

BACKGROUND

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Recommendations for the Next Ballistic Missile Defense-and-Defeat Review

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Abstract

The Trump Administration must advance U.S. missile defense capabilities, including ballistic missile defense interceptors located in space. It should also acknowledge unique contributions of missile defense to U.S. and allied security in the face of adversarial offensive postures, including North Korea and Iran's large and growing ballistic missile arsenals. By emphasizing steps ranging from ensuring that our current interceptors are optimized, to positioning the United States to address future threats by funding defense technologies and interceptors in space, the ballistic missile defense-and-defeat review provides a unique opportunity to put the U.S. missile defense policy on a sounder footing than its predecessors have done.

The fiscal year (FY) 2017 National Defense Authorization Act (NDAA) mandated a joint review of the missile defeat policy and strategy of the United States. The Secretary of Defense and the Joint Chiefs of Staff are jointly conducting the review. The NDAA verbiage indicates the assessment will encompass a somewhat broader scope than the Obama Administration's 2010 Ballistic Missile Defense Review Report, which focused only on missile defense systems and policy.¹ The Obama Administration's report concluded that ballistic missile systems "are becoming more flexible, mobile, survivable, reliable, and accurate, while also increasing in range."²

As the Trump Administration continues its own missile-defense review, it will need to consider both new challenges and opportunities. U.S. adversaries armed with ballistic missiles demand considerable attention, as does the crucial task of keeping up with ballistic

KEY POINTS

- The U.S. Secretary of Defense and Joint Chiefs of Staff are conducting a fiscal year 2017 joint review of the missile defeat policy and strategy of the United States.
- The Trump Administration should use this opportunity to advance U.S. missile defense capabilities, including ballistic missile defense interceptors located in space.
- It should also acknowledge the unique contributions of missile defense to U.S. and allied security in the face of adversarial offensive postures, including North Korea's and Iran's large and growing ballistic missile arsenals.
- By emphasizing steps ranging from ensuring that our current interceptors are optimized to positioning the United States to address future threats by funding defense technologies and interceptors in space, the ballistic missile defense-and-defeat review provides a unique opportunity to put the U.S. missile defense policy on a sound footing.

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missile research and development (R&D) in an era of constrained financial resources.

The Trump Administration must advance U.S. missile defense capabilities, including ballistic missile defense interceptors located in space. It should also acknowledge the unique contributions of missile defense to U.S. and allied security in the face of adversarial offensive postures, including North Korea's and Iran's large and growing ballistic missile arsenals.

Historical Context

U.S. missile defense programs have come a long way since President Reagan's historic March 23, 1983, address to the nation on defense and national security. In the speech, also colloquially known as the "Star Wars" speech, President Reagan called upon the scientific community to render the threat of nuclear-armed ballistic missiles "impotent and obsolete."³ Previous thinking about missile defense programs caused sharp divisions during the Cold War because many considered such systems "destabilizing"—and these divisions continue to impact debates on U.S. missile defense policy to this day. Increasingly worried about advancing ballistic missile threats and their implications for U.S. national security, Congress agreed to pursue a national missile defense "system capable of defending the territory of the United States against limited ballistic missile attack" in 1999.⁴

The sense of urgency—driven by the advancement of ballistic missile defense technologies making ballistic missiles cheaper, more capable, and more destructive, as well as the continued interest of U.S. adversaries in them—increased the perception of the need for the development and deployment of missile defense systems in the United States.⁵ Due to the

advancement and increasing availability of ballistic missile technologies, Congress decided to change the 1999 National Missile Defense Act in its 2017 National Defense Authorization Act.⁶ It no longer refers to ballistic missile defense against "limited" attacks, implying that they may be redefining the scope of the task.

The United States significantly increased its commitment to missile defense development and deployment after its withdrawal from the Cold War-era Anti-Ballistic Missile Treaty in 2002. Today, the Ground-Based Midcourse Defense (GMD) system, remains the only missile defense system capable of shooting down long-range ballistic missiles headed for the U.S. homeland. Relying on the GMD system, however, over the long run is sub-optimal. The interceptors are expensive at about \$70 million each, and even though \$70 million is much less than the damage that would be caused by a successful ballistic missile attack on the U.S. homeland, the price tag makes a larger-scale deployment problematic in the current budget environment. Regrettably, the United States does not currently have a viable alternative to the GMD system.

Threat: The United States Must Get Serious

U.S. missile defense policy changes have been driven by the need to address and counter developments in the threat environment. Ballistic missiles are particularly attractive weapons for America's adversaries. They are lethal, difficult to defeat, relatively easily transportable and therefore more survivable, and have fewer maintenance, training, and logistics requirements than manned aircraft.⁷ The improvement in capability and sophistication of North Korean and Iranian ballistic missiles is partic-

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1. Thomas Karako, Wes Rumbaugh, and Ian Williams, *Missile Defense 2020: Next Steps for Defending the Homeland* (Lanham, MD: Rowman & Littlefield, 2017), http://csis-prod.s3.amazonaws.com/s3fs-public/publication/170406_Karako_MissileDefense2020_Web.pdf?rgfZJOoY5AJY5ScsfZQW8z7Bn7dtSlr (accessed July 17, 2017).
 2. U.S. Department of Defense, "Ballistic Missile Defense Review Report," February 2010, https://www.defense.gov/Portals/1/features/defenseReviews/BMDR/BMDR_as_of_26JAN10_0630_for_web.pdf (accessed July 17, 2017).
 3. Ronald W. Reagan, "Address to the Nation on Defense and National Security," address delivered March 23, 1983, <https://reaganlibrary.archives.gov/archives/speeches/1983/32383d.htm> (accessed July 26, 2017).
 4. National Missile Defense Act of 1999, Public Law 106-38.
 5. *Ibid.*
 6. National Defense Authorization Act for Fiscal Year 2017, Public Law 114-328.
 7. National Air and Space Intelligence Center, "Ballistic & Cruise Missile Threat," 2013, https://fas.org/programs/ssp/nukes/nuclearweapons/NASIC2013_050813.pdf (accessed July 17, 2017).
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ularly worrisome. Secretary of Defense James Mattis recently called North Korea “a direct threat to the United States.”⁸

North Korea. Despite decades of sanctions and an enormous economic toll on its population, North Korea continues to develop long-range ballistic missiles and has a very active nuclear weapons program. North Korea’s objective appears to be having the ability to threaten the U.S. homeland, a feat it is capable of based on its most recent intercontinental ballistic missile test.⁹ Pyongyang can already threaten U.S. allies in South Korea and Japan, as well as U.S. forces stationed in these countries. It is increasingly obvious that the Kim Jong-Un regime will not voluntarily give up its nuclear weapons program, which leaves the United States with an option to either be vulnerable to the whims of an unpredictable totalitarian dictatorship or find ways to defend its way of life as well as its allies.

Iran. Iran is another volatile actor with a large ballistic missile arsenal and active nuclear program. The Joint Comprehensive Plan of Action (JCPOA) cannot stop Iran from weaponizing its nuclear program. The JCPOA is making it easier for Iran to develop better ballistic missiles and gain access to cash and modern technologies that could be used for dual purposes.¹⁰ Iran remains hostile to the United States and its allies in the Middle East. Its cooperation with North Korea remains a proliferation concern. Iran’s relatively advanced space program might help to shorten Tehran’s path to an Intercontinental Ballistic Missile (ICBM) as technologies for both are similar.¹¹

Russia. For decades, the United States has chosen to forego defenses against Russian and Chinese ballistic missiles. The Cold War mindset labeled comprehensive layered missile defense systems “destabilizing” because they were said to incentivize a disarming first strike before missile defense sites

could be completed. There is no empirical evidence for this belief. Russia develops and deploys missile defense systems, including those that have capabilities against U.S. long-range ballistic missiles. If the development of Russia’s capabilities was accompanied by a principle of non-aggression, it would not be a threat to the United States. In fact, the United States ought to welcome general moves toward more defensive strategic postures.

Moreover, missile defenses are useful because there is a fundamental deterrence asymmetry between what the United States values and what U.S. adversaries value. U.S. adversaries value their leadership. U.S. adversaries, or potential adversaries, value tools that keep the leadership in power domestically (e.g., state organs enabling internal oppression) and tools that enable it to coerce other countries internationally (e.g., the military). The United States values its population, cities, and the foundations of its economic power.¹² These are much easier to destroy than deeply buried high-value targets where leadership might reside. Protecting life and the foundations of U.S. economic power and institutions is more consistent with U.S. values than leaving them vulnerable to an adversary’s attack. Protecting what the United States values adds credibility to U.S. threats, thereby contributing to nuclear deterrence.

Regrettably, due to the legacy of the Anti-Ballistic Missile (ABM) Treaty and the subsequent lack of consensus on the need for a truly effective missile defense system, U.S. missile defense systems currently lag behind the ballistic missile threat. Elements of comprehensive layered missile defense architecture are in place—but not in sufficient quantities to provide comprehensive protection from ballistic missile attacks that encompass more than a handful of long-range ballistic missiles. U.S. missile defense systems are more capable (relatively speaking) when it comes to dealing with short-range and intermediate-range

8. John Dickerson, “Transcript: Defense Secretary James Mattis on ‘Face the Nation,’ May 28, 2017,” CBS News, May 28, 2017, <http://www.cbsnews.com/news/transcript-defense-secretary-james-mattis-on-face-the-nation-may-28-2017/> (accessed July 17, 2017).

9. Jordan Bernstein and Michaela Dodge, “North Korean Missile Threat Proves Need for More Investment in Missile Defense,” The Daily Signal, July 5, 2017, <http://dailysignal.com/2017/07/05/north-korean-missile-threat-proves-need-investment-missile-defense/> (accessed July 17, 2017).

10. 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>.

11. Defense Intelligence Ballistic Missile Analysis Committee, “Ballistic and Cruise Missile Threat,” June 2017, <https://fas.org/irp/threat/missile/bm-2017.pdf> (accessed July 17, 2017).

12. Baker Spring, “Congressional Commission Should Recommend ‘Damage Limitation’ Strategy,” Heritage Foundation *Backgrounder* No. 2172, August 14, 2008, <http://www.heritage.org/defense/report/congressional-commission-should-recommend-damage-limitation-strategy>.

ballistic missiles, as those systems were not considered destabilizing during the Cold War.

Even then, however, these systems were in some cases “dumbed down” so as not to impede the so-called strategic stability, making the U.S. and its allies more vulnerable to this class of ballistic missile threats than otherwise would be the case. Herein lies an additional problem with the mutually assured destruction ideology. Dumbing down long-range missile defense systems impacts other U.S. missile defense systems and will inevitably result in missile defense systems that are less capable even against North Korean and Iranian ballistic missiles, particularly as these countries advance in their technological developments.

Ballistic Missile Defense System: Achieving the Unthinkable

The U.S. missile defense system is comprised of three critical elements: (1) sensors that provide critical data about incoming missiles; (2) hit-to-kill interceptors that are responsible for the destruction of adversarial missiles; and (3) command-and-control battle management and communication architecture that provides for data transmission among different elements of the system.¹³ The U.S. Missile Defense Agency (MDA) is responsible for the development, testing, and fielding of the U.S. missile defense systems.

The United States relies on a network of space-based, ground-based, and sea-based sensors to provide cueing and tracking of incoming ballistic missiles. The sensors are responsible for detecting when a ballistic missile is launched and for calculating its trajectory and a likely place of impact based on data gained in early stages of its flight. Sensors are also responsible for discriminating the warhead and its re-entry vehicles from debris, decoys, and countermeasures and for cueing an interceptor so that it can position itself into the path of the incoming missile. In a successful intercept, the sheer force of an impact destroys both the missile and the interceptor: Current interceptors are not equipped with explosives.

The U.S. ballistic missile defense program has

built on the legacy of technologies and concepts developed during President Reagan’s Strategic Defense Initiative program, although technologies today are far more advanced than those of 1980s. Ballistic missile defense interceptors can be generally distinguished based upon which stage of a ballistic missile flight they shoot down an incoming missile (boost, midcourse, or terminal phase) or on the range of the incoming missile they are capable of shooting down (short-range, intermediate-range, or long-range interceptor). Interceptors can also be categorized by their primary mode of deployment (ground-based, sea-based, air-based, or space-based). The most effective, but also the most technologically challenging, are boost-phase missile defense interceptors. This is due to very short warning times. Since the Obama Administration terminated the Airborne Laser program in 2010, the United States lacks significant missile defense capability in this area. The longer the range of the incoming missile, the faster it is and the more challenging the intercept becomes.

The sea-based Aegis missile defense system is capable of shooting down short-range and intermediate-range ballistic missiles in boost/ascent as well as midcourse and terminal stages of flight (depending on the geographic location of the ship relative to the location of the launch pad and availability of clear data and tracking information). The United States currently has five missile-defense-capable cruisers and 28 missile-defense-capable destroyers for a planned increase to 36 missile-defense-capable ships total by the end of FY 2018.¹⁴

Land-based Aegis sites in Romania and Poland will have similar capabilities. The Aegis system uses different variants of the Standard Missile (SM)-3 family of interceptors, each type more advanced and capable than its predecessors. The SM-3 Block IIA, co-developed with Japan and to be deployed in 2018, is designed to shoot down short-range, medium-range, and intermediate-range ballistic missiles.¹⁵ This interceptor is also scheduled to be deployed to the Aegis site in Poland in 2018.

The U.S. GMD system is the only U.S. system that

13. “The Ballistic Missile Defense System (BMDS),” U.S. Department of Defense, Missile Defense Agency, <https://www.mda.mil/system/system.html> (accessed July 17, 2017).

14. Vice Admiral J. D. Syring, “Fiscal Year 2018 Priorities and Posture of Missile Defeat Programs and Activities,” testimony before the Subcommittee on Strategic Forces, Committee on Armed Services, U.S. House of Representatives, June 7, 2017, https://www.mda.mil/global/documents/pdf/FY18_WrittenStatement_HASC_SFS.PDF (accessed July 17, 2017).

15. Raytheon Company, “SM-3 Interceptor,” Raytheon, <http://www.raytheon.com/capabilities/products/sm-3/> (accessed July 17, 2017).

is capable of intercepting an ICBM in the mid-course phase of its flight. The United States currently deploys four interceptors in California and 32 in Alaska. The total number is planned to increase to 44 by the end of 2017.¹⁶ Current interceptor inventory plans, however, do not support sustainment at this level past 2018, leaving the impression that the ballistic missile threat will diminish by then. That is unlikely. Advanced technologies are unlikely to be available for deployment in that time frame. The United States ought to plan for sustaining 44 deployed interceptors *at a minimum*.

The United States also deploys terminal-phase missile defense and air defense systems like the Terminal High Altitude Area Defense (THAAD) or the Patriot Advanced Capability system. Under the best of conditions, the THAAD system can shoot down incoming missiles at ICBM speeds, but the system is not primarily designed with that mission in mind. The Patriot system is designed to shoot down short-range ballistic missiles, large-caliber rockets, and air-breathing platforms.¹⁷ Both the THAAD and the Patriot are popular, particularly among U.S. allies in the Persian Gulf because of the shorter-range nature of the ballistic missile threats they protect against.

Advancing Future Capabilities

In FY 2018, the MDA requested \$7.9 billion, an increase of \$375 million over the previous year's budget.¹⁸ The budget is sufficient to support the current missile defense plans but is not enough to advance future missile defense technologies. The MDA is requesting \$128.4 million to advance unmanned aerial vehicle-based (UAV) sensors, as well as to continue the design and begin fabrication of a UAV-borne laser capable of shooting down ballistic missiles in the boost phase of their flight.¹⁹

The MDA also plans on spending \$252.9 billion on Common Kill Vehicles (Multi-Object Kill Vehicles or MOKV) Technology that would allow the United States to place more kill vehicles on top of each inter-

ceptor. Putting multiple-kill vehicles on top of a single interceptor would increase its efficiency and probability of intercept. In particular, the GMD program would benefit from such an advancement as each interceptor costs around \$70 million. The concept is similar to the Multiple Kill Vehicle (MKV) program that the Obama Administration cancelled in 2009. The MKV program achieved a free-flight hover test in 2008, demonstrating the MKV's "capability to hover under its own power and prove its capability to recognize and track a surrogate target in a flight environment."²⁰

The MDA requested additional funding of \$20.2 million to cooperate with small businesses, universities, and international partners on advancing future missile-defense capabilities. An additional \$13 million is allocated to the centralization of advanced technology concept-modeling, simulation, and performance analysis, with the ultimate goal of delivering an independent capability to assess concepts supporting the acquisition strategy and to define technology focus areas. Over the next five years or so, the MDA is planning on developing a Medium Range Discrimination Radar (MRDR) at a cost of about \$800 million. The radar is envisioned to provide additional long-range discrimination to enable the GMD interceptor to protect Hawaii from a North Korean ballistic missile. But the United States can utilize existing assets, like Aegis ships or Aegis Ashore sites accompanied by an Army-Navy Transportable Radar Surveillance radar to protect Hawaii today at much lower cost. The MDA should prioritize currently available solutions, provided they do not affect activities at the Pacific Missile Range Facility, particularly considering the current state of the North Korean ballistic missile threat.

The MDA's investment in space-based technologies is wholly inadequate. The MDA requested \$17 million for the Space-Based Kill Assessment Experiment, a sensor network that would "deliver an experimental kill assessment capability tailored to homeland

16. Missile Defense Agency, "Fiscal Year (FY) 2018 Budget Estimates," May 15, 2017, <https://www.mda.mil/global/documents/pdf/budgetfy18.pdf> (accessed July 17, 2017).

17. "PATRIOT Advanced Capability-3 (PAC-3)," U.S. Department of Defense, Missile Defense Agency, https://www.mda.mil/system/pac_3.html (accessed July 17, 2017).

18. Missile Defense Agency, "Fiscal Year (FY) 2018 Budget Estimates."

19. *Ibid.*

20. Press release, Missile Defense Agency, "Multiple Kill Vehicle Completes Hover Test," December 3, 2008, <https://www.mda.mil/global/documents/pdf/O8fyi0110.pdf> (accessed July 17, 2017).

defense” and be hosted on commercial satellites.²¹ Additionally, \$34.9 million was requested for the Space Tracking and Surveillance System, two satellites that provide data for U.S. missile defense interceptors.

There is no money allocated for space-based missile defense interceptor R&D. Because there are more opportunities in space-based versus terrestrial-based interceptors, ultimately, if the United States is serious about its missile defense program, it will have to invest in space-based interceptor technologies. Such investments are overdue.²² The United States should also explore the benefits of lasers for missile defense interceptor applications. Additionally, the MDA should reinvigorate concepts like the Network Centric Airborne Defense Element, a small, relatively cheap boost/ascent phase ballistic missile interceptor geared toward short-range and medium-range ballistic missiles.²³

Recommendations for a More Secure Future

The United States can and ought to take steps to protect its citizens, forward-deployed troops, and allies from an ever-expanding ballistic missile threat. It is vital that U.S. adversaries are denied an option to blackmail the United States or limit our freedom of action. To that end, the next ballistic missile defense-and-defeat review should advance the following policies:

- **Recognize benefits of missile defense to the United States and its allies.** When U.S. missile defense systems complicate an adversary’s attack calculations, they take cheap shots off the table and give leadership time to choose actions with the highest likelihood for de-escalation.²⁴ A national security posture that emphasizes defense is more consistent with U.S. values, particularly its concern over the lives of its citizens and their
- **Work toward unlocking the potential of currently deployed missile defense systems.** The United States must work toward making the current interceptors all they can be. Such work includes providing interceptors with better quality data as well as making hardware and software modifications to different elements of the system. As a general principle, U.S. missile defense systems should be made the best they can be and effective against multiple technologically advanced ballistic missiles. Some will argue that such policy undermines the United States’ strategic relationship with Russia. However, Russia is developing and deploying its own missile defense system. Moscow’s choices are driven by its perception of its own national interest. Additionally, restraining U.S. missile defense systems for fear of offending Russia makes them ultimately less effective against rogue states such as North Korea or Iran.
- **Invest in future missile defense technologies.** The United States must increase investments in future ballistic missile defense technologies, including advancing boost-phase and ascent-phase missile defense efforts that were significantly scaled down under President Obama’s watch. Technologies such as MOKV would help to increase the efficiency of the currently deployed interceptors.
- **Increase the Missile Defense Agency budget.** Defense Secretary James Mattis said that the United States must review missile defense policy before increasing the MDA’s R&D budget.²⁵ But the MDA will be able to do very little cutting-edge

21. Missile Defense Agency, “Fiscal Year (FY) 2018 Budget Estimates.”

22. Rebecca L. Heinrichs, “Space and the Right to Self Defense,” Hudson Institute, June 2016, <https://www.hudson.org/content/researchattachments/attachment/1499/20160627heinrichspaceandtherighttoselfdefense.pdf> (accessed July 17, 2017).

23. Loren B. Thompson, “NCADE: Missile Defense Agency Neglects Its Most Affordable Option,” The Lexington Institute, November 13, 2009, <http://www.lexingtoninstitute.org/ncade-missile-defense-agency-neglects-its-most-affordable-option/> (accessed July 17, 2017).

24. Spring and Michaela Dodge, “Israel and the Iron Dome System: A Lesson for the United States,” Heritage Foundation *Web Memo* No. 3370, September 26, 2011, <http://www.heritage.org/defense/report/israel-and-the-iron-dome-system-lesson-the-united-states>.

25. James N. Mattis, “The Fiscal Year 2018 National Defense Authorization Budget Request from the Department of Defense,” testimony before the Committee on Armed Services, U.S. House of Representatives, June 12, 2017, <https://armedservices.house.gov/legislation/hearings/fiscal-year-2018-national-defense-authorization-budget-request-department> (accessed July 17, 2017).

research to advance future missile defense concepts if the MDA's funding remains the same. Foregoing advanced missile defense research sets the United States up for failure in the future as adversaries continue to advance their ballistic missile capabilities both quantitatively and qualitatively.

- **Invest in space-based missile defense interceptors.** Missile defense interceptors in space present a tremendous opportunity to defend our way of life from even large-scale ballistic missile attacks. They can be cost-efficient, particularly considering advances in miniaturization technologies since the 1990s. NASA's 1990s Clementine mission validated most technologies needed for space-based interceptors, illustrating that space-based interceptors are possible today, as opposed to belonging to the realm of science fiction.²⁶
- **Plan on maintaining a sufficient Ground-Based Interceptor (GBI) inventory into the future.** Current purchase plans do not support an inventory of interceptors large enough to maintain 44 operationally deployed GBIs into the 2020s. It is unreasonable to assume that the ballistic missile threat will diminish. In fact, it is likely that it will expand further. The United States must ensure it has enough GBIs, either through life-extension programs, additional interceptor purchases, or a combination of both.
- **Maintain and strengthen international cooperation.** U.S. missile defense cooperation with other nations—Israel especially—is a testament to how quickly missile defense systems can advance when there is a bipartisan consensus on the need for them. U.S. missile defense cooperation with Japan has been equally valuable. The Trump Administration should continue to support missile defense cooperation internationally, particularly within the North Atlantic Treaty Organization framework.
- **Continue missile defense deployments in**

Europe. The United States should continue its missile defense cooperation with allies in Poland and Romania. Both countries host land-based Aegis missile defense systems geared toward mitigating the Iranian ballistic missile threat. The Trump Administration ought to continue the construction and operation of the land-based sites in Poland and in Romania.

- **Prioritize currently available missile defense solutions, provided they are cost effective and do not negatively affect other missile defense operations.** The MDA ought to re-evaluate a plan to develop and deploy the MRDR in Hawaii, especially considering there is a more cost-effective and immediate solution at hand.

The U.S. missile defense program has come a long way since the Bush Administration withdrew from the Anti-Ballistic Missile Treaty in 2001. But if the United States intends to keep itself and its allies safe, there is a lot more work to be done. By emphasizing steps ranging from ensuring that our current interceptors are optimized, to positioning the United States to address future technologically advanced threats by funding future missile defense technologies and interceptors in space, the ballistic missile defeat review provides a unique opportunity to put the U.S. missile defense policy on a sounder footing than its predecessors have done.

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26. Michaela Dodge, "Space-Based Missile Defense: Advancing Creativity, Protecting Lives," *Heritage Foundation Commentary*, August 20, 2014, <http://www.heritage.org/defense/commentary/space-based-missile-defense-advancing-creativity-protecting-lives>.