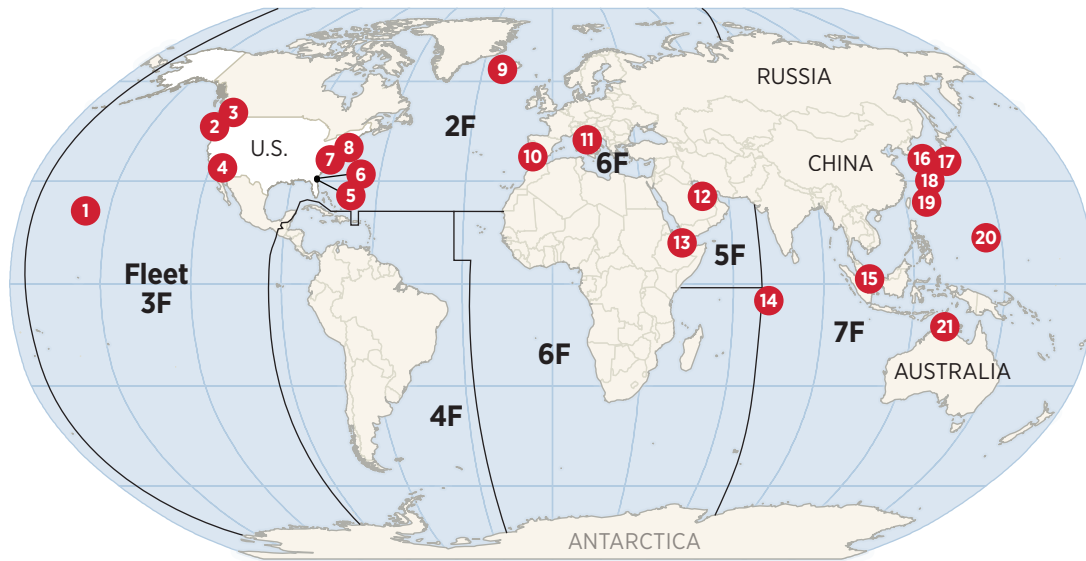
- Sufficient **capacity** to defeat enemies in major combat operations and provide a credible peacetime forward presence to maintain freedom of shipping lanes and deter aggression;
- Sufficient technical **capability** to ensure that the Navy is able to defeat potential adversaries; and
- Sufficient **readiness** to ensure that the fleet can "fight tonight" given proper material maintenance, personnel training, and physical well-being.

## Capacity

**Force Structure.** The Navy is unique relative to the other services in that its capacity requirements must meet two separate objectives:

1. During peacetime, the Navy must maintain a global presence in distant regions both to deter potential aggressors and to assure allies and security partners.

## Key U.S. Naval Installations



- |  |   |
|--|---|
| <p><b>1</b> Joint Base Pearl Harbor-Hickham, HI<br/>U.S. Pacific Fleet headquarters</p> <p><b>2</b> Naval Base Kitsap</p> <p><b>3</b> Naval Station Everett, WA</p> <p><b>4</b> Naval Base San Diego and Naval Base Coronado, CA<br/>U.S. Third Fleet headquarters</p> <p><b>5</b> Naval Station Mayport, FL<br/>U.S. Fourth Fleet headquarters</p> <p><b>6</b> Naval Submarine Base King's Bay, GA</p> <p><b>7</b> Naval Base Norfolk and Joint Expeditionary Base Little Creek, VA<br/>U.S. Fleet Forces Command and U.S. Second Fleet headquarters</p> <p><b>8</b> Naval Submarine Base New London, CT</p> <p><b>9</b> Keflavik, Iceland—Expeditionary Maritime Operations Center</p> <p><b>10</b> Naval Station Rota, Spain</p> <p><b>11</b> Naval Support Activity Gaeta, Italy<br/>U.S. Sixth Fleet headquarters</p> | <p><b>12</b> Naval Support Activity, Bahrain<br/>U.S. Fifth Fleet headquarters</p> <p><b>13</b> Lemonnier, Djibouti—Camp Lemonnier</p> <p><b>14</b> Diego Garcia—Navy Support Facility Diego Garcia</p> <p><b>15</b> Singapore—Commander Logistics Group Western Pacific</p> <p><b>16</b> Busan, South Korea—Fleet Activities Chinhae Navy Base</p> <p><b>17</b> U.S. Fleet Activity Yokosuka, Japan<br/>U.S. Seventh Fleet headquarters</p> <p><b>18</b> U.S. Fleet Activity Sasebo, Japan</p> <p><b>19</b> Okinawa, Japan—Naval Base White Beach</p> <p><b>20</b> Naval Base Guam—Navy Expeditionary Force Command Pacific headquarters</p> <p><b>21</b> Darwin, Australia—Marine Rotational Force Darwin</p> |
|--|---|

**NOTE:** Fleet boundaries are approximate.

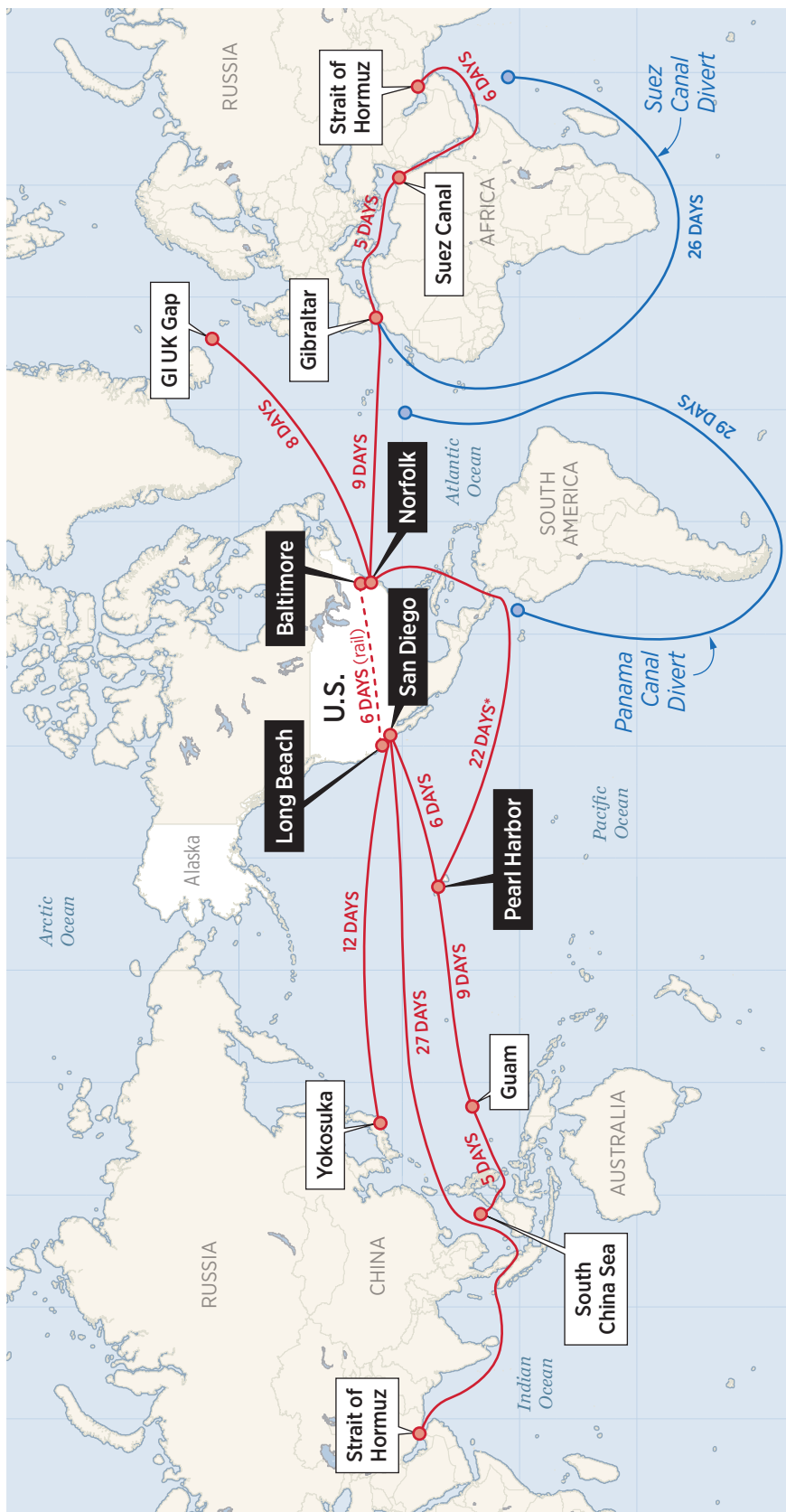
**SOURCE:** Heritage Foundation research.

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MAP 16

## Steaming Times to Areas of Vital U.S. National Interest

Steam times are approximate based on an average speed of 15 knots.



\* Assumes no delay in passage through the Panama Canal.

SOURCE: Heritage Foundation research.

2. The Navy must be able to win wars. To this end, the Navy measures capacity by the size of its battle force, which is composed of ships it considers directly connected to combat missions.<sup>15</sup>

This *Index* continues the benchmark set in the 2019 *Index*: 400 ships to ensure the capability to fight two major regional contingencies (MRCs) simultaneously or nearly simultaneously, plus a 20 percent strategic reserve, and historical levels of 100 ships forward deployed in peacetime.<sup>16</sup> This 400-ship fleet is centered on providing:

- 13 Carrier Strike Groups (CSGs);
- 13 carrier air wings with a minimum of 624 strike fighter aircraft;<sup>17</sup> and
- 15 Expeditionary Strike Groups (ESGs).<sup>18</sup>

Unmanned platforms are not included because they have not matured as a practical asset. They hold great potential and will likely be a significant capability, but until they are developed and fielded in larger numbers, their impact on the Navy's warfighting potential remains speculative. The same holds true across the fleet when it comes to new classes of ships. The Navy is investing in research, modeling, war gaming, and intellectual exercises to improve its understanding of the potential utility of new ship and fleet designs, but until new ships are added to the fleet, it is hard to know how they will affect the Navy's ability to perform its missions. Consequently, this *Index* measures what is known and can be known in naval affairs, assessing the current Navy's size, modernity, and readiness to perform its most important missions today.

Relative to the above metric, the Navy's fleet of 298 warships as of June 27, 2022, is inadequate and places greater strain on the ability of ships and crews to meet existing operational requirements. To alleviate the operational stress on an undersized fleet, the Navy has attempted since 2016 to build a larger fleet. However, for myriad reasons, it has been unable to achieve sustained growth and in fact has underdelivered by approximately 10 ships each year since 2016.<sup>19</sup> In the past, the Navy has had some success in meeting operational requirements with fewer ships by posturing ships forward as it has done in Rota, Spain, and Guam.

At a February 2022 naval conference, the Chief of Naval Operations (CNO) stated, "I've concluded—consistent with the analysis—that we need a naval force of over 500 ships."<sup>20</sup> He went on to specify that this fleet would include 12 carriers, 19 to 20 large amphibious warships, more than 30 smaller amphibious ships, 60 destroyers, 50 frigates, 70 attack submarines, and a dozen ballistic missile submarines, all backed by 100 support ships and 150 unmanned vessels. Based on the CNO's military advice and Heritage Foundation analysis, today's fleet remains too small to meet today's threats with maximum effectiveness.

**Posture/Presence.** Although the Navy remains committed to sustaining forward presence, it has struggled to meet the requests of regional Combatant Commanders. The result has been longer and more frequent deployments to meet a historical steady-state forward presence of 100 warships.<sup>21</sup> In 1985, at the height of the Cold War, the percentage of the 571-ship fleet deployed was less than 15 percent, and throughout the 1990s, deployments seldom exceeded the six-month norm: Only 4 percent to 7 percent of the fleet exceeded six-month deployments on an annual basis.<sup>22</sup> Using the Navy's aircraft carrier fleet—the most taxed platform—as a sample set, for 20 years, approximately 25 percent of the aircraft carrier fleet has been deployed. Following the 2017 deadly collisions involving USS *McCain* and USS *Fitzgerald*, the overall fleet deployment percentage dropped temporarily to less than 20 percent, but it surged again to almost 30 percent in 2020.<sup>23</sup>

The numbers as of June 27, 2022, are fairly typical for a total battle force of 298 deployable ships with 102 warships at sea: 67 deployed and underway and 35 underway on local operations for an operational tempo (OPTEMPO) of 34 percent, double the OPTEMPO that characterized the Cold War.<sup>24</sup> Given Combatant Commanders' requirements for naval presence, there is impetus to have as many ships forward deployed as possible by:

- **Homeporting.** The ships, crew, and their families are stationed at the port or based abroad (for example, a CSG in Yokosuka, Japan).
- **Forward Stationing.** Only the ships are based abroad, and crews are rotated out to the ship.<sup>25</sup> This deployment model is currently used for Littoral Combat Ships (LCS) and *Ohio*-class



guided missile submarines (SSGNs) manned with rotating blue and gold crews, effectively doubling the normal forward deployment time (for example, LCS in Singapore).

These options allow one forward-based ship to provide a greater level of presence than four ships based in the continental United States (CONUS) can provide by offsetting the time needed to transit ships to and familiarize their crews with distant theaters.<sup>26</sup> This is captured in the Navy's GFM planning assumptions: 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>27</sup> To date, the Navy's use of homeporting and forward stationing has not mitigated the effect of the reduction in overall fleet size on forward presence.

**Shipbuilding Capacity.** To meet stated fleet-size goals, the Navy must build faster and maintain more ships than its current capacity. However, significant shortfalls in shipyards, both government and commercial, make it hard to accomplish either task, and underfunded defense budgets make it even more difficult. Given the limited ability to build ships, the Navy will struggle to meet the congressionally mandated 355-ship goal,<sup>28</sup> much less the 400-ship goal advocated in this *Index*.

A bright spot in FY 2020 was the Navy's procurement of 12 ships, which marked a high point in shipbuilding over the past 20 years.<sup>29</sup> However, subsequent procurement has not kept pace. The Navy purchased 10 new warships in FY 2021. Congress overruled the President's purchase of eight, raising him to 13 new buys in FY 2022,<sup>30</sup> but this still misses congressional mandates for a fleet of 12 aircraft carriers.<sup>31</sup> Instead, the aircraft carrier fleet could shrink to nine (possibly augmented by a light carrier yet to be defined).<sup>32</sup> The current long-range shipbuilding plan does not indicate a desire to reverse the downward trends; instead, the "PB2023 shipbuilding plan includes procurement of 9 manned ships in FY2023 and 51 manned battle force ships within the [Future years Defense Program]. Based on the corresponding projected funding levels in the FYDP, the battle force inventory will be 280 manned ships by FY2027."<sup>33</sup>

Meanwhile, diminished demand for ships has led shipbuilders to divest workforce and delay capital investments. From 2005 to 2020, the Navy's procurement of new warships increased the size of

the fleet from 291 to 296 warships; at the same time, China's navy grew from 216 to 360 warships.<sup>34</sup> If the Navy is to build a larger fleet, more shipbuilders will have to be hired and trained—a lengthy process that precedes any expansion of the fleet. However, recent labor statistics comparing 2017 to 2021 show some positive trends, with total shipbuilding labor involved in production, like welders and pipefitters, adding 3,134 workers.<sup>35</sup>

Of particular concern is the increased production of nuclear-powered warships, most notably nuclear-powered submarines that would be vital in any conflict with China. Limited nuclear shipbuilding capacity<sup>36</sup> may constrain the Navy's plans to increase the build rate from two attack submarines per year to three while concurrently building one ballistic missile submarine.<sup>37</sup> To support a larger nuclear-powered fleet, the relevant public shipyards have increased their workforce by 16 percent since 2013, but this still falls short of the workforce needed to achieve the Navy's objectives.<sup>38</sup> As demand increases for nuclear-powered warships to pace the threat from China and Russia into the foreseeable future, it remains to be seen whether the public shipyards will be able to sustain the recruitment of skilled labor in the numbers needed.

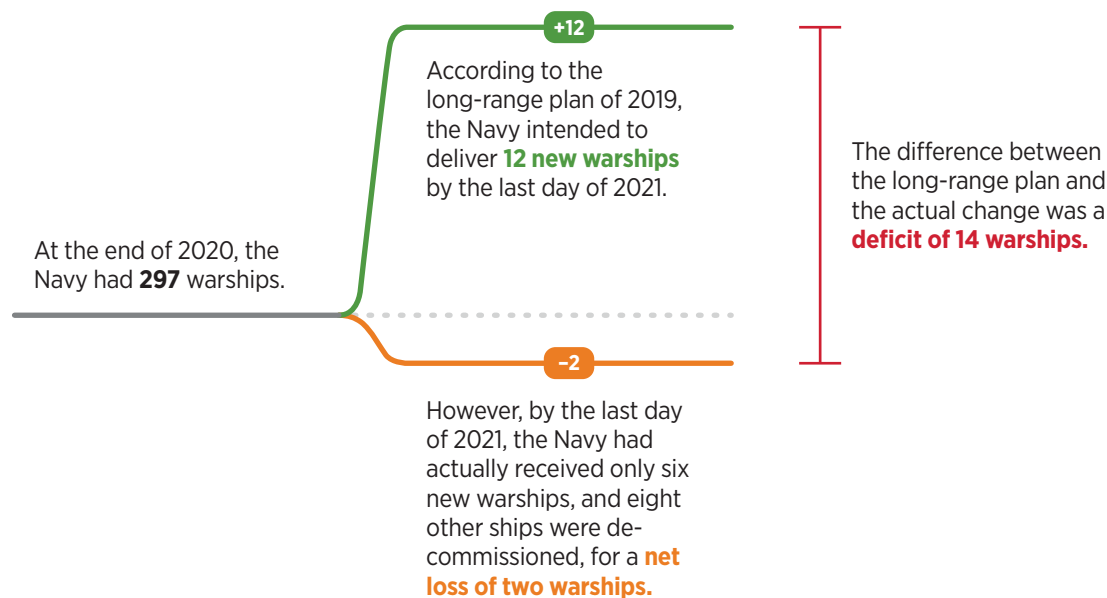
As it stands today, the most senior naval officer, the Chief of Naval Operations, has admitted that current funding will not build or maintain the larger fleet that both the Navy and this *Index* say is needed and Congress has mandated. Nothing has changed to alter his 2021 assessment that current budgets can only "sustain a Navy of about 300 to 305 ships."<sup>39</sup>

**Manpower.** In 2018, the Navy assessed that its manpower would need to grow by approximately 35,000 to achieve an end strength of 360,395 sailors to support a 355-ship Navy.<sup>40</sup> For comparison, the last time the Navy had a similar number of ships was in 1997, when it had 359 ships and also had a total of 398,847 personnel.<sup>41</sup> As of June 15, 2022, the Navy consisted of 344,827 officers and sailors, up 1,916 from June 2021 but 15,568 short of the number needed by 2034.<sup>42</sup> To improve personnel readiness and meet the demands of a growing fleet, the Navy added 5,100 sailors in FY 2020.<sup>43</sup> The FY 2021 budget continued these increases in active-duty manning end strength by an additional 7,300 sailors.<sup>44</sup>

Regrettably, trends for the Navy's personnel budget and for its recruiting and retention efforts have begun to point in the wrong direction. Despite the

FIGURE 2

## Change in Navy Battle Fleet Size, 2020–2021



**SOURCES:** U.S. Naval Institute News, “UNSI News Fleet and Marine Tracker: Jan. 4, 2021,” January 4, 2021, <https://news.usni.org/2021/01/04/usni-news-fleet-and-marine-tracker-jan-4-2021> (accessed August 3, 2022); 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, [https://media.defense.gov/2020/May/18/2002302045/-1/-1/1/PB20\\_SHIPBUILDING\\_PLAN.PDF](https://media.defense.gov/2020/May/18/2002302045/-1/-1/1/PB20_SHIPBUILDING_PLAN.PDF) (accessed August 3, 2022); and Naval Sea Systems Command, Naval Vessel Register, “Fleet Size,” <http://www.nvr.navy.mil/NVRSHIPS/FLEETSIZE.HTML> (accessed August 3, 2022).

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need for more sailors and officers, total end strength has fallen from 347,677 in FY 2021 to 346,300 in FY 2023 and is trending toward 336,600 in FY 2027.<sup>45</sup> It remains to be seen whether retention rates can be sustained to meet long-range manning needs in the face of a tightening labor market and dismissals for non-compliance with COVID vaccine mandates.

Despite the acknowledged need to increase the Navy’s cadre of officers and enlisted sailors, the President’s FY 2023 budget continues the recent trend toward reduced end strength. This proposed budget, combined with last year’s, decreases the Navy’s end strength by a total of 2,120 officers and sailors in the Active component and 900 in the reserves while increasing the civilian workforce by 269 full-time employees.<sup>46</sup> Such sustained reductions are surprising in view of the Government Accountability Office’s findings that persistent crew manning shortfalls on

ships are as high as 15 percent and compound crew fatigue, which was a contributing factor in several fatal collisions in 2017.<sup>47</sup>

Finally, the effort to attract people to join the Navy is made more difficult by wages that are not keeping up with inflated costs of living. In the battle for people, last year’s 2.7 percent pay raise and the proposed 4.6 percent raise planned for FY 2023<sup>48</sup> are not helping the Navy to make a compelling case for young people to join and stay in the service. Using the Consumer Price Index, pay is trailing the rate of inflation, which in April 2022 had reached 8.5 percent.<sup>49</sup>

### Capability

A complete measure of naval capabilities requires an assessment of U.S. platforms against enemy weapons in plausible scenarios. The Navy routinely conducts war games, exercises, and simulations to

TABLE 6

## Navy Fleet Design

Platform Class	Navy Plan, May 2022	BY 2027			BY 2045
		Recommendation	Navy Plan, Dec. 2020	Navy Plan, April 2022	Range per Future Naval Force Study, 2020
Unmanned (LUSV, MUSV, XLUUV)	0*	36	21**	n/a**	143 to 242
Aircraft Carriers (CVN, CVNE, CVS)	11	12	10	10	8 to 17
Large Surface Combatant	93	110	97	86	73 to 88
Small Surface Combatant	32	37	34	23	60 to 67
Logistics and Support Vessels	62	90	82	74	96 to 117
Submarines (SSBN, SSGN, SSN)	68	77	67	62	84 to 90
Amphibious Warships	32	41	32	25	61 to 67
Total Without Unmanned	298	367	322	280	382 to 446
Total	298	403	343	280	525 to 688

\* As of May 2022, the U.S. Navy had only prototypes in operation for XLUUV, LUSV, and MUSV.

\*\* 21 unmanned vessels were planned for procurement by fiscal year 2026; the long-range plan included no procurement data for unmanned platforms in 2022.

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- **Recommendation:** Brent D. Sadler, "Rebuilding America's Military: The United States Navy," Heritage Foundation *Special Report* No. 242, February 18, 2021, p. 83, <http://report.heritage.org/sr242>.
- **Navy plan, December 2020, and Future Naval Force Study:** U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfighting Requirements and Capabilities-OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels*, December 9, 2020, [https://media.defense.gov/2020/Dec/10/2002549918/-1/-1/1/SHIPBUILDING%20PLAN%20DEC%2020\\_NAVY\\_OSD\\_OMB\\_FINAL.PDF](https://media.defense.gov/2020/Dec/10/2002549918/-1/-1/1/SHIPBUILDING%20PLAN%20DEC%2020_NAVY_OSD_OMB_FINAL.PDF) (accessed August 3, 2022); David B. Larter and Aaron Mehta, "The Pentagon Is Eyeing a 500-Ship Navy, Documents Reveal," *Defense News*, September 24, 2020, <https://www.defensenews.com/naval/2020/09/24/the-pentagon-is-eyeing-a-500-ship-navy-documents-reveal/> (accessed August 3, 2022); and Ronald O'Rourke, "Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress," Congressional Research Service *Report for Members and Committees of Congress* No. RL32665, September 17, 2020, pp. 10 and 11, [https://www.everycrsreport.com/files/2020-09-17\\_RL32665\\_c609d44928ddf6f859c2d347ac90c2ab90a813ed.pdf](https://www.everycrsreport.com/files/2020-09-17_RL32665_c609d44928ddf6f859c2d347ac90c2ab90a813ed.pdf) (accessed August 3, 2022).
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assess this, but insight into its assessments is limited by their classified nature. This *Index* therefore assesses capability based on remaining hull life, mission effectiveness, payloads, and the feasibility of maintaining the platform's technological edge.

Most of the Navy's fleet consists of older platforms: Of the Navy's 20 classes of ships, only eight are in production. However, at \$230.8 billion, the Department of the Navy's proposed budget for FY 2023 represents a real dollar increase of \$1.9 billion,



which is a relative increase of 8.7 percent from the previous year; procurement is increased by only 4 percent.<sup>50</sup> The following are highlights by platform.

**Ballistic Missile Submarines (SSBN).** The *Columbia*-class will relieve the aging *Ohio*-class SSBN fleet. Because of the implications of this change for the nation's strategic nuclear deterrence, the *Columbia*-class SSBN remains the Navy's top acquisition priority. To ensure the continuity of this leg of the U.S. nuclear triad, the first *Columbia*-class SSBN must be delivered on time for its first deterrent patrol in 2031.<sup>51</sup> To achieve this goal, the Navy signed a \$9.47 billion contract in November 2020 with General Dynamics Electric Boat for the first in-class boat and advanced procurement for long-lead-time components of the second hull.<sup>52</sup> At a May 18, 2022, hearing, it was noted that the lead ship's keel-laying ceremony was to be on June 6, 2022.

However, there are concerns in Congress that the Department of Defense (DOD) may not be fully utilizing special authorities granted the Navy to ensure that this critical program is adequately resourced. Specifically, in 2014, the Congress established the National Sea-Based Deterrence Fund, which has saved more than \$1.4 billion using flexible funding but "has yet to utilize the core function of the NSBDF—namely, to provide increased flexibility to repurpose funds into it to buy down the fiscal impact of the program on our other shipbuilding priorities."<sup>53</sup>

**Nuclear Attack Submarines (SSN).** SSNs are multi-mission platforms whose stealth enables clandestine intelligence collection; surveillance; anti-submarine warfare (ASW); anti-surface warfare (ASuW); special operations forces insertion and extraction; land attack strikes; and offensive mine warfare. The newest class of SSN, the Block V *Virginia* with the Virginia Payload Module (VPM) enhancement, is important to the Navy's overall strike capacity, enabling the employment of an additional 28 Tomahawk cruise missiles over earlier SSN variants.<sup>54</sup> Construction of Block V submarines began in September 2019 with the *Oklahoma* (SSN 802) to be delivered May 2027 and three more boats to be delivered before the end of the decade.<sup>55</sup>

The FY 2021 National Defense Authorization Act included additional funds for advanced procurement that preserves a future option to buy as many as 10 *Virginia*-class submarines through FY 2023. As indicated previously, increasing *Virginia*-class

production has raised concerns regarding strain on the industrial base, and the FY 2023 budget would put \$1.6 billion toward expansion of the submarine industrial base "to support the Navy plan of serial production of 1 COLUMBIA plus 2 VIRGINIAS starting in FY25/26."<sup>56</sup> Quality control of the supply chain is a key factor in submarine construction, and if it is not done well, the consequences can be catastrophic. That is why the premature replacement of critical submarine parts in 2021—parts that are intended to last the life of the boat—remains a concern.<sup>57</sup> Added vigilance will be required as the Navy finds new suppliers to meet future increased submarine production as well as the potential need to provide support to AUKUS.

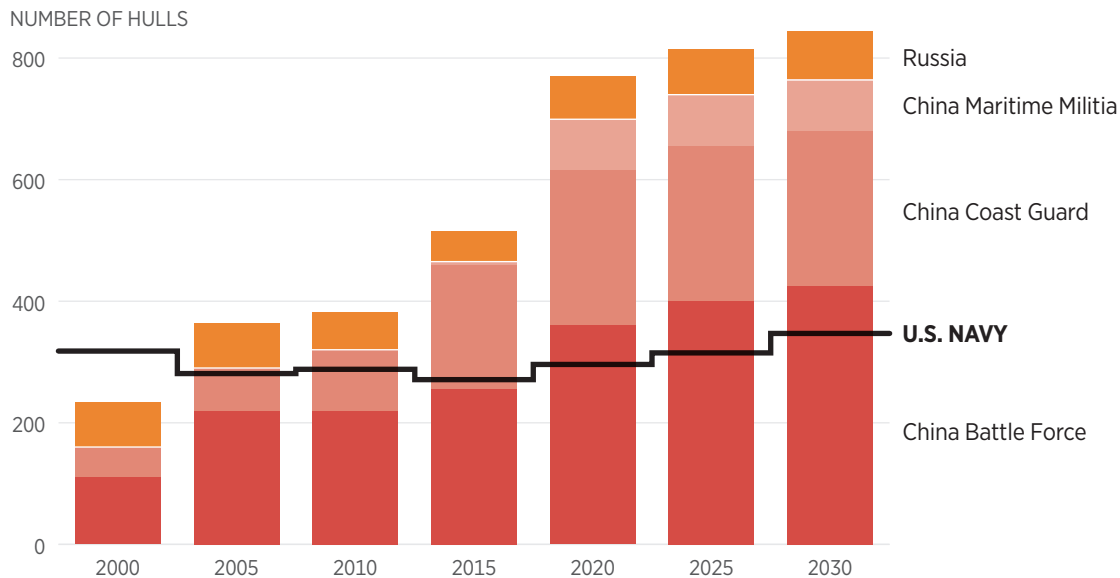
**Aircraft Carriers (CVN).** The Navy has 11 nuclear-powered aircraft carriers: 10 *Nimitz*-class and one *Ford*-class. The Navy has been making progress in overcoming nagging issues with several advanced systems, notably advanced weapons elevators, and the *Ford*'s first operational deployment is on track for the fall of 2022.<sup>58</sup> The second ship in the class, *Kennedy* (CVN 79), was christened on December 7, 2019, and remains on schedule for delivery in 2024, followed by *Enterprise* (CVN 80), which is in early construction.

The U.S. lead in this category of naval power may be waning as China completes construction of its first super carrier. As the U.S. Navy struggles to build, maintain, and crew a fleet of 11 aircraft carriers, China is rapidly catching up both in numbers and platform capability. Its newest carrier, the Type-003, like the *Ford*-class, will utilize electromagnetic catapults that will give its air wing greater range and sortie rates, thus greatly narrowing the capability gap.<sup>59</sup> The Type-003 is China's second indigenously built carrier, marking a significant engineering milestone, and there has been renewed emphasis on having the ship delivered before the next Chinese Communist Party congress, which is scheduled for the fall of 2022.<sup>60</sup> China's growing naval aviation and aircraft carrier capabilities place added stress on U.S. naval aviation and air defenses.

**Large Surface Combatants.** The Navy's large surface combatants consist of the *Ticonderoga*-class cruiser, the *Zumwalt*-class destroyer, and the *Arleigh Burke*-class destroyer. If the President's FY 2023 budget is executed, the Navy will decommission five aged cruisers. This will decrement the Navy's sea-launched firepower by 316 vertical launch tubes

CHART 7

## U.S. vs. China and Russia Navies: Fleet Expansion Trends



**NOTE:** U.S. figures are actual through 2020. Figures for 2025 and 2030 are from the Navy's December 2020 30-year shipbuilding plan. See U.S. Navy, Office of the Chief of Naval Operations, Deputy Chief of Naval Operations (Warfighting Requirements and Capabilities-OPNAV N9), *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels*, December 9, 2020, [https://media.defense.gov/2020/Dec/10/2002549918/-1/-1/1/SHIPBUILDING%20PLAN%20DEC%2020\\_NAVY\\_OSD\\_OMB\\_FINAL.PDF](https://media.defense.gov/2020/Dec/10/2002549918/-1/-1/1/SHIPBUILDING%20PLAN%20DEC%2020_NAVY_OSD_OMB_FINAL.PDF) (accessed September 3, 2021).

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when measured against FY 2023 delivery of new strike-capable ships and submarines. Attempts to extend the life of the aging *Ticonderoga*-class cruisers have yielded mixed results as deferred upgrades and past incomplete maintenance are now driving up operating costs.<sup>61</sup>

In FY 2022, the Navy procured two *Arleigh Burke*-class DDG 51 destroyers, bringing the total

on active duty in the fleet to 70. Fourteen more have been ordered. The *Zumwalt* class was envisioned as bringing advanced capabilities to the fleet, but the program has suffered technological problems and cost overruns, and the Navy has not indicated that it intends to acquire more than the three that have already been purchased and are being built out: the USS *Zumwalt* (DDG-1000), which was delivered on

April 24, 2020; USS *Michael Monsoor* (DDG-1001), which was commissioned on January 26, 2019; and USS *Lyndon B. Johnson* (DDG-1002), which is completing checks before delivery to the Navy in 2024.<sup>62</sup> The *Zumwalt* was to achieve initial operational capability (IOC) by September 2021, which the Navy pushed back to December 2021.<sup>63</sup> As of May 2022, a revised timeline for achieving IOC had not been made public.

To reach 355 ships by 2034, the Navy plans several class-wide service life extensions, notably extension of the DDG-51-class service life from 35 to 40 years and modernization of older hulls. The FY 2020 budget included \$4 billion for modernization of 19 destroyers from FY 2021 through FY 2024.<sup>64</sup> The previously noted planned decommissioning of five cruisers in FY 2023 makes this more critical.

**Small Surface Combatants.** The Navy's small surface combatants consist principally of the *Avenger*-class mine countermeasures (MCM) ship; the Littoral Combat Ship (LCS); and the *Constellation*-class frigate (FFG), which began production in 2021. In January 2021, the Navy halted production of the mono-hull LCS *Freedom*-variant until issues involving the design of its propulsion system are resolved. In the meantime, the top speed of affected ships (currently 40-plus knots) is reportedly limited to 34 knots.<sup>65</sup> Last year, the fleet of 23 LCS (10 *Freedom*-variant and 13 *Independence*-variant) was expected to grow to 34 and be joined by 18 frigates by FY 2034.<sup>66</sup> Since then, the Navy has reversed course and terminated the LCS anti-submarine mission module program (10 units originally planned) and plans to decommission the remaining nine *Freedom* monohull variant.<sup>67</sup>

On August 20, 2020, the Navy decommissioned three of its aging *Avenger*-class MCM ships, leaving eight in service overseas in Sasebo, Japan, and Manama, Bahrain. These represent the only ship class dedicated to countering the mine threat.<sup>68</sup> The current long-range shipbuilding plan confirms that the Navy intends to operate these aged MCMs through FY 2027.<sup>69</sup>

As these ships reach the end of their service life, the Navy is relying on the development of mine countermeasure mission packages for the LCS to provide this capability. At an April 2022 webinar, the CNO indicated that these mission modules are on track to reach IOC by the end of 2022.<sup>70</sup> In an unanticipated move, the Navy began to arm LCS with the

naval strike missile, giving these ships a long-range anti-ship capability that they had lacked despite notable operations by the class in the South China Sea.<sup>71</sup> On December 9, 2021, the San Diego-based *Independence*-variant *Oakland* received this new capability.<sup>72</sup>

Instead of requesting additional LCS, the Navy has focused on a new frigate. On April 30, 2020, the Navy awarded Fincantieri \$795 million to build the lead ship at its Marinette Marine shipyard in Wisconsin based on a proven design currently in service with the French and Italian navies.<sup>73</sup> While the design for the U.S. ship has not been finalized, the frigate is intended to be a multi-mission warship with 32 VLS cells, up to 16 containerized naval strike missiles (NSM), and one helicopter.<sup>74</sup> In May 2021, the Navy contracted for the second ship in the class, the USS *Congress* (FFG-63).<sup>75</sup> In FY 2022 a third ship was purchased with two more planned for purchase in FY 2024.

The Navy continues to explore options to expand production eventually to as many as four ships a year. To do this, the Navy intends to begin production at a second yard by FY 2025; a decision on this "follow yard" is expected by FY 2023. In 2021, Austal USA broke new ground on a steel production facility that could position it to bid as the second yard,<sup>76</sup> but the FY 2022 appropriations bill contains language that may defer identification of this second yard until after delivery of the first frigate during FY 2026. To replicate Fincantieri Marine's Wisconsin shipyard would likely cost over \$700 million.

**Amphibious Ships.** Commandant of the Marine Corps General David Berger issued the 38th Commandant's Planning Guidance in July 2019 and Force Design 2030 in March 2020. Both documents signaled a break with past Marine Corps requests for amphibious lift, specifically moving away from the requirement for 38 amphibious ships to support an amphibious force of two Marine Expeditionary Brigades (MEB).<sup>77</sup> The Commandant envisions a larger yet affordable fleet of smaller, low-signature amphibious ships—the Light Amphibious Warship (LAW)—that enable littoral maneuver and associated logistics support in a contested theater.<sup>78</sup> However, the amphibious fleet remains centered on fewer large ships.

The Navy's Future Naval Force Study (FNFS)<sup>79</sup> and December 2020 30-year shipbuilding plan acknowledged the growing importance of the LAW, which will have to be produced rapidly and in

sufficient numbers in order to actualize the naval forces' distributed concepts of operations (e.g., Marine Littoral Regiments and Distributed Maritime Operations). According to the April 2022 long-range shipbuilding plan, the Navy intends to purchase the first LAW in FY 2025. The Marine Corps had intended to have the ship under contract by the summer of 2022, but because of delays, it has begun to use alternative platforms to train and work out operational concepts so that it will be ready when the ship eventually is delivered.<sup>80</sup>

As of July 1, 2022, the Navy had nine amphibious assault ships in the fleet (seven *Wasp*-class LHD and two *America*-class LHA); 12 amphibious transport docks (LPD); and 11 dock landing ships (LSD).<sup>81</sup> The FY 2021 budget included \$250 million in additional funds to accelerate construction of LHA-9 following the July 2020 catastrophic fire on *Bonhomme Richard* (LHD-6).<sup>82</sup> The decision to decommission the damaged ship further exposed limitations in shipyard capacity, as repairs would have had a negative effect on other planned shipbuilding and maintenance.<sup>83</sup>

The Navy's LSDs, the *Whidbey Island*-class and *Harpers Ferry*-class amphibious vessels, are scheduled to reach the end of their 40-year service lives beginning in 2025. LPD-30 began construction in April 2020 and when delivered will be the first of 13 *San Antonio*-class Flight II ships to replace the legacy LSD ships. The 12th first flight *San Antonio*-class ship (LPD 28) was delivered six months later than reported in the 2022 *Index*.<sup>84</sup> The FY 2021 budget included \$500 million "to maximize the benefit of the amphibious ship procurement authorities provided elsewhere in this Act through the procurement of long lead material for LPD-32 and LPD-33."<sup>85</sup> In the Navy's FY 2023 proposed budget, LPD-32 would be the last Flight II purchased of the originally envisioned 13; the Marine Corps is seeking procurement of the fourth LPD-33 Flight II as its top unfunded request.<sup>86</sup>

**Unmanned Systems.** The Navy does not include unmanned ships in counting its battle force size. Previous long-range shipbuilding plans envisioned the purchase of 13 Large Unmanned Surface Vessels (LUSV); one Medium Unmanned Surface Vessel (MUSV); and eight Extra Large Undersea Unmanned Vessels (XLUUV) by FY 2026.<sup>87</sup> On May 18, 2021, one of these experimental LUSV vessels, the *Nomad*, was seen transiting the Panama Canal on

its way to Surface Development Squadron (SURF-DESRON) 1.<sup>88</sup> In April 2020, the Navy took delivery of its second MUSV *Sea Hunter* prototype, joining two LUSV, and the *Zumwalt* destroyer under SURF-DEVRON 1.<sup>89</sup> Since the 2022 *Index*, there has been significant progress in learning what it will take to operate a fleet of unmanned naval warships and their limitations.

The Navy reached a significant milestone in September 2021 when its small fleet of unmanned surface ships launched and hit a target with an SM-6 interceptor missile.<sup>90</sup> After spending years in a laboratory and controlled at-sea navigational tests, unmanned ships are now deploying. That same month, Task Force 59, based in the Persian Gulf and comprised of smaller unmanned drones and vessels, conducted International Maritime Exercise 2022 (IMX22) with 10 nations and more than 80 unmanned platforms in the Red Sea.<sup>91</sup> Despite these advances, the FY 2023 budget will slow the pace of procurement with the next LUSV procured in FY 2025 and the next XLUUV in FY 2024 for a combined total of 12 of these craft by FY 2027.<sup>92</sup> Overall, the Navy is making progress in maturing its unmanned fleet.

**Logistics, Auxiliary, and Expeditionary Ships.** Expeditionary support vessels are highly flexible platforms of two types: those used for prepositioning and sustaining forward operations and others used for high-speed lift in uncontested environments. The Navy has five of the former (two Expeditionary Transfer Dock [ESD] and three Expeditionary Sea Base [ESB] vessels) and 12 of the latter (shallow-draft Expeditionary Fast Transport [EPF] vessels). In March and April 2022, ESB *Hershel Williams* (ESB 4) demonstrated the versatility of these ships during maritime security missions with African coast guards and navies. In August 2021, it conducted a counter-piracy exercise with the Brazilian navy. At the same time, China was attempting to secure a base in Equatorial Guinea.<sup>93</sup> The Navy christened ESB 6, USNS *John L. Canley*, on June 25, 2022, and ESB 7, USNS *Robert E. Simanek*, "is currently under construction."<sup>94</sup>

With their shallow draft and versatile cargo capacity, EPFs offer unique capabilities that are well suited to austere but uncontested waters. Specifically, these ships can transport 600 short tons of military cargo (for example, main battle tanks) 1,200 nautical miles at 35 knots. The Navy christened its



13th EPF, the *Apalachicola*, on November 13, 2021, and construction is progressing.<sup>95</sup> In March 2021, the Navy revised its contract with Austal USA for \$235 million to modify EPF 14 and the future EPF 15 to be high-speed hospital ships with the capability of embarking a V-22 tilt-rotor aircraft.<sup>96</sup> The keel for EPF 14 configured as a hospital ship was laid on January 26, 2022, and construction of EPF 15 in the same configuration commenced the same month.<sup>97</sup>

The Navy's Combat Logistics Force (CLF) includes dry-cargo and ammunition ships (T-AKE); fast combat support ships (T-AOE); and oilers (AO). The CLF provides critical support, including at-sea replenishment, that enables the Navy to sustain the fleet at sea for prolonged periods. The Navy's future oiler *John Lewis* (T-AO 205) was procured in 2016 and launched five years later on January 12, 2021; 20 ships of this class are planned.<sup>98</sup> However, because of a flooding incident at the graving dock, delivery of *John Lewis* has been delayed, and this in turn has caused cascading delays of 12 to 15 months in construction of the second through sixth ships.<sup>99</sup>

To sustain the number of oilers needed by the fleet, the Navy will have to receive the first two of this class by FY 2023.<sup>100</sup> Secretary of Defense Lloyd Austin's March 7, 2022, decision to dismantle Red Hill fuel storage facilities in Hawaii will generate additional pressure to increase the Navy's at-sea oiler fleet to meet operational needs in the Pacific. A plan specifying how the Navy will mitigate the loss of these massive Pacific fuel storage facilities was due by May 31, 2022.<sup>101</sup>

**Strike Platforms and Key Munitions.** The FY 2023 budget continues the Navy's focus on long-range offensive strikes launched from ships, submarines, and aircraft. Notable capability enhancements funded in the FY 2023 budget include Conventional Prompt Strike (CPS), a maneuverable hypersonic non-nuclear weapon for long-range strikes that receives support for initial deployment on the *Zumwalt*-class destroyer in FY 2025, and the upgraded Block V Maritime Strike Tomahawk (MST) with improved targeting.<sup>102</sup>

To counter the threat posed by the Chinese PL-15 long-range air-to-air missile, which has an operational range of 186 miles, the Navy is working with the Air Force to develop the AIM-120 Advanced Medium-Range missile, the operational range of which has not been made public.<sup>103</sup> In March 2021, the Air Force reported a record long-range kill of a drone

target by this developmental missile from one of its F-15C fighters.<sup>104</sup> If this report is accurate, it indicates that development of this needed capability is proceeding apace.

**Shore-Based Anti-Ship Capabilities.** Following the August 2019 U.S. withdrawal from the Intermediate-Range Nuclear Forces (INF) Treaty, new intermediate-range (500–1,000 miles) conventional ground-launched strike options became politically viable. This is especially important in Asia where such capable missiles deployed to the first island chain would have great relevance in any conflict with China.<sup>105</sup>

The FY 2020 budget included \$76 million to develop ground-launched cruise missiles.<sup>106</sup> The FY 2021 budget included \$59.6 million in additional funds to procure 36 ground-based anti-ship missiles.<sup>107</sup> The FY 2023 budget, building on recent successes, continues this upward investment in development and increased production of these weapon systems. A photo of the launch of a U.S. Marine Corps truck-mounted Naval Strike Missile—ostensibly part of the Navy–Marine Expeditionary Ship Interdiction System (NMESIS)—was released in April 2021.<sup>108</sup> The FY 2023 budget will fund low-rate initial production of 115 Naval Strike Missiles and associated development of Marine Corps platoon-level targeting systems.<sup>109</sup> Ukraine's use of shore-based anti-ship missiles to sink Russia's Black Sea flag ship, the *Moskva*, in April 2022 has renewed interest in such systems.

**Electronic Warfare (EW).** The purpose of electronic warfare is to control the electromagnetic spectrum (EMS) by exploiting, deceiving, or denying its use by an enemy while ensuring its use by friendly forces. It is therefore a critical element of successful modern warfare. The final dedicated EW aircraft, the EA-18G Growler, was delivered in July 2019, meeting the Navy's requirement to provide this capability to nine carrier air wings (CVW), five expeditionary squadrons, and one reserve squadron.<sup>110</sup> Anticipating the EA-18G's retirement in the 2030s, the Navy has been exploring follow-on manned and unmanned systems, but no new developments have been reported in 2022.

The Navy's proposal to retire all of its expeditionary electronic attack squadrons by FY 2025 has come as a surprise.<sup>111</sup> Unless there is a replacement capability, retirement of these aircraft removes the EW coverage provided by these units from forward



airfields, shifting the support burden to nearby naval platforms and the other services.

**Air Early Warning.** The E-2D forms the hub of the Naval Integrated Control Counter Air (NF-IC-CA) system and provides critical theater air and missile defense capabilities. The Navy's FY 2021 budget supported the procurement of four aircraft with an additional 10 to be procured over the next two years.<sup>112</sup> The FY 2023 budget completes this plan by including procurement of the final five new E-2D aircraft, which are important air control platforms.

**High Energy Laser (HEL).** HEL systems provide the potential to engage targets or shoot down missiles without being limited by how much ammunition can be carried onboard ship. A significant milestone was achieved when USS *Portland* (LPD-27) used its HEL Weapon System Demonstrator to shoot down an unmanned aerial vehicle (UAV) over the Pacific on May 16, 2020.<sup>113</sup> This was followed by the Navy's decision to begin installation of a HEL system—the HELIOS (60 kw) laser—on destroyers in 2021 beginning with USS *Preble*.<sup>114</sup> HELIOS is a scalable laser system that is integrated into the ship's weapons control and radar systems and can dazzle and confuse threats, disable small boats, or shoot down smaller air threats.

In April 2022, the Navy demonstrated the ability of its Layered Laser Defense HEL system to shoot down a drone simulating a cruise missile.<sup>115</sup> Successful tests like this and the ongoing deployment of the HELIOS on destroyer *Preble* will be followed by installation of a much stronger 100 kw laser on *Portland* (LPD-27) that approaches the powers needed for missile defense.<sup>116</sup> However, until field testing against meaningful threat platforms is conducted across a range of weather conditions, the effectiveness of such systems will remain unproven.

**Command and Control.** Networked communications are essential to successful military operations. The information passed over these networks includes sensitive data on such subjects as targeting and logistics, and this makes cyber security, communications, and the information systems that generate and relay this information critical elements of the DOD information enterprise.

On October 1, 2020, Chief of Naval Operations Admiral Michael Gilday signed two memos establishing Project Overmatch. The goal was to achieve situational awareness and effective command and control of a geographically dispersed naval force.

In his two memos, the CNO directed that investments be made to deliver network architectures, unmanned capabilities, and data analytics to ensure that the Navy can operate and dominate in a contested environment.<sup>117</sup> The CNO also directed the Navy to leverage related Air Force efforts on JADC2, now a Joint Force effort involving all of the military branches. Remarkably, despite the significance of the effort, little has been publicly released on Project Overmatch; what is known is that it involves three classified funding lines with initial deployment slated for 2023.<sup>118</sup> In unofficial venues, it has been hinted that the first platform to employ JADC2 capabilities will be an aircraft carrier, but public statements indicate that the objective is to connect all platform data flows, analyze them for classification, and make predictive targeting recommendations. If successful, artificial intelligence paired with resilient communications and big data analytics can enable a key element of Distributed Maritime Operations (DMO).

## Readiness

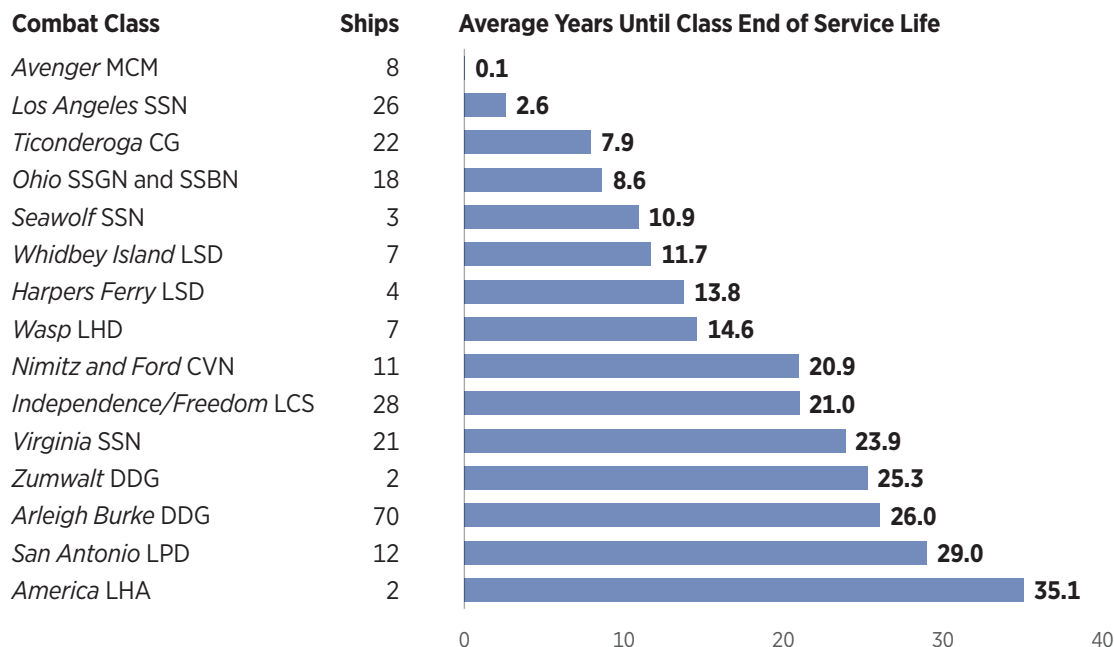
In the 1980s, the Navy had nearly 600 ships in the fleet and kept roughly 100 (17 percent) deployed at any one time. As of June 22, 2022, the fleet numbered 298 ships, of which 94 (31.5 percent) were at sea or deployed. With fewer ships carrying an unchanging operational workload, training schedules become shorter and deployments become longer. The commanding officer's discretionary time for training and crew familiarization is a precious commodity that is made ever scarcer by the increasing operational demands on fewer ships.

FY 2019 marked the first time in more than a decade that DOD and the Navy did not have to operate under a continuing resolution 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 on its path to restoring fleet readiness. However, as CNO Admiral John Richardson explained to the Senate Armed Services Committee in April 2018, it will take until late 2021 or 2022 to restore fleet readiness to an "acceptable" level if adequate funding is maintained; without "stable and adequate funding," it will take longer.<sup>119</sup> Unfortunately, the Navy began FY 2020 under a continuing resolution that delayed planned maintenance for USS *Bainbridge* (DDG 96) and USS *Gonzalez* (DDG 66).<sup>120</sup>

Given this recent history, as well as the effects of COVID, and the demands of unplanned urgent

CHART 8

## Navy Combat Ships Nearing End of Service Life



**NOTE:** Figures are based on calculations for August 2022.

**SOURCE:** U.S. Navy, Naval Sea Systems Command, Naval Vessel Register, "Fleet Size," <http://www.nvr.navy.mil/NVRSHIPS/FLEETSIZE.HTML> (accessed August 17, 2022).

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ship repairs brought about by such incidents as the grounding of the submarine *Connecticut*, the Navy still has much to do.

**Impact of COVID-19.** The eruption of the COVID-19 pandemic in 2020 caused many problems for the U.S. Navy. USS *Theodore Roosevelt* (CVN 71), for example, was forced to quarantine for 55 days in Guam; the major biannual international Rim of the Pacific Exercise (RIMPAC) was scaled down; 1,629 reservists were called to active duty to backfill high-risk shipyard workers conducting critical maintenance; and the Navy was restricted to using "safe haven" COVID-free ports. In May 2021, the CNO assessed that the Navy managed the pandemic with minimal operational impact but with added time at sea and delays for family reunions pending quarantines.<sup>121</sup>

In fact, as the pandemic recedes, the Navy's response has been a success overall. As of June 22,

2022, total cumulative COVID cases among the Navy's active-duty uniformed personnel numbered 97,880 with 17 deaths, and only 3,371 remained unvaccinated, of which 214 had approved exemptions to the mandated vaccination.<sup>122</sup> Given vaccination rates and ebbing danger, the Navy appears to be past the COVID epidemic. It is therefore expected that the Navy will implement lessons learned from this experience to prepare for future pandemics and biological attacks.

**Maintenance and Repairs.** Naval Sea Systems Command completed its Shipyard Optimization and Recapitalization Plan in September 2018.<sup>123</sup> Three years later, the improvement of public shipyard capacities is just beginning. The initial step of building digital models to inform future upgrades to the Navy's four public shipyards was expected to be complete by the end of 2021, but remained

incomplete as of June 2022. Attempts by Congress to accelerate the effort have not been effective.<sup>124</sup> At a May 10, 2022, Senate hearing, it became apparent both that the original costs were significantly underestimated and that timelines are slipping. During that hearing, the Government Accountability Office reported that:

- “[F]rom 2017 to 2020, the backlog of restoration and modernization projects at the Navy shipyards has grown by over \$1.6 billion, an increase of 31 percent.”<sup>125</sup>
- “In 2018, the Navy estimated that it would need to invest about \$4 billion in its dry docks to obtain the capacity to perform the 67 availabilities it cannot currently support. This estimate included 14 dry dock projects planned over [a] 20-year span. However...the Navy’s first three dry dock projects have grown in cost from an estimated \$970 million in 2018 to over \$5.1 billion in 2022, an increase of more than 400 percent.”<sup>126</sup>
- “In a 2021 report to Congress, the Navy stated it would complete the ADPs by fiscal year 2021. However, in a September 2021 update of that report, the Navy stated the [Area Development Plans] would be complete four years later, in fiscal year 2025.”<sup>127</sup>

### **Training, Ranges, and Live-Fire Exercises.**

Ship and aircraft operations and training are critical to fleet readiness. The Navy seeks to meet fleet readiness requirements by funding 58 underway days for each deployed warship and 24 underway days for each non-deployed warship per quarter. Less clear is how much of this time is spent on crew training and whether the Navy assesses this as effective in meeting needed operational proficiencies.

To improve warfighting proficiency, the Navy is seeking to expand and update instrumentation of the training range at Naval Air Station Fallon, Nevada, to enable practice with the most advanced weapon systems.<sup>128</sup> This training range fits into the larger five-year \$27.3 billion Pacific Deterrence Initiative (PDI), led by Indo Pacific Command, that is intended partly to transform the way the Navy trains for high-end conflict and improve training with U.S. allies in the Pacific.<sup>129</sup> Of particular importance to the Navy

are PDI investments to modernize the Pacific Missile Range Facility (PMRF); the Joint Pacific Alaska Range Complex (JPARC); and the Combined/Joint Military Training (CJMT) Commonwealth Northern Mariana Islands in order to improve training for operations across all domains: air, land, sea, space, and cyber.<sup>130</sup>

The FY 2023 budget earmarks \$6.1 billion of DOD’s topline budget for PDI. Especially important are long lead time infrastructure projects in Guam and Tinian in the northern Marianas. This year’s PDI budget includes the largest amount allocated so far for exercises, training, experimentation, and innovation: approximately \$2.3 billion.<sup>131</sup> To measure the effectiveness of these investments, the Navy will need to demonstrate increased frequency of exercises that practice high-end warfighting independently, jointly, and with key allies such as Australia, Japan, and South Korea. This should include increased numbers of realistic free-play events and increased by-hull frequency of live-fire drills.

Finally, not forgotten are the 2017 collisions of USS *John S. McCain* (DDG 56) and USS *Fitzgerald* (DDG 62) in which 17 sailors were lost. Findings of the subsequent investigations, which highlighted the importance of operational risk management and unit readiness, remain relevant.<sup>132</sup> To ensure that these tragic events are not repeated, the following broad institutional recommendations in the Secretary of the Navy’s *Strategic Readiness Review* should be implemented:

- “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>133</sup>

A reminder that the above recommendations remain relevant was the October 2021 grounding of submarine *Connecticut* in the South China Sea. The subsequent investigation found the event

avoidable while operating in poorly surveyed waters—a reminder of the risk as well as vigilance required at sea.<sup>134</sup>

## Scoring the U.S. Navy

### Capacity Score: Very Weak

This *Index* assesses that a battle force consisting of 400 manned ships is required for the U.S. Navy to do what is expected of it today. The Navy's current battle force fleet of 298 ships and intensified operational tempo combine to reveal a service that is much too small relative to its tasks. Contributing to a lower assessment is the Navy's persistent inability to arrest and reverse the continued diminution of its fleet while adversary forces grow in number and capability. On its current trajectory, the Navy will shrink further to 280 ships by 2037. The result is a score of "very weak," which is down from the 2022 *Index*. Depending on the Navy's ability to realize aggressive growth, reverse early decommissioning plans, increase its end strength, and develop creative service life extensions, its capacity score will probably remain "very weak" for the foreseeable future.

### Capability Score: Marginal Trending Toward Weak

The overall capability score for the Navy remains "marginal" with downward pressure as the Navy's technological edge narrows against peer competitors China and Russia. The combination of a fleet that is aging faster than old ships are being replaced and the rapid growth of competitor navies with modern technologies has only intensified the danger for U.S. naval power. Without meaningful progress in

fielding systems that are able to defend against an array of threats, greater integration of unmanned systems into the fleet, and development of a family of new long-range weapons, especially in air-to-air combat, next year's capability score could well decline to "weak."

### Readiness Score: Weak

The Navy's readiness is rated lower this year as "weak." This is due primarily to the Navy's persistent struggle to recapitalize antiquated, inadequate maintenance infrastructure and workforce to meet current needs. The effectiveness of training and exercises measured against China will be an increasingly critical metric in this score.

### Overall U.S. Navy Score: Weak

The Navy's overall score for the 2023 *Index* is "weak" driven by lower scores in capacity and readiness. To correct this trend, the Navy will have to eliminate several readiness and capacity bottlenecks while seeing to it that America has an operational fleet with the numbers and capabilities postured to counter Russian and Chinese naval advances. There is added urgency given that China is aggressively posturing itself to obtain maximum advantage over Taiwan and many of the U.S. Navy's efforts to improve itself will take several years to realize.

## U.S. Military Power: Navy



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

## NAVY SCORES

1 2 3 4 5  
Weakest ← Strongest

Procurement and Spending ■ Through FY 2022 ■ Pending

### Aircraft Carrier

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<b><i>Nimitz</i>-Class Aircraft Carrier (CVN-68)</b> Inventory: <b>10</b> Fleet age: <b>30</b> Date: <b>1975</b>  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, starting with CVN-68 USS <i>Nimitz</i> and CVN-69 USS <i>Eisenhower</i> , and will be replaced by the <i>Ford</i> -class carriers.	3	3	<b><i>Ford</i>-Class Aircraft Carrier (CVN-78)</b>  Timeline: <b>2017-TBD</b>  Currently in production, the <i>Ford</i> -class will replace the <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 to achieve a 33 percent higher sortie rate, a smaller crew with approximately 600 fewer sailors, two and a half times more electrical power, and over \$4 billion in life-cycle cost savings over the <i>Nimitz</i> -class. The ship completed Planned Incremental Availability on March 1 after six months of modernization and maintenance work. The crew is currently undergoing training to prepare for the first deployment of the ship in the fall of 2022. The ship's intended life expectancy is 50 years.	2	2
<b><i>Ford</i>-Class Aircraft Carrier (CVN-78)</b> Inventory: <b>1</b> Fleet age: <b>5</b> Date: <b>2017</b>  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. CVN-78 is expected to deploy in the fall of 2022 after five years of delays. CVN-79 is awaiting testing while CVN-80 and CVN-81 are under construction.	5	4	<b>PROCUREMENT</b>  <b>SPENDING (\$ millions)</b> 		

**NOTE:** See page 386 for details on fleet ages, dates, timelines, and procurement spending.







## NAVY SCORES

1 2 3 4 5  
Weakest ← Strongest

Procurement and Spending ■ Through FY 2022 ■ Pending

### Large Surface Combatant

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<b><i>Ticonderoga-Class Cruiser (CG-47)</i></b> Inventory: <b>22</b> Fleet age: <b>33.5</b> Date: <b>1981</b>  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. The cruisers have a life expectancy of 40 years. The Navy plans to retire the entire cruiser fleet by FY 2027.	2	3	<b><i>Zumwalt-Class Destroyer (DDG-1000)</i></b> Timeline: <b>2016–2024</b>  The DDG-1000 was designed to be a new-generation destroyer capable of handling more advanced weapon systems for long-range strike with a hull design aimed to reduce radar detectability for its original primary mission of naval surface fire support (NSFS). The DDG-1000 program was intended to produce a total of 32 ships, but this number has been reduced to three. The first DDG-1000 was commissioned in October 2016. DDG-1002, the last ship of the class, is expected to be delivered in 2024.	1	1
<b><i>Zumwalt-Class Destroyer (DDG-1000)</i></b> Inventory: <b>1</b> Fleet age: <b>4.5</b> Date: <b>2016</b>  The <i>Zumwalt</i> -class is 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 was commissioned in FY 2020, with DDG 1002 currently awaiting Combat Systems testing before entering the service.	5	2	<b>PROCUREMENT</b>  3 <b>SPENDING (\$ millions)</b>  \$4,092		
<b><i>Arleigh Burke-Class Destroyer (DDG-51)</i></b> Inventory: <b>70</b> Fleet age: <b>15.5</b> Date: <b>1991</b>  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 procured two in FY 2022 and will continue to procure two more each fiscal year. The destroyers will begin to decommission starting in FY 2027 with DDG-51.	3	4	<b><i>Arleigh Burke-Class Destroyer (DDG-51)</i></b> Timeline: <b>1991–2029</b>  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. The Navy procured two destroyers in FY 2022 and plans to procure two more each fiscal year. The destroyers are believed to have an extended life span of 45 years of operational service.	3	4
			<b>PROCUREMENT</b>  89 12 <b>SPENDING (\$ millions)</b>  \$95,474 \$25,785		

**NOTE:** See page 386 for details on fleet ages, dates, timelines, and procurement spending.

## NAVY SCORES

1 2 3 4 5  
Weakest ← Strongest

Procurement and Spending ■ Through FY 2022 ■ Pending

### Small Surface Combatant

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<b>Littoral Combat Ship (LCS)</b> Inventory: <b>22</b> Fleet age: <b>7</b> Date: <b>2008</b>  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. However, the Navy is planning to decommission nine <i>Freedom</i> -class LCS under its FY 2023 budget proposal as well as two <i>Independence</i> -class LCS in FY 2024, despite resistance from Congress.	5		<b>Littoral Combat Ship (LCS)</b>  Timeline: <b>1991–2024</b>  The LCS is intended to fulfill the mine countermeasure, antisubmarine warfare, and surface warfare roles for the Navy. It is designed to operate in near-shore environments but is also capable of open-ocean operation. It works better with smaller ships than the DDG-51. In the FY 2023 budget proposal, the Navy has marked all nine <i>Freedom</i> -class ships currently in service for early disposal. The <i>Independence</i> -class LCS would remain as the sole small surface combatant after the retirement of the MCM ships and until the new FFG-62 frigates are delivered. The decision to scrap the <i>Freedom</i> -class LCS does not affect the ships currently under construction.	2	2
<b>Avenger-Class Mine Counter Measure (MCM-1)</b> Inventory: <b>8</b> Fleet age: <b>31.5</b> Date: <b>1983</b>  Avenger-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.	1	2	<b>FFG Frigate</b>  Timeline: <b>1991–2030</b>  A new program called the FFG-62 will augment the LCS program to fill out the remaining 20-ship small surface combatant requirement for a total of 52 small surface combatants. The ships will be 496 feet with a top speed of 29 miles per hour and a range of 6,000 nautical miles. Its purpose is to escort carrier battle groups and high-value convoys. It will accommodate 32 VLS cells to handle high-powered missiles and machine guns. The first ship should be delivered by 2026 and be operational by 2030. The current contract would provide 10 hulls by 203, with a total of 20 FFG-62 frigates in the fleet. Procurement has been one frigate per fiscal year with the Navy requesting to procure one more in FY 2023.	N/A	N/A
			<b>PROCUREMENT</b> 33	<b>SPENDING (\$ millions)</b> \$16,182	
			<b>PROCUREMENT</b> 3 17	<b>SPENDING (\$ millions)</b> \$3,425 \$17,636	

**NOTE:** See page 386 for details on fleet ages, dates, timelines, and procurement spending.

## NAVY SCORES

1 2 3 4 5  
Weakest ← Strongest

Procurement and Spending ■ Through FY 2022  
■ Pending

### SSGN Cruise Missile Submarine

PLATFORM	Age Score	Capability Score	MODERNIZATION PROGRAM	Size Score	Health Score
<p><b>Ohio-Class (SSGN-726)</b></p> <p>Inventory: <b>4</b> Fleet age: <b>39.5</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 and FY 2028. The Navy tentatively plans to replace the SSGNs with a new Large Payload Submarine beginning in FY 2036, but loss of the SSGN undersea strike capability will be mitigated by the <i>Virginia</i>-class Payload Module (VPM). It had a planned service life of 42 years, but this may be extended.</p>	1	4	None		

**NOTE:** See page 386 for details on fleet ages, dates, timelines, and procurement spending.

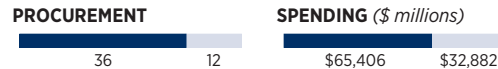
## NAVY SCORES

1 2 3 4 5  
Weakest ← Strongest

Procurement and Spending ■ Through FY 2022 ■ Pending

### Attack Submarines

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<b>Seawolf-Class (SSN-21)</b> Inventory: <b>3</b> Fleet age: <b>21</b> Date: <b>1997</b>  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.	3	4	<b>Virginia-Class (SSN-774)</b> Timeline: <b>2004–2036</b>	2	3
<b>Los Angeles-Class (SSN-688)</b> Inventory: <b>28</b> Fleet age: <b>36</b> Date: <b>1976</b>  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. Between 2022 and 2028, 14 <i>Los Angeles</i> -class submarines will be retired and replaced by the <i>Virginia</i> -class.	1	3			
<b>Virginia-Class (SSN-774)</b> Inventory: <b>19</b> Fleet age: <b>9</b> Date: <b>2004</b>  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. Thirty-six have been procured so far, at a rate of two per year.	4	4			



**NOTE:** See page 386 for details on fleet ages, dates, timelines, and procurement spending.

## NAVY SCORES

1 2 3 4 5  
Weakest ← Strongest

Procurement and Spending ■ Through FY 2022 ■ Pending

### SSBN Ballistic Missile Submarine

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<b>Ohio-Class (SSBN)</b> Inventory: <b>14</b> Fleet age: <b>33</b> Date: <b>1981</b> <p>The <i>Ohio</i>-class SSBN is most survivable leg of the U.S. military's strategic nuclear triad. The <i>Ohio</i>-class 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 fleet will be replaced by 12 <i>Columbia</i>-class SSBNs.</p>	2	4	<b>Columbia-Class (SSBN-826)</b> Timeline: <b>2021-TBD</b> <p>The 12-boat <i>Columbia</i>-class will replace the existing <i>Ohio</i>-class nuclear ballistic submarine force, which provides a credible and survivable sea-based strategic deterrent. The Navy's FY 2023 budget submission estimates the total procurement cost of the 12 boats at \$112.7 billion. The lead boat, SSBN-826, is expected to be delivered in FY 2027 with its first patrol scheduled for FY 2031. Due to complications from the pandemic and technical challenges, the program could be delayed. Despite such issues, construction continues to be underway. The <i>Columbia</i>-class will have a 42-year life expectancy.</p> <div> <div> <b>PROCUREMENT</b>  </div> <div> <b>SPENDING (\$ millions)</b>  </div> </div>		

### Amphibious Warfare Ship

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<b>Wasp-Class Amphibious Assault Ship (LHD-1)</b> Inventory: <b>7</b> Fleet age: <b>23</b> Date: <b>1989</b> <p>The <i>Wasp</i>-class can support amphibious landing operations with Marine Corps landing craft via its well deck. It can also support 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>	2	3	<b>America-Class (LHA-6)</b> Timeline: <b>2014-2028</b> <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 <i>America</i>-class is in production with three LHA 6s already procured. In the FY 2023 budget estimate, the Navy has requested procurement for LHA-9.</p> <div> <div> <b>PROCUREMENT</b>  </div> <div> <b>SPENDING (\$ millions)</b>  </div> </div>	3	3
<b>America-Class Amphibious Assault Ship (LHA-6)</b> Inventory: <b>2</b> Fleet age: <b>5</b> Date: <b>2014</b> <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 <i>America</i>-class is designed to accommodate the Marine Corps' F-35Bs. In the FY 2023 budget estimates, the Navy plans to procure one LHA.</p>	5	4			

**NOTE:** See page 386 for details on fleet ages, dates, timelines, and procurement spending.



## NAVY SCORES

1 2 3 4 5  
Weakest ← Strongest

Procurement and Spending ■ Through FY 2022 ■ Pending

### Amphibious Warfare Ship (Cont.)

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<b>San Antonio-Class Amphibious Transport Dock (LPD-17)</b> Inventory: <b>11</b> Fleet age: <b>10.5</b> Date: <b>2006</b> The LPDs have well decks that allow the USMC to conduct amphibious operations with its landing craft. The LPD can also carry four CH-46s or two MV-22s. Eleven 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. As of FY 2022, two of the LPD Flight II-class have been procured.	4		<b>San Antonio-Class Amphibious Transport Dock (LPD-17)</b> Timeline: <b>2006-2017</b> The 13 LPD-17s are replacements for the <i>San Antonio</i> -class LPDs. 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.	5	4
<b>Whidbey Island-Class Dock Landing Ship (LSD-41)</b> Inventory: <b>7</b> Fleet age: <b>33.5</b> Date: <b>1985</b> 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 and FY 2033. LSD-41-class will be replaced by LPD-17 Flight II program, which began procurement in FY 2018. Before 2026, the Navy plans to retire six of the <i>Whidbey Island</i> -class ships.	2	3	<b>LPD-17 Flight II</b> Timeline: <b>2025-2029</b> 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, but 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. In the FY 2023 budget request, the Navy requested procurement for one Flight II.	5	4
<b>Harpers Ferry-Class Dock Landing Ships (LSD-49)</b> Inventory: <b>4</b> Fleet age: <b>25.5</b> Date: <b>1995</b> The <i>Harpers Ferry</i> -class reduced LCAC capacity to two while increasing cargo capacity. They have 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. Before 2026, the Navy plans to retire four of the <i>Harpers Ferry</i> -class ships.	3		<b>PROCUREMENT</b> 13 <b>SPENDING (\$ millions)</b> \$13,836		
			<b>PROCUREMENT</b> 2 1 <b>SPENDING (\$ millions)</b> \$2,926 \$1,673		

NOTE: See page 386 for details on fleet ages, dates, timelines, and procurement spending.

## NAVY SCORES

1 2 3 4 5  
Weakest ← Strongest

Procurement and Spending ■ Through FY 2022 ■ Pending

### Airborne Early Warning

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<b>E-2C Hawkeye</b> Inventory: <b>26</b> Fleet age: <b>39</b> Date: <b>1973</b> <p>The E-2C Hawkeye is a battle management and airborne early warning aircraft. The aircraft uses computerized radar and electronic surveillance sensors for threat analysis and early warning. 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	<b>E-2D Advanced Hawkeye</b> Timeline: <b>2014–2023</b> <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. An additional five aircraft were requested for procurement in FY 2023 after five were procured in FY 2022.</p> <div> <div> <b>PROCUREMENT</b>  </div> <div> <b>SPENDING (\$ millions)</b>  </div> </div>	4	4
<b>E-2D Advanced Hawkeye</b> Inventory: <b>48</b> Fleet age: <b>4.5</b> Date: <b>2014</b> <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. The E-2D AHE is replacement for the E-2C platform. As of FY 2022, 112 E-2D AHE were procured, and an additional five aircraft are requested for FY 2023.</p>	5	4			

### Electronic Attack Aircraft

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<b>EA-18G Growler</b> Inventory: <b>158</b> Fleet age: <b>9</b> Date: <b>2009</b> <p>The EA-18G Growler is the U.S. Navy's 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. The Navy proposed to retire 25 EA-18Gs across five land-based expeditionary electronic attack squadrons in its FY 2023 budget request. However, the Senate Armed Services Committee, in its markup of the FY 2023 National Defense Authorization Act (NDAA), prevented the retirement of the aircraft. The final decision to retire the 25 EA-18Gs waits to be confirmed.</p>	5	4	None		

**NOTE:** See page 386 for details on fleet ages, dates, timelines, and procurement spending.

## NAVY SCORES

1 2 3 4 5  
Weakest ← Strongest

Procurement and Spending ■ Through FY 2022 ■ Pending

### Fighter/Attack Aircraft

PLATFORM	Age Score	Capability Score	REPLACEMENT PROGRAM	Size Score	Health Score
<b>F/A-18E/F Super Hornet</b> Inventory: <b>598</b> Fleet age: <b>18</b> Date: <b>2001</b>  The F/A-18 E/F Super Hornet has longer range, greater weapons payload, and increased survivability than 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. As of FY 2022, 690 F/A-18 E/F Super Hornets were procured.	3	3	<b>F-35C Joint Strike Fighter</b>  Timeline: <b>2019-TBD</b>  The F-35C is the Navy's variant of the Joint Strike Fighter. The Joint Strike Fighter faced many issues during its developmental stages, including engine problems, software development delays, cost overruns incurring a Nunn-McCurdy breach, and structural problems. The Navy declared initial operational capability (IOC) of the F-35C in February 2019. The planned procurement of 273 F-35Cs will replace over 500 Super Hornets. As of FY 2022, 164 of the aircraft have been procured with an additional 13 being requested for procurement in FY 2023.  <div> <div> <b>PROCUREMENT</b>  </div> <div> <b>SPENDING (\$ millions)</b>  </div> </div>	2	3
<b>F-35C Joint Strike Fighter</b> Inventory: <b>35</b> Fleet age: <b>2</b> Date: <b>2019</b>  The C-variant is the Navy's fifth-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. As of FY 2022, 164 of the F-35C variant were procured, with 205 expected to be procured beginning in FY 2023.	5	4	<b>F/A-18 Super Hornet</b>  The Navy plans to buy 108 Block III Super Hornets by 2024 and modernize most of its existing Super Hornets to Block II standards. All Block III Super Hornets will have a life span of 10,000 flight hours, which is 50 percent greater than that of earlier F/A-18E/F aircraft. As of FY 2022, 690 F/A-18 E/F Super Hornets were procured.		

**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 first year of delivery to the last year of delivery. Spending does not include advanced procurement or research, development, test, and evaluation (RDT&E). 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.

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