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U.S. Air Force Intercontinental Ballistic Missile Sustainment, Modernization, and Recapitalization: Background and Issues for Congress

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Summary

Determining the future role of U.S. nuclear weapons within the U.S. national security strategy is currently a topic of much debate. Many senior leaders are determined to design a strategy that defines a new role for U.S. nuclear weapons and makes those weapons responsive and relevant in today's global threat environment. The current U.S. nuclear enterprise consists of a triad of options: Intercontinental Ballistic Missiles (ICBMs), Submarine Launched Ballistic Missiles (SLBMs), and long-range bombers. All three legs of the nuclear triad are aging, since they were largely built to counter the threat of the Soviet Union. Policymakers in Congress and the Executive Branch are now deciding whether to modernize or replace parts of each leg.

The Obama Administration's 2010 Nuclear Posture Review (NPR) outlines its approach to reducing nuclear dangers and pursuing the goal of a world without nuclear weapons, while simultaneously advancing broader U.S. security interests. In his April 2009 speech in Prague, President Obama highlighted the current nuclear dangers in the global environment and declared the United States will "seek the peace and security of a world without nuclear weapons." The Nuclear Posture Review provides the roadmap for implementing President Obama's agenda for reducing nuclear risks to the United States, U.S. allies and partners, and the international community.

This raises several issues for Congress particularly regarding the Triad's ICBM component. First, Congress may consider whether the current plans for the nuclear enterprise are sufficient to address the problems within the ICBM force or whether there may be other ways to sustain the current force. Second, Congress may consider whether the United States should continue to deploy ICBMs in the future nuclear force structure, particularly in light of expected financial constraints. It may consider whether nuclear weapons modernization programs will compete with each other, or with conventional weapons programs, for scarce resources. Finally, Congress may address questions about whether the United States can afford to forgo ICBM sustainment and modernization programs in an era of changing national security challenges.

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Introduction

The United States is currently facing two key challenges related to the U.S. intercontinental ballistic missile (ICBM) force. The first is sustainment of the current force and the implementation of needed improvements in operations and support. The second is the planned modernization of the ICBM force, including building new weapons, expected in the late 2020s. Both would likely necessitate increased funding, but the Budget Control Act (BCA) limits funding for the Department of Defense (DOD) through 2021. Moreover, the United States also plans to modernize other components of its nuclear forces during the 2020s, which would also likely necessitate further significant increases in spending in the 2020s. Congress has a key role in any decisions related to these issues.

The discussion about whether to modernize or replace the ICBM force is a significant part of the national debate about the future of U.S. nuclear weapons. Supporters argue that ICBMs have been the cornerstone of the U.S. nuclear force posture since the 1960s, when the U.S. fielded the first Minuteman III missile.[1] While deterrence in the 21st century is more difficult for the U.S. than it was in the past, having the right mix of nuclear capabilities to deal with new challenges is still seen as crucial.[2] The 2010 Nuclear Posture Review (NPR) identifies a variety of emerging situations in which ICBMs might play a role in deterring adversaries, stabilizing regions and reassuring allies and partners.[3] Both Russia and China are modernizing their nuclear weapons. Moreover, the U.S. relationship with China is evolving, North Korea has developed nuclear weapons, and Iran has pursued a nuclear program that may eventually provide a weapon capability.[4] The United States also continues to extend deterrence to allies and partner nations with a "credible U.S. 'nuclear umbrella.'"[5] Thus, according to many observers, the United States would need to sustain and modernize its ICBM force to manage challenges in the new global security and threat environment.

While long-range nuclear bombers and submarine launched ballistic missiles (SLBMS) are relatively concentrated in location (and therefore may be vulnerable to attack), the size, protection, and dispersion of ICBM forces makes them virtually impossible to destroy short of an all-out nuclear attack. Additionally, since an ICBM force can only be crippled by a large and unmistakable nuclear attack, land-based ICBMs can provide clarity about when a country is under attack and who the attacker is.[6]

Others, however, argue that ICBMs are a relic of the Cold War and play little or no role in helping the United States meet "21st century security challenges."[7] Further, they argue that, in an era of

[1] Lauren Caston, Robert S. Leonard, and Christopher A. Mouton, et al., *The Future of the U.S. Intercontinental Ballistic Missile Force*, RAND Corporation, Santa Monica, CA, 2014, p. 13, at http://www.rand.org/pubs/monographs/MG1210.html.

[2] Keir A. Lieber and Daryl G. Press, "The Nukes We Need: Preserving the American Deterrent," *Foreign Affairs*, Nov/Dec 2009.

[3] Ibid., p. 1.

[4] Ibid., p. 1.

[5] Department of Defense, *Nuclear Posture Review Report*, April 2010, p. 12.

[6] Kingston Reif, Travis Sharp, and Kirk Bansak, *Pruning the Nuclear Triad? Pros and Cons of Submarines, Bombers, and Missiles*, The Center for Arms Control and Non-Proliferation, May 16, 2013, at http://armscontrolcenter.org/publications/factsheets/051613_nuclear_triad_pros_cons/.

[7] Global Zero U.S. Nuclear Policy Commission Report, *Modernizing U.S. Nuclear Strategy, Force Structure and* (continued...)

constrained resources and declining defense budgets, U.S. security would be better served by investing in new advanced conventional weapons than by sustaining and modernizing the ICBM force.

Experts agree that the international security environment has changed dramatically since the end of the Cold War. As President Obama noted in the 2010 Nuclear Posture Review Report, the threat of global nuclear war has become remote, but the risk of nuclear attack has increased.[8] Some nations may be shifting their security strategy to rely more on nuclear weapons in an effort to counter the U.S. conventional forces.[9]

The Nuclear Posture Review further noted that, "as long as nuclear weapons exist," the United States will sustain secure and effective nuclear forces. In this view, these nuclear forces will continue to play an essential role in deterring potential adversaries and reassuring allies and partners around the world.[10] In "A Nuclear Deterrent for the 21st Century," Clark Murdock writes, "much like the United States in the 1950s when it faced massive Warsaw Pact conventional forces, other states are increasing their reliance on nuclear weapons. Nuclear weapons offset conventional military superiority. When the U.S. military declares that it is seeking 'full spectrum dominance", it simply reinforces the dependence of our would-be competitors on nuclear weapons."[11]

There are several issues for Congress. First, Congress may consider whether the current plans for the nuclear enterprise (consisting of leadership, people and things that work on the nuclear mission) are sufficient to address the problems within the ICBM force or whether there may be other ways to sustain the current force. Second, Congress may consider whether the United States should continue to deploy ICBMs in the future nuclear force structure, particularly in light of expected financial constraints. It may consider whether nuclear weapons modernization programs will compete with each other, or with conventional weapons programs, for scarce resources. Finally, Congress may question whether the United States can afford to forgo ICBM sustainment and modernization programs in an era of changing national security challenges.

Current U.S. Nuclear Force Structure

The U.S. nuclear force is a "Triad" consisting of strategic ballistic missile submarines (SSBNs) that carry submarine-launched ballistic missiles (SLBMs), the land-based ICBM force, and long-range bomber aircraft. Each leg of the triad has both strengths and weaknesses, leading some analysts to recognize the complementary capabilities of the three legs. According to the Nuclear Posture Review, "strategic nuclear submarines and the SLBMs they carry represent the most survivable leg of the U.S. nuclear Triad." Some argue single-warhead ICBMs contribute to stability, and like SLBMs are not vulnerable to air defenses. Unlike SLBMs and ICBMs, bombers

(...continued)

Posture, May 2012, p. 5, at http://www.globalzero.org/files/gz_us_nuclear_policy_commission_report.pdf.

[8] Department of Defense, *Nuclear Posture Review Report*, April 2010, p. 4.

[9] Clark A. Murdock, A Nuclear Deterrent for the 21st Century, Center for Strategic and International Studies, 2015, p. 16.

[10] Department of Defense, *Nuclear Posture Review Report*, April 2010, p. v.

[11] Clark A. Murdock, *A Nuclear Deterrent for the 21st Century*, Center for Strategic and International Studies, 2015, p. 16.

can be visibly forward deployed, as a signal in crisis to strengthen deterrence of potential adversaries and assurance to allies and partners.[12] Others contend that, because each leg of the triad contributes unique attributes that enhance deterrence and reduce risk, together they comprise a robust deterrent that complicates a potential adversary's offensive and defensive planning. In this view, they provide a "synergistic force" that provides protection against the failure of any single one of its legs. As a result, many analysts believe that these complementary capabilities justify retaining all three legs for the foreseeable future.

Strategic Nuclear Submarines

The ballistic missile submarine force has been a part of the U.S. nuclear deterrent since the 1960s. Experts argue that the SSBN leg of the Triad provides the United States with its most survivable and enduring nuclear strike capability because they serve as an undetectable launch platform for intercontinental missiles. The United States Navy currently deploys 14 Ohio-class SSBNs, with 12 available for deployment at any given time.[13] Seven are based in Bangor, Washington, and patrol in the Pacific Ocean, while five are based in Kings Bay, Georgia, and patrol in the Atlantic Ocean. These submarines carry a total of 288 Trident II D5 SLBMs, each of which can carry up to eight nuclear warheads. The Ohio-class submarines have a service life of 42 years—2 20-year cycles with a 2-year mid-life nuclear refueling.

The Ohio-class SSBNs were first deployed in 1981 and are to reach the end of their planned service life at a rate of approximately one boat per year between 2027 and 2040. The Navy plans to replace each retiring boat, starting in 2031, with a new class of ballistic missile submarine, referred to as the SSBNX, or the Ohio-class replacement. The Navy originally planned to begin using the replacement boats in 2029, but in 2012 the Pentagon announced a two-year delay to the SSBNX program. This would push back completion of the first SSBNX to 2031.[14] The FY2015 budget includes $1.4 billion for the Ohio-replacement program.

The Navy is also modernizing the Trident II D5 SLBMs with which both boats are armed. They are planned to remain in the arsenal until 2042. The FY2016 budget includes $1.2 billion for this Trident II Life Extension Program (LEP).[15]

Long-Range Strategic Bombers

The United States currently bases 18 B-2 *Spirit* stealth bombers at Whiteman Air Force Base in Missouri, and 76 B-52H *Stratofortress* bombers at Minot Air Force Base, ND, and Barksdale Air Force Base, LA, that can be equipped for nuclear missions. The B-2 bombers are equipped to carry B61 gravity bombs, while the B-52s can deliver gravity bombs or nuclear-armed air-launched cruise missiles (ALCMs).

[12] Department of Defense, *Nuclear Posture Review Report*, April 2010, p. p. 22.

[13] Arms Control Association, *U.S. Nuclear Modernization Fact Sheet*, at http://www.armscontrol.org/factsheets/USNuclearModernization.

[14] For details on the Ohio-replacement program, see CRS Report R41129, *Navy Ohio Replacement (SSBN[X]) Ballistic Missile Submarine Program: Background and Issues for Congress*, by (name redacted).

[15] Arms Control Association, *U.S. Nuclear Modernization Fact Sheet*, at http://www.armscontrol.org/factsheets/USNuclearModernization.

Some analysts attribute a number of advantages to the strategic bomber leg of the triad. Unlike land- or sea-based missiles, bombers can be recalled after launch. Bombers can launch quickly from their bases in an effort to survive a nuclear first strike. U.S. bombers also carry the nuclear weapons with the lowest yield, which means they offer a more diverse range of less devastating options for the President.[16]

The Air Force is developing a new long-range penetrating bomber with nuclear capabilities, known as the LRS-B. The 2012 Aircraft Procurement Plan anticipates a procurement of 80-100 bombers at an estimated per unit cost of $550 million, for a total of $40-60 billion. The Pentagon's FY2014 budget includes $359 million for research and development of the bomber. The Air Force plans to spend $32.1 billion over the next ten years on research and development of the new bomber.[17] The Air Force has also begun development of a new nuclear-armed cruise missile, known as the LRSO, which would replace the existing ALCM after 2030 and allow the bomber force to launch stand-off weapons in future contingencies.

In addition to developing a new long-range bomber, the Air Force is also modernizing the current B-2 fleet. These aircraft became operational in 1997 and have a planned service life of six decades. In order to continue delivering long-range direct attack munitions in an anti-access environment, the B-2 will need upgrades in communication, offensive, and defensive systems. According to the Nuclear Posture Review, the Pentagon is to invest over $1 billion over the next five years on upgrades for the B-2 survivability and mission effectiveness.[18]

Intercontinental Ballistic Missiles

The United States Air Force currently bases 450 Minuteman III ICBMs, with 150 each located at F.E. Warren Air Force Base, WY; Malmstrom Air Force Base, MT; and Minot Air Force Base, ND. In order to meet warhead levels set by START II, the U.S. permanently reduced the number of warheads in all Minuteman III missiles from three warheads to a single warhead.[19] The Air Force plans to retain 400 ICBMs as the United States reduces its forces under the 2010 New START Treaty. Many observers have noticed that, because these ICBMs are geographically dispersed in hardened, underground silos, the ICBMs would be difficult for any adversary to destroy in an attack on the United States. ICBMs are also cited as the "promptest leg of the triad, offering the U.S. the ability to launch a nuclear attack more quickly than the other two legs."[20]

Over the past 15 years, the Air Force has pursued several programs that are designed to improve the accuracy and reliability of the Minuteman fleet and to support the operational capability of the Minuteman ICBM through 2030. These programs have addressed aging and technology issues in

[16] Kingston Reif, Travis Sharp, and Kirk Bansak, *Pruning the Nuclear Triad? Pros and Cons of Submarines, Bombers, and Missiles*, The Center for Arms Control and Non-Proliferation, May 16, 2013, at http://armscontrolcenter.org/publications/factsheets/051613_nuclear_triad_pros_cons/.

[17] Arms Control Association, *U.S. Nuclear Modernization Fact Sheet*, at http://www.armscontrol.org/factsheets/USNuclearModernization.

[18] Ibid.

[19] Federation of American Scientists, *LGM-30 Minuteman III*, February 17, 2015, at http://fas.org/nuke/guide/usa/icbm/lgm-30_3.htm.

[20] Kingston Reif, Travis Sharp, and Kirk Bansak, *Pruning the Nuclear Triad? Pros and Cons of Submarines, Bombers, and Missiles*, The Center for Arms Control and Non-Proliferation, May 16, 2013, at http://armscontrolcenter.org/publications/factsheets/051613_nuclear_triad_pros_cons/.

the missiles' propulsion, guidance, and reentry vehicle systems.[21] Currently, the Air Force is pursuing the ICBM fuse modernization program, which is to replace the current MK21 warhead fuse so that the missiles can operate through 2030. The Air Force plans to procure 693 modernized fuses for the Minuteman fleet, at a cost of $830 million. It has requested $13.7 million for this program in FY2016, and expects to spend around $65 million through 2020.[22] The Air Force is also funding, through its RDT&E budget, a number of programs under the ICBM demonstration and validation (Dem/Val) title that would allow it to create technologies that might support both the existing Minuteman fleet and the future ICBM program (known as the Ground Based Strategic Deterrent.).

Modernizing the ICBM Force

In October 2010, the Air Force produced an ICBM Master Plan that outlined its approach to sustaining and modernizing the Minuteman (MM) force. This report indicated that the Air Force would sustain the Minuteman III missiles through 2030 and deploy a follow-on system after 2030.[23]

The plan states that "beginning in 2020, large-scale investment will be required to sustain MM III through 2030. These modernization efforts must support both sustainment through 2030 and recapitalization for a Minuteman Follow-on after 2030."[24] Also stated is "MM III sustainment funding must continue until Initial Operational Capability (IOC)[25] of a new or replacement weapon system...."[26] This is currently projected to occur in the Dem/Val program described above.

The Air Force has reportedly decided to pursue a "hybrid" plan for the next generation ICBM. It would maintain the basic design of the missile, the current communications system, and the existing launch silos, but would replace the rocket motors, guidance sets, post-boost vehicles, and re-entry systems. In other words, the Air Force would deploy a new missile in its existing Minuteman infrastructure. Reports also indicate that, although this missile would be deployed in fixed silos, the design would allow the missiles to be deployed on mobile launchers sometime in the future.[27] The Air Force has requested $75 million for this program in FY2016, but expects to spend $945 million through FY2020.

[21] For descriptions of these programs, see CRS Report RL33640, *U.S. Strategic Nuclear Forces: Background, Developments, and Issues*, by (name redacted).

[22] Air Force, *RDT&E Budget Item Justification ICBM Fuze Modernization*, pp. 1-9.

[23] Jeffrey F. Smith, Brig Gen, U.S. Air Force, *ICBM Master Plan*, Headquarters Air Force Global Strike Command, Barksdale AFB, LA, October 2010.

[24] Ibid., p. 25.

[25] IOC is described as the first attainment of the capability to effectively employ a weapon, item of equipment, or system of approved specific characteristics that is manned or operated by an adequately trained, equipped, and supported military unit or force per the Dictionary of Military and Associated Terms from the DOD.

[26] Jeffrey F. Smith, Brig Gen, U.S. Air Force, *ICBM Master Plan*, Headquarters Air Force Global Strike Command, Barksdale AFB, LA, October 2010, p. 26.

[27] Elaine Grossman, "Key Targeting Tech for Future U.S. Nuclear Missile has Gone Unfunded," *Nextgov.com*, August 19, 2014.

While the Air Force appears committed to pursuing the development of a new ground-based strategic deterrent, there is growing recognition among analysts that fiscal constraints may alter this approach.

ICBM Modernization Options

The RAND Corporation published a 2014 study that outlined six options to modernize the ICBM force.[28] System characteristics go from rather well defined and narrowly scoped to much broader and ambiguous. The first two options, which would not replace the current Minuteman system, would either continue basic sustainment until the system is ineffective or unsustainable or continue indefinite incremental modernization (IIM) until the system is ineffective or unsustainable. The last four options would replace the Minuteman with a new system, with increasing levels of sophistication. These four options would

1. Acquire "Minuteman IV" (MM IV) (which RAND defines to be "Minuteman III–like"). Replace the current system with one of similar capability and with a virtually identical employment concept.
2. Acquire an all-new-design ICBM to be based in existing Minuteman silos with a similar employment concept.
3. Acquire an all-new-design ICBM with an alternative basing scheme but using existing U.S. Air Force military base infrastructure and footprint.
4. Acquire an all-new-design ICBM with an alternative basing scheme requiring use of public lands or enhanced U.S. Air Force military base infrastructure and footprint.[29]

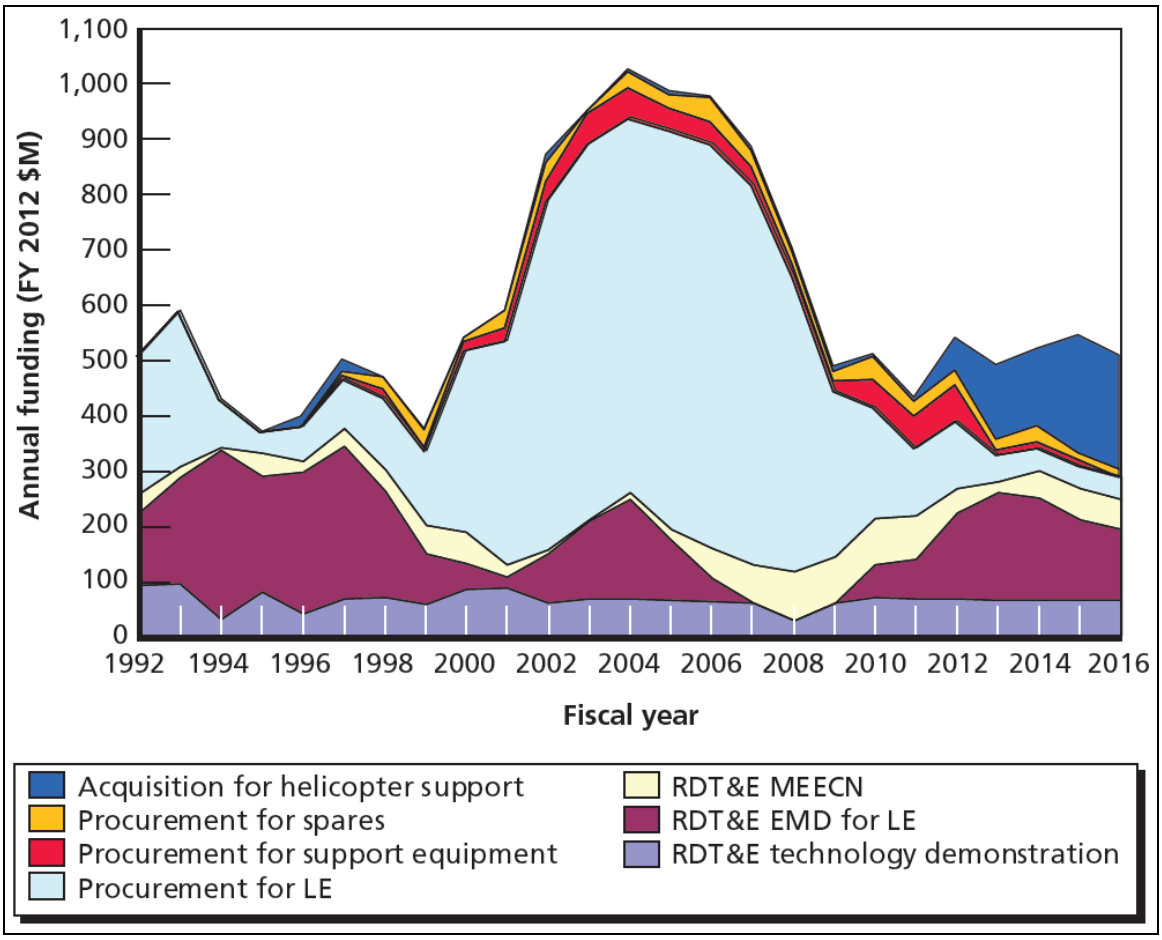
Detailed analysis from the RAND study indicates that an "all-new ICBM system will likely cost almost twice (and perhaps even three times) as much as incremental modernization and sustainment of the Minuteman III system." Specifically, the RAND study estimated that the lifecycle costs for incrementally modernizing the Minuteman III would be $60 to $90 billion, while a new silo-based ICBM would cost between $84 billion and $125 billion. Rail- and road-mobile versions would cost significantly more, from $124 billion to $219 billion. This modernization program results in essentially a "new" missile that provides expanded targeting options along with improved accuracy and survivability.

RAND found that the cost to replace the Minuteman force would likely be considerably lower than the cost of upgrading and modernizing the current arsenal over the period of FY2012 through FY2050. The historical and projected future cost of maintaining the current Minuteman force and the comparisons of modernization costs are illustrated in **Figure 1** and **Figure 2**.

[28] Lauren Caston, Robert S. Leonard, and Christopher A. Mouton, et al., *The Future of the U.S. Intercontinental Ballistic Missile Force*, The RAND Corporation, Washington, DC, 2014, (hereinafter, RAND study) at http://www.rand.org/pubs/monographs/MG1210.html.

[29] Entire section adapted from RAND study, p. 87.

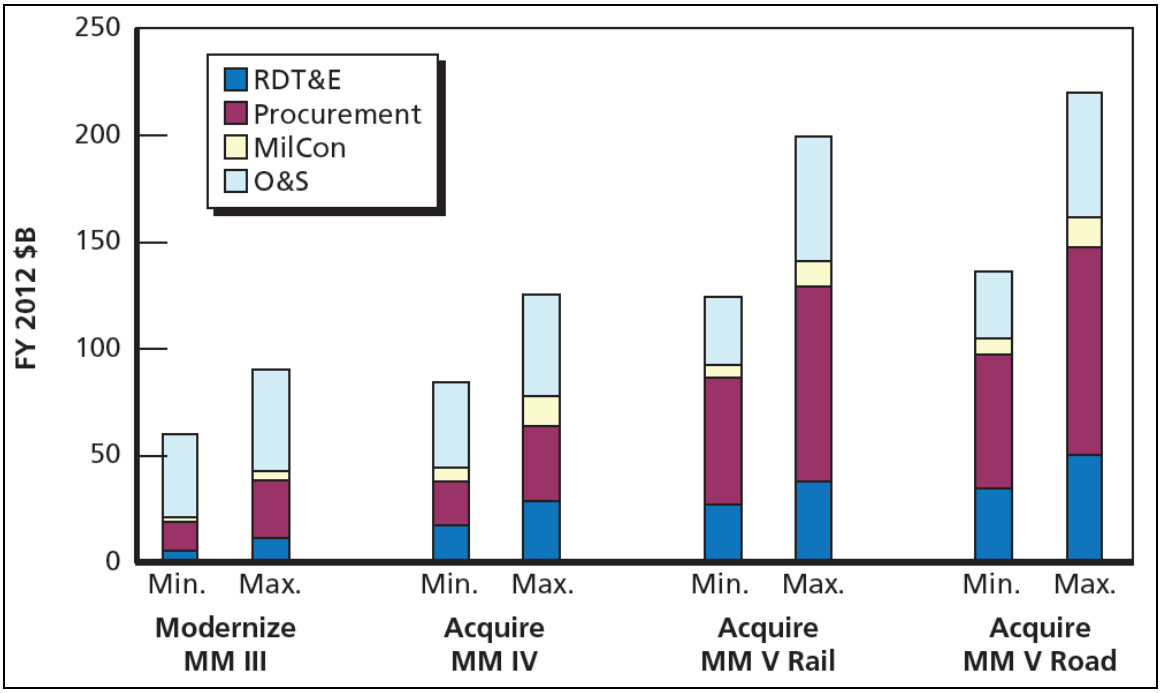
Figure 1. Minuteman III Acquisition Investment, FY1992-FY2001 and FY2012-FY2016 (FYDP)



Source: RAND Study 2014.

Note: Accumulated all costs associated with Minuteman III include acquisition costs and those for operations and support (O&S). O&S costs include system-related operations and maintenance (O&M) and military personnel (MilPers) expenditures.

Figure 2. Life-Cycle Cost Estimates Minimums and Maximums for Four Potential ICBM Future Force Options, FY2012-FY2050



Source: RAND Study, 2014.

Note: This research was conducted in FY2011. In each case, life-cycle costs are shown as a stacked bar of the four primary cost categories: RDT&E, procurement, MilCon, and O&S.

Addressing Operational Issues in the Current ICBM Force

Ever since 2007, when crews at Minot Air Force Base in North Dakota mistakenly loaded six cruise missiles carrying nuclear warheads on B-52s, transported them to Barksdale Air Force Base in Louisiana, and left them unguarded for 36 hours before anyone realized they were missing, the Air Force has faced questions about morale and operations within its nuclear enterprise. Studies completed at the time identified a number of issues plaguing the community, including a disregard for safety and security rules and an overall sense of "lack of professional pride."[30] Although the Air Force implemented a number of changes in its command structure and operational procedures, new issues have emerged.

Specifically, in January 2014 the Air Force announced that it uncovered cheating on the monthly proficiency exams required of missileers at the 341st Missile Wing at Malmstrom Air Force Base in Montana. Reports of drug use among some airmen and morale problems at Air Force bases renewed concerns with the state of the Air Force nuclear enterprise.[31]

[30] Adam Lowther, *A Year Later: Responding to Problems in the ICBM Force*, Bulletin of the Atomic Scientists, February 2, 2015, at http://thebulletin.org/year-later-responding-problems-icbm-force7984.

[31] Ibid.

In response to these concerns, Secretary of Defense Chuck Hagel initiated two reviews, one internal and one external to DOD. These reviews were not about nuclear warheads or nuclear weapons, and the reviews did not focus on the U.S. nuclear force posture or policy. Rather, both reviews focused on the people, systems, and infrastructure of the DOD to support the nuclear triad. The internal review also focused on training, testing, command oversight, mission performance, and investment. Thousands of personnel were interviewed, from officers to enlisted personnel as well as civilians and contractors from across the armed services.[32]

Internal Review

The internal review disclosed systemic problems across the nuclear enterprise. In general, these problems can be divided into several categories: "long-standing, known problems that remained unaddressed and so became, over time, under-reported; known problems that were addressed but the corrective actions made the problem worse (or created new problems); and problems that were common knowledge in the field but which were never communicated to leadership."[33]

The internal review found that the nuclear deterrent is safe, secure, and effective, today. However, it said, action needs to be taken now to ensure that this remains the case in the future. The review organized its inquiry, findings, and recommendation into four categories: personnel, inspections, organization and investment.

In terms of personnel issues, the review identified issues with accountability, manning and skills mix, career development, morale and recognition, the personnel reliability program, and security forces. More specifically, there was a blurring of the lines between accountability and perfection and a lack of promotion opportunities and a lack of a defined, sustainable career path for nuclear officers in the Air Force. Also, the implementation of the personnel reliability program was found to be burdensome, overly technical, and excessively risk-averse.

Regarding inspections, the review found that the nuclear enterprise is subject to a culture of excessive inspections. In the Air Force, an additional issue is the demand for perfection at all times and lack of a meaningful self-assessment program.

Regarding investment, the review surveyed an aging nuclear enterprise and determined that as the infrastructure continues to age, sustainment will become increasingly more difficult, time-consuming and expensive. Findings included the "lack of a 'weapons system' approach to the ICBM force, leading to disparate and insufficient sustainment and investment decisions for different system components; component issues resulting from an aging, unique, and small-sized programs; and serious shortfalls in basic O&M requirements."[34]

[32] Department of State, *Department of Defense Reforms to the NuclearEnterprise*, November 14, 2014, at http://fpc.state.gov/234084.htm.

[33] Department of Defense, *Summary of DOD Internal Nuclear Enterprise Review*, at http://www.defense.gov/pubs/Summary-Internal-NER.pdf.

[34] *Summary of DOD Internal Nuclear Enterprise Review.*

External Review

The independent review was tasked with examining the nuclear deterrent mission in the Departments of the Navy and the Air Force. The mission was to identify leadership, organization, investment, morale, policy, procedural, and/or other shortcomings that adversely affected the mission. The review team found the following:

- There were significant disconnects between what the DOD and service leadership expected and what the leadership did to empower the forces to meet those expectations.
- There were also disconnects between what leadership says and presumably believes and what the sailors, airmen, and Marines who must execute the mission actually experience.
- The interpretation of how the personnel system measures adequacy of manning differed from the total workload in the field associated with mission and other demands.
- Additional disconnects existed between the drive for efficiency in logistics support and what those in the field experience in actually getting needed parts in a timely manner.
- Many divides existed between leadership and the forces on the quality of the training.
- Finally, there were serious inefficiencies noted from micromanagement, excessive security demands, and the need to address a plethora of requirements not directly contributing to the mission.[35]

The review team outlined several initiatives that could be instituted immediately at various levels of leadership. The team recommended that the Secretary of Defense

- Take back the nuclear mission with direct meetings with senior leaders to ensure programs are in place and follow up on status.
- Establish support programs and bring together the federated nuclear activities within the Office of the Secretary of Defense (OSD) and the Air Force.
- Establish the nuclear mission has first priority and ensure equal personnel, logistics, and funding support to match.
- Acknowledge problems have continued since additional focus has been placed on the nuclear enterprise in 2007-2008.
- Direct a move from a culture of micromanagement by commanders/supervisors to a culture of empowerment of qualified people to do their work.

[35] Larry D. Welch and John C. Harvey, Jr., *Independent Review of the Department of Defense Nuclear Enterprise*, Department of Defense, June 2, 2014, p. 1, at http://www.defense.gov/pubs/Independent-Nuclear-Enterprise-Review-Report-30-June-2014.pdf.

- Hold senior leaders accountable and make it clear that individual behavior is a matter of personal responsibility and that failure to meet performance is a military discipline issue to be addressed by commanders.[36]

Over the course of the past year, the parallel reviews have provided Air Force leaders with almost 1,000 pages of observations and recommendations for the missile force. Based on this, the Air Force has commenced a significant number of reforms that involve training, funding and increasing staffing the missile force.[37]

Three Challenges with the Nuclear Force

The Cheating Issues

Cheating on tests in both the Navy and the Air Force raised questions about the integrity and ethics of the personnel in the nuclear force. The incidents occurred despite Services cultures placing a premium on integrity. The review team found that in both incidents the tests had evolved from a focus on measuring task-based qualifications to career-defining events that had direct, major impact on the professional futures of the participants.[38] The cheating thus arose from pressures associated with the testing program itself, according to the review's authors. Most missileers perceived these tests as important for career progression and believed that these tests had a direct impact on their livelihood. The review recommended that Navy and Air Force senior leadership ensure that training and skill testing should focus on measuring whether the person's knowledge is necessary and sufficient for the mission, but does not transform into a counterproductive demand for higher grades.

ICBM Combat Crew Duty

The independent review raised two significant issues regarding Air Force missiles officers assigned to ICBM combat crew duty: the intensity of the assignment itself, and the uncertainty associated with the missileer career path. ICBM combat crew duty is complex and characterized by high pressure to avoid errors in execution. Many officers on missile duty feel that the rewards of such work are not commensurate with the effort required, despite the knowledge that the work is vital to national security. Therefore, missile crews seek ways to minimize their exposure to primary combat crew duty. One way to do so is to score high marks on proficiency examinations, which can lead to designation as a crew instructor and a reduction in duty on missile alert. This attitude is completely opposite to Air Force flight crews who are generally motivated to spend as much time as possible performing crew duty in the air.[39]

Another issue is the long-term viability of the ICBM officer career. While the Air Force needs a large number of junior officers on combat crews, it does not need as many in other ICBM-related assignments such as instructors or working daily operations. Consequently, missileers must

[36] Ibid., pp. 10-11.

[37] *A Year Later*.

[38] Welch and Harvey, p. 13.

[39] Ibid., p. 15.

anticipate either leaving the service after only one or two duty assignments or applying for a significant change of career paths.

The review team offered several recommendations to overcome these issues. First, they recommended that the Secretary of the Air Force and the Chief of Staff of the Air Force (CSAF) should initiate a program to enhance recognition and reward for ICBM duty. This program would address everything from narrowing choices for follow-on career paths, with a guarantee the operators would get one of their three choices, to special pay incentives. The team also suggested the Commander, Air Force Global Strike Command, should return full authority to Missile Combat Crew Commanders for the execution of the duties of the crew and to hold them accountable.[40] Doing so would display trust in Mission Crew Commanders and afford them the opportunity to train and test in their working environment.

Creating a 'Real' Nuclear Enterprise

A third issue that the review team uncovered was the absence of a "nuclear enterprise" across the services and DOD. The "nuclear enterprise" consists of leadership, people and things that work on the nuclear mission. The review team characterized the current nuclear activities across the OSD, Joint Staff, Air Force, and Navy as a "loose federation of separate activities scattered across multiple organizations without clarity in responsibility and accountability."[41]

The team's recommendations began with the Office of the Secretary of Defense and the Joint Staff. During the Cold War, the Joint Staff had personnel with expertise on nuclear operational and systems requirements, but this has atrophied over the past three decades. Up through the early 1990s, a triad of officials within the OSD looked across the whole of the nuclear enterprise:

- The Assistant to the Secretary of Defense for Atomic Energy (ATSD/AE) was responsible for the nuclear warheads and stockpile management on behalf of DOD.
- The Director, Strategic and Theater Nuclear Forces, within Acquisition, Technology and Logistics (AT&L), was responsible for the development of new nuclear platforms and weapons systems.
- The Assistant Secretary of Defense for International Security Policy focused on nuclear weapons policy and strategy. Together the three offices focused across the enterprise, synchronizing policy, mission, weapons, and platforms.[42]

These offices no longer plan the guidance and sustainment of all nuclear forces. The Nuclear Weapons Council was created to address this issue. The Nuclear Weapons Council serves as the focal point of DOD and the National Nuclear Security Administration to maintain the U.S. nuclear weapons stockpile. Although the Nuclear Weapons Council addresses many of these issues, there is no forum or office effectively integrating across OSD to form a complete nuclear enterprise. Therefore, the review team recommended that OSD and the Joint Staff realign their

[40] Ibid., p. 17-18.

[41] Ibid., p. 18.

[42] Ibid., p. 19.

structures to plan nuclear activities across the entire enterprise: policy, strategy, mission, platforms, weapons, and support.[43]

The review team also identified issues within the Air Force that have created strains within the missile force: logistics structure changes, base closures, and organizational realignment that have reduced dedicated support for nuclear forces. The team recommended that the Air Force create a nuclear enterprise that encompasses Air Force Headquarters, Air Force Materiel Command, U.S. Air Forces in Europe and Air Force Global Strike Command.

Funding the Nuclear Enterprise

Proposed changes to the nuclear weapons arsenal may require the commitment of significant funding. DOD is asking for 10% annual spending increases over the next five years to implement the recommendations of the recent reviews. This is in addition to the tens of billions of dollars the Pentagon has asked Congress to provide to modernize each leg of the nuclear triad. In the near future, says DOD, the funds are needed to improve morale, such as providing incentive pay, creating new officer positions, and the refurbishment of the 45 underground Minuteman III launch centers—none of which reportedly have been thoroughly vacuumed in more than 50 years.[44]

The current strategic nuclear forces in the triad are reaching the end of their service lifetimes. Over the next two decades, Congress will face decisions about the extent to which all of the U.S. nuclear delivery systems would be modernized or replaced with new systems.[45] The Congressional Budget Office (CBO) is required under the National Defense Authorization Act of 2015 to periodically update its estimate of the cost of nuclear forces. CBO estimates that over the 2015-2024 time period, the Administration's plans for nuclear forces would cost $348 billion, an average of about $35 billion a year.[46] (Note: both estimates are provided in nominal dollars; they do not include the effects of inflation.)

Issues for Congress

Given the complexity and cost of the proposed changes to the nuclear workforce and arsenal, several issues arise before Congress.

Are Current Plans to Sustain the Nuclear Enterprise Appropriate and Adequate?

As the Air Force begins to revamp the ICBM leg of the nuclear triad, three significant issues suggest themselves for potential consideration in Congress. As is noted above, the Air Force is

[43] Ibid.

[44] Rachel Oswald, "Decisions on Upgrading Nuclear Arsenals Will Wait for Next Defense Secretary's Attention," *CQ Roll Call*, vol. 60, no. 46 (December 3, 2014).

[45] Congressional Budget Office, *Projected Costs of U.S. Nuclear Forces, 2015-2024*, January 2015, at https://www.cbo.gov/publication/49870.

[46] Ibid.

pursuing several tracks to sustain the current Minuteman force. The first track includes the ongoing projects funded through the Air Force O&M accounts and the Dem/Val program, while modernization programs needed to recapitalize the ICBM force are planned to be funded in the late 2020s. Included in the President's Budget request in FY2016 are requests to fund nuclear enterprise improvements. These include upgrades to facilities, improvements in manning and safety procedures, as well as technology improvements.[47]

The other issue is addressing the recommendations from the internal and external review teams for the nuclear enterprise. Many argue that in the year since those reports were issued, much has improved. DOD leadership is requesting funds to continue to improve the nuclear enterprise. Defense Secretary Chuck Hagel stated the Pentagon would add 10% a year over the next five years to nuclear spending in order to correct the problems. The Pentagon currently spends between $15 billion and $16 billion, so this increase would equate to at least a $7.5 billion increase between 2016 and 2020.[48] The 2016 budget request calls for $8 billion in new spending on the nuclear force over the next five years, including about $1 billion for FY2016.[49]

In addition to money, Secretary Hagel promised more troops, more trainers, more equipment and more leadership to nuclear forces, all of which have experienced decades of neglect and deterioration.[50] Also, the Department of Defense began the Force Improvement Program (FIP). Under the DOD FIP program, the Air Force has approved incentive pay and bonuses for missileers, exchange programs across bases and with the Navy, and infrastructure upgrades at missile bases.[51]

Air Force Secretary Deborah Lee James has supported implementing the identified changes from both the internal and external reviews of the nuclear forces. James has said "there is no mission more important to our nation's security than the nuclear mission," and the changes to the nuclear force are "aimed at improving morale and shifting from a culture of always preparing for the next test and next inspection."[52] After a year, there is a stark contrast from earlier attitudes in each of the missile wings, with the workforce mostly positive toward leadership actions. Approximately 98% of the Force Improvement Program's recommendations either have been or are being implemented.[53]

To ensure focus on each of these programs, Secretary Hagel established the Nuclear Deterrent Enterprise Review Group (NDERG) to establish senior leader accountability and bring together all the elements of the nuclear force into a coherent enterprise. This group is led by Deputy

[47] Office of the Under Secretary of Defense (Comptroller), *Fiscal Year 2016 Budget Request*, February 2015, at http://www.defense.gov/pubs/FY16_Budget_Request_Rollout_Final_2-2-15.pdf.

[48] Marcus Weisgerber, *DOD To Spend Billions More on Nukes*, Defense One, November 14, 2014, at http://www.defenseone.com/management/2014/11/dod-spend-billions-more-nukes/99092/.

[49] David Alexander, *After Neglect, U.S. Nuclear Force Seeing Improvement: Official*, Reuters, February 11, 2015, at http://www.reuters.com/article/2015/02/12/us-usa-defense-nuclear-idUSKBN0LG07I20150212.

[50] Weisgerber.

[51] Brian Everstine, *Spotlight on Nuclear Force Prompts Ongoing Reform*, Air Force Times, September 15, 2014, at http://www.airforcetimes.com/article/20140915/NEWS/309150037/Spotlight-nuclear-forces-prompts-ongoing-reforms.htm.

[52] Brian Everstine, *James presents first round of Air Force nuclear service medals*, Air Force Times, November 6, 2014, at http://www.airforcetimes.com/article/20141106/NEWS/311060046/James-presents-first-round-of-Air-Force-nuclear-service-medals.html.

[53] Lowther, *A Year Later*.

Secretary Bob Work and is to review the actions taken and the progress made in the health of nuclear forces. In addition, Secretary Hagel directed Office of the Secretary of Defense/ Cost Assessment and Program Evaluation (OSD/CAPE) to lead an effort to track and assess the implementation of the over 100 recommendations from the internal and external reviews. CAPE is to also conduct analysis to determine if corrective actions are having the desired effect as well as to continue assessing the health of the nuclear deterrent enterprise.[54]

Congress may remain concerned about the implementation of these programs and ask for updates. In the National Defense Authorization Act (NDAA) for Fiscal Year 2016, the House Committee on Armed Services stated

> As a result of the NER and NDERG, the fiscal year 2016 budget request contained approximately $1.00 billion in additional funding for the Department of Defense nuclear enterprise, with a total of $8.00 billion in additional funding planned over the next 5 years. The committee believes sustained leadership, follow-through, and investment will be required to ensure the revitalization of our nuclear enterprise, including in certain instances improving or changing the culture and leadership standards. The committee believes the NDERG seems to be successful in this regard, but cautions that institutionalization of such a process may be required to ensure sustained attention after key leaders depart. The committee expects the Secretary, the Deputy Secretary, and all leaders within the Department of Defense to ensure continued focus and resources for the Department's "highest priority mission.[55]

Many experts believe these programs have made a difference and are improving conditions for airmen.[56] The increased retention of missile combat crews (and other supporting metrics) may indicate that the Air Force initiative is having an effect. Renewed focus on the nuclear forces is paying dividends, some say, but more work is seen as necessary to continue to move the program forward.

However, some are skeptical that more money, more people, and more commitment is the right way to address the issue. Many see that nuclear weapons are no longer useful in the current security environment, especially given their destructive power. They argue that it is "unlikely that these problems can be solved by more money, more stars, more organizational changes, reducing burdens on airmen, or recommitting to the importance of deterrence without addressing the underlying problem."[57] The underlying problem, according to these skeptics, is that nuclear weapons no longer play a prominent role in U.S. national security policy.

Others also argue that these reforms will not be sufficient in addressing the underlying problems because no amount of cleaning, paint, or increase in pay can offset the sense, in the ICBM force, that there is no meaning to the mission.[58] The morale problems facing the troops who are part of the nuclear enterprise are unlikely to be fully resolved by any changes that DOD can make. Secretary of Defense Chuck Hagel stated in discussing the review that in order to change the

[54] *Fact Sheet: Implementing Changes to the Nuclear Enterprise* at http://www.defense.gov/pubs/NER-Fact-Sheet.pdf.

[55] H.R. 1735

[56] Adam Lowther, *A Year Later: Responding to Problems in the ICBM Force*, Bulletin of the Atomic Scientists, February 2, 2015, at http://thebulletin.org/year-later-responding-problems-icbm-force7984.

[57] Marcus Weisgerber, *DOD To Spend Billions More on Nukes*, Defense One, November 14, 2014, at http://www.defenseone.com/management/2014/11/dod-spend-billions-more-nukes/99092/.

[58] Ibid.

situation, "we must change the cultural perception of a nuclear enterprise…We must restore the prestige that attracted the brightest minds of the Cold War era, so our most talented young men and women see the nuclear pathway as promising in value."[59] Some argue that Hagel's assessment only draws further attention to the real issue—the United States is no longer in "the Cold War era." They state the U.S. is in a strategic transition from the Cold War to an era characterized by threats such as al Qaeda, ISIS, and Ebola. They say those who work with nuclear weapons (i) have not been part of the wars in Afghanistan or Iraq that have been the formative experience for the military in recent years, and (ii) hope they are unlikely ever to be called on to carry out their assigned mission.[60]

Should the ICBM Force be Modernized in an Era of Fiscal Constraint?

Both the cost to modernize or replace the ICBM arsenal and the future role the ICBM force will play in the nation's defense strategy may also prove of interest to Congress.

The Cost of Modernization

The United States is currently planning a number of programs to update and modernize most aspects of the U.S. nuclear force. In addition to pursuing sustainment and modernization programs for the ICBM force, the Air Force is beginning work on a new long-range bomber and a new cruise missile, and the Navy is beginning the construction of a new ballistic missile submarine while pursuing a life extension program for its submarine launched D-5 missile. Congress may consider whether the U.S. should continue to deploy ICBMs in the future nuclear force structure, particularly in light of expected financial constraints. It may consider whether nuclear weapons modernization programs will compete with each other, or with conventional weapons programs, for scarce resources.

The Department of Energy (DOE) is currently investing in life extension programs for U.S. nuclear warheads. During the Cold War, DOE sustained the U.S. warhead stockpile by designing, testing, and deploying new warheads to replace aging warheads.[61] Because the United States has observed a testing moratorium since 1992, it maintains its current inventory through the Stockpile Stewardship Program, a scientific experimentation and simulation undertaking that assesses the status of the nuclear weapon arsenal without underground nuclear tests.[62] Instead of designing and deploying new warheads, DOE manages and maintains the stockpile by pursuing Life Extension Programs (LEPs) for existing warheads and investing in the supporting and aging infrastructure. Many analysts agree that investments in both the infrastructure and workforce will help sustain the long-term safety, security, and effectiveness of the U.S. nuclear arsenal,[63] but

[59] Eryn MacDonald, *Independent Review of DOD's Nuclear Enterprise: Money, Maintenance, and Morale*, Union of Concerned Scientists, November 21, 2014, at http://allthingsnuclear.org/independent-review-of-dods-nuclear-enterprise-money-maintenance-and-morale/.

[60] Ibid.

[61] Department of Defense, *Nuclear Posture Review Report,* April 2010, p. 37.

[62] Ibid., p. 37.

[63] Ibid., p. 41.

these investments could add to the cost of the nuclear enterprise at the same time that DOD is modernizing its nuclear delivery systems.

As calculated by the Congressional Budget Office (CBO), the costs of these programs could reach more than $30 billion per year in the 2020s, and amount to a total of more than $1 trillion over 30 years.[64] Yet, as Frank Kendall, Under Secretary of Defense for Acquisition, Technology and Logistics testified to the Senate Armed Services Committee,[65] this plan could generate "affordability problems" in the 2020s. This can raise questions of whether the United States can, or should, pursue all of these programs.[66] As a result, some have suggested that the United States forgo the ICBM modernization programs and eventually eliminate the ICBM leg of the triad.

Over the 2015-2024 time period, the Administration's plans for nuclear forces would cost $348 billion per CBO estimates (see **Table 1**). Of that total, CBO projects that $299 billion would be budgeted by DOD and DOE:[67]

- $160 billion for strategic nuclear delivery systems and weapons;
- $8 billion for tactical nuclear delivery systems and weapons;
- $79 billion for nuclear weapons laboratories and their supporting activities; and
- $52 billion for nuclear-related command, control, communications, and early-warning systems.

The remaining $49 billion represents CBO's estimate of additional costs that would be incurred over the coming decade if the nuclear program costs grow as expected. [68]

Table 1. Projected Costs of U.S. Nuclear Forces, by Department and Function

Billions of Dollars

	FY2015			Total FY2015-FY2024		
Category	DOD	DOE	Total	DOD	DOE	Total
CBO's projections of budgeted amounts for nuclear forces[a]						
Nuclear delivery systems and weapons						
Strategic systems						
Total, 2015–2024						
DOE Total						
Ballistic missile submarines	5.5	1.0	6.4	75	8	83

[64] Congressional Budget Office, *Projected Costs of U.S. Nuclear Forces, 2015-2024*, January 2015, at https://www.cbo.gov/publication/49870.

[65] U.S. Congress, Senate Committee on Armed Services, Subcommittee on Strategic Forces, *Witness Statement of the Nuclear Weapons Council*, 114th Cong., March 4, 2015, p.8-9.

[66] Lacie Heeley, *Nukes or Conventional Weapons? Buy the Ones We Use*, Breaking Defense, May 14, 2015, at http://www.breakingdefense.com/2015/05/nukes-or-conventional-weapons-buy-the-ones-we-use/.

[67] *Projected Costs of U.S. Nuclear Forces, 2015-2024.*

[68] Ibid.

	FY2015			Total FY2015-FY2024		
Intercontinental ballistic missiles	1.3	0.2	1.5	24	3	26
Bombers	2.0	0.5	2.5	32	7	40
Other nuclear activities[b]	1.0	—	1.0	11	—	11
Subtotal	9.8	1.7	11.4	142	18	160
Tactical delivery systems and weapons	0.4	0.4	0.7	4	3	8
Nuclear weapons laboratories and supporting activities						
Stockpile services	—	1.1	1.1	—	15	15
Facilities and infrastructure	—	2.1	2.1	—	28	28
Other stewardship and support activities[c]	—	3.4	3.4	—	37	37
Subtotal	—	6.5	6.5	—	79	79
Total, nuclear delivery systems and weapons	10.1	8.5	18.7	146	101	247
Command, control, communications, and early-warning systems						
Command and control	1.2	—	1.2	12	—	12
Communications	2.1	—	2.1	20	—	20
Early warning	1.9	—	1.9	19	—	19
Subtotal	5.2	—	5.2	52	—	52
Total budgeted amounts for nuclear forces	15.4	8.5	23.9	198	101	299
Estimated additional costs based on historical cost growth	—	—	—	28	21	49
Total Estimated Cost of Nuclear Forces	**15.4**	**8.5**	**23.9**	**227**	**121**	**348**

Source: Congressional Budget Office based on information from the Department of Defense and the Department of Energy.

Notes: DOD = Department of Defense; DOE = Department of Energy; —= not applicable.

a. This category is based on CBO's analysis of DOD's and DOE's budget proposals and accompanying documents as well as CBO's projections of those budget figures under the assumption that programs will proceed as described in budget documentation. The category also includes several programs for which plans are still being formulated. In those cases, CBO based its estimate on historical costs of analogous programs. The budgeted amounts do not reflect independent estimates by CBO of the costs of U.S. nuclear forces.

b. This category includes nuclear-related research and operations support activities by DOD that CBO could not associate with a specific type of delivery system or weapon.

c. Activities include security forces, transportation of nuclear materials and weapons, and scientific research and high-performance computing to improve understanding of nuclear explosions. This category also includes $400 million in 2015 and $4 billion over the 2015–2024 period for federal salaries and expenses. (This category of costs had previously been referred to as Office of the Administrator of the National Nuclear Security Administration.)

What Role Would a Modernized ICBM Force Play in National Defense?

Congress may also wish to reconsider the role ICBMs play in the national defense. Most experts agree that U.S. nuclear strategy has changed since the Cold War days of potential massive retaliation and mutual assured destruction, but many argue that nuclear weapons still matter for

the United States because they are the most credible means of deterring the use of nuclear weapons by other states.[69] While few anticipate a U.S.-USSR-style potential nuclear exchange, some experts suggest that a "second nuclear age" has begun in which numerous nations may possess nuclear weapons and the ability to use them in regional conflicts.[70] The 2010 Nuclear Posture Review recognized this change when it asserted that nuclear terrorism and nuclear proliferation now pose greater threats to U.S. security than established nuclear-armed states. U.S. strategic nuclear forces are not well designed to combat the threat of nuclear terrorism, but future U.S. nuclear strategy will need to account for the threats that may exist as a result of nuclear proliferation.

Some argue that ICBMs are antiquated systems unchanged since the Cold War. They contend that the ICBM force is a relic of the Cold War and is not relevant in an environment where the United States no longer faces the threat of a massive attack from the Soviet Union. These analysts argue that because the Pentagon cannot plan "for every contingency, it must plan for the most conceivable future. In this case, that might mean a step back from nuclear weapons toward greater focus on those weapons we might actually use."[71] Others argue that U.S. ICBMs could only be used against Russia because if they were to be sent anywhere else in the world, they would still have to overfly Russia, risking the creation of ambiguous attack indicators that could trigger a nuclear response.[72]

On the other hand, some experts argue that ICBMs continue to provide a deterrent to nuclear attack on the homeland. They note that the sheer numbers of Minuteman III silos (400+) that are spread across the American West are invulnerable to all but massive nuclear missile attacks.[73] This curbs those who may wish to attack the United States: conventionally or with nuclear weapons. They note that, without ICBMs, U.S. land-based strategic nuclear targets shrink "from 503 to six, which could all be destroyed with conventional strikes. Only ICBMs require a nuclear strike."[74] Moreover, any attack against the ICBM force represents a direct attack against the United States. Therefore, ICBMs deny prospective enemies "any hope of half-way measures against us: if they mean nuclear war, then they must decide upon nuclear war."[75]

Should ICBMs Be Sustained in an Era of Strategic Uncertainty?

As analysts within and outside DOD continue to debate the value of the nuclear deterrent to the defense of the United States, Congress may wish to reevaluate whether to continue to support the nation's ICBM force. Some analysts have questioned whether the United States can, or should

[69] Clark A. Murdock, *A Nuclear Deterrent for the 21st Century*, Center for Strategic and International Studies, 2015, p. 17.

[70] Paul Bracken, *The Second Nuclear Age: Strategy, Danger, and the New Power Politics* (New York : Henry Holt and Company, 2012).

[71] Lacie Heeley, *Nukes or Conventional Weapons? Buy the Ones We Use*, Breaking Defense, May 14, 2015, at http://www.breakingdefense.com/2015/05/nukes-or-conventional-weapons-buy-the-ones-we-use/.

[72] M.J.S., *Fewer nukes, more security* , Global Zero, May 16, 2012, at http://www.economist.com/blogs/clausewitz/2012/05/global-zero

[73] Robert Spalding and Adam Lowther, *Rethinking the Ground-Based Strategic Deterrent*, Breaking Defense, December 2014, at http://breakingdefense.com/2014/12/rethinking-the-ground-based-strategic-deterrent/.

[74] Ibid.

[75] Liz Whitfield, *The Cost of Modernization: Can We Afford to Replicate the Triad?*, Project on Nuclear Issues, October 2014, at http://poniforum.csis.org/blog/the-cost-of-modernization-can-we-afford-to-replicate-the-triad/.

forgo its ICBM modernization program even if the missiles' future role is uncertain. These arguments focus more on the uncertainties and challenges in the emerging strategic environment than on the specific military value of the ICBM force.

Emerging Nuclear Threats

Those who suggest that the United States can forgo its ICBM modernization program argue that the force was designed during the Cold War and is not suited to match the challenges of the current security environment. They argue that threats now come in the form of terrorists, suicide bombers, and regimes not friendly to the U.S. looking for nuclear weapons. They believe that the use of a nuclear ICBM in this environment is unlikely and that the United States should better align its nuclear policies to meet the most urgent priorities: preventing nuclear terrorism and nuclear proliferation.[76]

Analysts point out that many security concerns are associated with nuclear terrorism that cannot addressed with ICBMs. They note that weapon-grade nuclear materials may be stored in insecure locations around the world, vulnerable to loss or theft. Also, sensitive equipment and technologies associated with nuclear weaponry are widely available on the black market. While most do not believe that any terrorist organization currently has access to a nuclear weapon or nuclear technology, some argue that it remains a possibility in nuclear-armed states that have lax security or face political upheaval.

Nuclear proliferation is another contemporary threat. According to the 2010 Nuclear Posture Review Report, both North Korea and Iran have violated nonproliferation obligations, defied directives of the United Nations Security Council, pursued missile delivery capabilities, and resisted international efforts to resolve through diplomatic means the crises they have created.[77] This could introduce instability not only within their regions, but also around the globe, creating situations in which neighboring countries may view their only option as pursuing a nuclear weapon to protect their interests. This could undermine the credibility of the NPT and threaten destabilization of international security.

Strategic Security Challenges with Russia and China

Many analysts agree that the United States continues to face challenges in strategic security from both Russia and the People's Republic of China (PRC). The United States could seek to address these challenges through dialogue and transparency. Though the dialogue with each country would be different, the message could be similar: fostering good will and partnerships. For example, a strategic dialogue with Russia could allow the United States to explain that "our missile defenses and any future U.S. conventionally armed long-range ballistic missile systems are designed to address newly emerging regional threats, and are not intended to affect the strategic balance with Russia."[78] In turn, the United States could ask Russia to explain their modernization programs as well as their strategic doctrine.

[76] Ibid., p. v.

[77] Department of Defense, *Nuclear Posture Review Report* , April 2010, p. iv.

[78] Department of Defense, *Nuclear Posture Review Report*, April 2010, p. x.

A strategic dialogue with China could, likewise, allow both nations to communicate with one another about their views on each other's nuclear strategies, policies, and programs. China's leaders have been vocal about their concerns over the U.S. ballistic missile defenses. As stated in the 2010 Ballistic Missile Defense Review Report, "maintaining strategic stability in the U.S.-China relationship is as important to this Administration as maintaining strategic stability with other major powers."[79] It is seen as important for the U.S. to highlight willingness to work together with the PRC, while simultaneously underlining U.S. support to its allies and partners in the East Asia region.

Others, however, doubt that dialogue, even when combined with transparency, would resolve emerging concerns with either Russia or China. In the past year, Russia has taken a number of steps, such as its invasion of Ukraine, its aggressive military exercises, and its violation of the 1987 INF Treaty, that challenge the security interests of the United States and its allies. China has also become more assertive in its region with its actions in the East China and South China Seas in ways that have raised concerns about challenges to U.S. interests and allies. At the same time, both nations are modernizing their nuclear forces and, in some cases, expanding their nuclear arsenals.

As a result, many analysts continue to view nuclear weapons, and the nuclear balance, as a significant marker in the U.S. relationship with both Russia and China. They note that a U.S. commitment to modernizing its triad, in general, and its ICBM force, in particular, is necessary to assure stability and U.S. security. Some experts argue that, from a global perspective, the United States must "maintain nuclear parity with the Russians and sustain nuclear superiority over the Chinese." They contend that dealing with a Russian government believing it possessed nuclear superiority would be more difficult than it is at present and that dealing with a China that had achieved nuclear parity would tear big holes in the U.S. nuclear umbrella.[80] Therefore, some argue that, in order to remain a credible player on the world stage, the U.S. must ensure that its nuclear forces and capabilities remain a priority. Others may see less need for a specific balance in nuclear forces, but still believe that maintaining strategic stability with Russia and China should be a key U.S. priority.[81]

Admiral Cecil Haney, the Commander of U.S. Strategic Command (STRATCOM) highlighted the value of the U.S. nuclear triad in this uncertain strategic environment in a press conference in March 2015. He noted that "while our nation's nuclear enterprise is safe, secure, and effective, we cannot take it for granted any longer. For decades, we have sustained while others have modernized their strategic nuclear forces...." He indicated that, in this environment, "as a nation, we cannot simply afford to underfund our strategic capabilities. Any cuts to the President's budget, including those imposed by sequestration, will hamper our ability to sustain and modernize our joint military forces and put us at real risk of making our nation less secure and

[79] Department of Defense, *Ballistic Missile Defense Review Report*, February 2010, p. 34.

[80] Clark A. Murdock, *A Nuclear Deterrent for the 21st Century*, Center for Strategic and International Studies, 2015, p. 17.

[81] According to Gregory Koblentz, "the highest U.S. priority is to maintain strategic stability with Russia and China, the two states with the capability and potential intent to launch a nuclear attack on the homeland. Though strategic stability is just one aspect of the United States' multifaceted relations with both countries, its enduring importance requires sustained high-level attention even during periods of international tension or in the face of unfavorable domestic politics." Gregory D. Koblentz, *Strategic Stability in the Second Nuclear Age*, Council on Foreign Relations, Council Special Report No. 71, November 2014, p. 4.

able to address future threats."[82] Secretary of Defense Ashton Carter has not spoken out on this issue, since replacing Secretary Hagel in February 2015.

The current ICBM force was deployed in the 1970s, which means it has been in service for over 40 years—much longer than anticipated. The Air Force determined the best way forward is to develop a replacement missile that utilizes modernized silos to ensure viability of the ICBM force structure until 2075. This program is called the Ground-Based Strategic Deterrent (GBSD).[83] The President's FY2016 budget allocates for funds for continued development of the GBSD. Congress will play a key role in determining the future of the GBSD.

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[82] U.S. Department of Defense, *Department of Defense Press Briefing by Adm. Haney in the Pentagon Briefing Room*, Washington, D.C., March 24, 2015, http://www.defense.gov/transcripts/transcript.aspx?transcriptid=5605.

[83] Constance Baroudos, M.A., *The Minuteman III ICBM's Future*, Lexington Institute, April 27, 2015, at http://lexingtoninstitute.org/the-minuteman-iii-icbms-future/.