



# Setting Priorities for Nuclear Modernization

By Lawrence J. Korb and Adam Mount    February 2016

Center for American Progress



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# Introduction and summary

In the next decade, the United States will have to make decisions that will shape its nuclear arsenal for much of the next century. Nearly every missile, submarine, aircraft, and warhead in the U.S. arsenal is nearing the end of its service life and must be replaced. As Congress and the Obama administration continue to wrestle with the effects of sequestration on projected levels of defense spending, the U.S. Department of Defense has begun a series of procurement programs that will nearly double the amount the country spends on its nuclear deterrent in the next decade compared to what it spent in the past decade. Over the next 30 years, the cost of the nuclear deterrent could pass \$1 trillion and crowd out defense and domestic investments needed to keep the United States strong and competitive. In addition, it could undermine U.S. credibility on the issue of nuclear proliferation—especially when it comes to dealing with regimes such as Russia, China, and North Korea.

It is no accident that so many modernization programs must begin in this decade. The United States, like Russia, modernizes its nuclear arsenal in cycles. The current U.S. nuclear arsenal entered service in the 1980s when President Ronald Reagan dramatically expanded the funding devoted to nuclear weapons. That decade saw the Department of Defense field the B-1 and B-2 bombers; the Peacekeeper Intercontinental Ballistic Missile, or ICBM; and the Ohio-class ballistic-missile submarines, or SSBN. With the benefit of hindsight, it is now known that this modernization cycle was highly inefficient: in the years that followed, political, budgetary, and strategic events would modify the U.S. arsenal from its intended shape. Initial plans to deploy 244 B-1A bombers were reduced to 100 B-1B bombers, which were removed from the nuclear mission in 1993; the expected purchase of 132 B-2 bombers was first cut to 75 and then to 21; and 24 planned Ohio-class submarines were cut to 18, four of which were subsequently converted to a conventional role.<sup>1</sup>

Now, some 30 years later, these weapons systems are nearing retirement and must be replaced. This new modernization cycle represents a major challenge for the United States, as well as an opportunity to ensure that the arsenal is the right size and shape to meet national security needs in a cost-effective manner. There is little reason to hope that the current modernization cycle will be easier than the last. In Congress, budgetary politics have become even more difficult. The Budget Control Act of 2011 has severely constrained federal spending, including projected levels of defense spending. At the same time, each of the military services is undergoing contentious and costly modernization of conventional weapons systems. Treasured priorities, including Ford-class aircraft carriers; Virginia-class attack submarines; a large and diverse surface fleet; the F-35 multirole aircraft; and Army readiness could all be affected by the current plans to modernize the nuclear arsenal.

If history is any guide, modernizing the nuclear arsenal will be a difficult endeavor. Congress is unlikely to appropriate funding for full modernization plans. Frank Kendall, the Pentagon's acquisitions chief, admitted to reporters in early 2015 that the plans are likely "a fantasy, that what we're going to end up with is nowhere near what we requested."<sup>2</sup> To ensure that the nuclear force can continue to serve the next president's strategic guidance, the executive branch should review nuclear spending and put in place an affordable plan for the coming decades. If it does not, the shape of the next nuclear arsenal will likely be set by the vagaries of congressional politics as they seek to curtail whichever programs happen to face cost overruns.<sup>3</sup>

This report describes four changes to U.S. nuclear modernization plans that ensure strategic stability in a cost-effective way:

1. Reducing the planned number of submarines from 12 to 10
2. Cancellation of the new cruise missile
3. Elimination of the tactical nuclear mission
4. A gradual reduction in the size of the ICBM force



Collectively, these changes could save roughly \$120 billion over the next 30 years. These savings would increase the likelihood that the services will have the consistent funding necessary to efficiently modernize the nuclear force and would lower the risk they will have to quickly accommodate shocks to the nuclear force structure on short notice.<sup>4</sup> This plan preserves the overall structure of the nuclear triad of bombers, land-based missiles, and sea-based missiles while remaining at the warhead ceiling allowed by the New Strategic Arms Reduction Treaty, or New START. These changes would not reduce either the number or types of targets that the United States could hold at risk nor the yield or speed with which it could strike these targets. However, the plan does decrease the number of ways that the services could strike the same target. It may also marginally diminish the survivability of some warheads under certain contingencies. In the authors' judgment, the benefits of maintaining this redundancy simply do not justify its costs when measured against other military and domestic priorities.

Before leaving office, the Obama administration can take three steps to ensure that his successor has the information and flexibility necessary to make these needed changes. First, the president should cancel two programs: an effort to consolidate variants of the B61 gravity bomb—a lower-yield nuclear weapon dropped from fighter aircraft—as well as a program to produce a new cruise missile launched from a bomber that is able to maneuver to its target. Second, the president should revise deterrence requirements that currently constrain modernization plans. Third, the White House should order the Pentagon to generate analysis in order to inform the next Nuclear Posture Review regarding options to limit the modernization plans.

When the new presidential administration takes office in January 2017, it should implement these changes to the nuclear force structure and seriously consider two additional steps: a further reduction of the submarine force from 10 subs to 8 subs, as well as a delay of the Long-Range Strike Bomber program.

Taking these steps will not only save at least \$120 billion, which will allow the Pentagon to fund more critical priorities, but will also permit President Barack Obama's successor to have the flexibility to make even more reductions to the U.S. nuclear arsenal without undermining nuclear deterrence.

# The politics of modernization

Ongoing debate about the size and shape of the U.S. nuclear arsenal may be due in part to a disagreement about how the country sets the nuclear force structure. On paper, the process is orderly and apolitical.<sup>5</sup> Under this model, a new president issues broad requirements for the nuclear force. The secretary of defense and the Pentagon then use these requirements to generate specific guidance on targeting objectives and attack options. Thereafter, U.S. Strategic Command produces a set of war plans for the employment of strategic forces and determines the inventory of systems necessary to meet both the president's deterrence requirements and hold at risk the specified targets. In practice, former officials describe the process as interactive—the Pentagon and the White House will work together to set numbers and requirements—but officially the process ends here. The executive branch assumes that Congress will appropriate the funding necessary to allow the services to procure the requested inventory of systems.

Many strategists seem to believe that this is more or less an accurate model of how nuclear force structure is decided.<sup>6</sup> Or, at least, many seem to think of this objective theory as a kind of ideal that should be worked toward. There are advantages to this model: If it works, there is a high probability that deterrence requirements will be met and risk will be minimized. Furthermore, predictability in the budgeting process will ensure that acquisitions are efficient. However, there are also disadvantages: If the White House does not provide clear and current guidance, procurement policy may not efficiently adapt to changing strategic conditions. This approach may not adequately account for the diplomatic or economic consequences of nuclear modernization. Most importantly, this model does not allow the executive branch to account for political and fiscal pressures that may prevent the services from procuring the nuclear force that targeting analysis implied.

An examination of past modernization cycles tells a different story. The arsenal that exists today is the result of political infighting; concessions to budgetary pressures; abortive acquisition efforts that were later reversed in costly and inefficient ways; casual compromise; and rote estimation. In other words, it was an inefficient

and politicized mess. It makes sense for analyses of nuclear weapon policy to begin from a theory about the optimal force structure for strategic stability. However, when these analyses ignore or assume away the historically stochastic nature of nuclear modernization, they risk misleading policymakers. Like all public policy, nuclear strategy is, to some extent, an exercise in the politically and fiscally possible. Worse still, thinking of nuclear strategy as an abstract and objective domain protected from normal political pressures prevents scholars and practitioners from learning from past modernization cycles. Importantly, surveying past modernization efforts reveals several patterns that are likely to recur in the coming decades.

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## Bombers

Since the Kennedy administration, the U.S. strategic bomber force has struggled with almost continual controversy. Repeated efforts to replace and upgrade the B-52 subsonic intercontinental bomber—which first flew in 1952—have been cancelled or have seen their purchase orders reduced dramatically. Today, despite ambitious plans and pitched political battles, the strategic bomber fleet consists of 76 B-52s and only 20 stealthy B-2s.<sup>7</sup>

At the beginning of the Eisenhower administration, the Strategic Air Command, or SAC, was the primary arm of the U.S. nuclear arsenal. Responsible for implementing a strategy of massive retaliation to counterbalance the Soviet's numeric advantage in conventional weapons, SAC retained 1,500 intermediate-range B-47 bombers stationed at home and in allied countries. Soon after World War II, the U.S. Air Force began developing a long-range strategic bomber—the B-52—and, by 1962, the Air Force had purchased of 742 B-52 bombers capable of delivering nuclear weapons.

Because the Air Force was concerned that the B-52s would be vulnerable to Soviet interceptor aircraft, it also began work in the early 1950s on the B-70: a large six-engine aircraft capable of reaching speeds in excess of Mach 3, or three times the speed of sound, while flying at 70,000 feet. However, by the late 1950s, the Soviet development of surface-to-air missiles—such as the ones that shot down the U-2 spy plane—put the B-70's near invulnerability in doubt. Therefore, despite opposition from the Congress, Secretary of Defense Robert McNamara canceled the bomber in 1961.



After the cancellation of the B-70, Secretary McNamara directed SAC to buy 263 FB-111s configured for strategic bombing by means of low-level penetration.<sup>8</sup> However, because of cost growth and a declining defense budget, McNamara's successor, Melvin Laird, cut the number of FB-111s to 76 in 1969.

Soon after, the Air Force began a program to replace the oldest B-52s with the B-1 bomber—a less-expensive bomber than the B-70.<sup>9</sup> The plan was to build 244 of these aircraft by 1986. However, in 1977—his first year in office—President Jimmy Carter stopped production of the B-1A and decided to focus on developing a long-range nuclear cruise missile that could be launched from a distance—obviating the need for nonstealthy aircraft, such as the B-52, to penetrate Soviet airspace. The Carter administration also began developing a stealthy radar-evading advanced technology bomber, or ATB: the B-2.

Because President Reagan had criticized President Carter for canceling the B-1 during his campaign for the presidency, he decided to build both the B-1 and the B-2 bombers—100 of the former and 132 of the latter. During the first term of the Reagan administration, the defense budget increased by 28 percent in real terms, helping the Air Force to procure its 100 B-1B bombers. However, the rapid rise in defense spending helped to provoke the first sequester in 1985, which depressed the defense budget 10 percent in real terms during the second term of the Reagan administration. Tightened budgets and the end of the Cold War caused the George H.W. Bush administration to reduce the number of B-2s to 75 and, eventually, to 21.

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## Intercontinental ballistic missiles

Although the Air Force worked to collect materials on Adolf Hitler's V2 program, after WWII, it gave priority to cruise missiles over ballistic missiles as an unmanned way to deliver nuclear weapons. But when the cruise missiles proved unreliable, the Air Force began to focus on ICBMs. During the Eisenhower administration, the air force focused first on liquid-fuel missiles, the development of which were accelerated after Sputnik was launched in 1957. However, these missiles had several problems and were difficult and expensive to maintain.

The Air Force then turned its focus to solid-fuel missiles and produced the Minuteman in early 1962. When the Air Force began deploying its land-based Minuteman missiles in the early 1960s, it requested that the Pentagon eventually employ 10,000 of these weapons. The Bureau of the Budget—the forerunner of the Office of Management and Budget—argued that anything more than 450 would be

a waste. After negotiating with the Air Force, the Bureau of the Budget, and the secretary of defense, President Lyndon Johnson came to an agreement with Air Force Chief of Staff Curtis LeMay on 1,000 Minuteman missiles. As Desmond Ball, the former head of the Strategic and Defense Studies Centre, noted, this number was a result of a visceral feeling on the part of Secretary McNamara and his aides that 1,000 was a satisfactory and viable compromise—both strategically and politically. In other words, the decision was not the result of a precise calculation of what was needed for deterrence and second-strike capability.<sup>10</sup>

However, less than a decade later, the Air Force argued that Minuteman technology was becoming obsolete and proposed building a new ICBM that would incorporate more technologically advanced features, such as increased range, greater accuracy, and variable-yield warheads.

Congress originally met the proposal with skepticism, concerned that silo-based missiles would be vulnerable to Soviet ICBMs in a first strike. But, by 1979—after the Soviet invasion of Afghanistan—Congress changed its position, and President Carter authorized the deployment of 200 mobile MX, or Peacekeeper, missiles. President Reagan initially cut the number of missiles to 100, but Congress limited the number to 50. These missiles were then deployed in existing Minuteman silos. Eventually, these 50 missiles were decommissioned between 2003 and 2005 as part of the 1991 Strategic Arms Reduction Treaty, or START.

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## Submarine-launched ballistic missiles

During the Eisenhower administration, in the event of a Soviet invasion, the national military strategy was to respond to its superior number of conventional forces by escalating to the nuclear level. As a result, the Air Force, which possessed strategic bombers and land-based missiles, received the lion's share of the defense budget. In order to increase its share of the defense budget and gain a more prominent role within President Dwight Eisenhower's strategy, the Navy decided to try to get into the nuclear game by developing a ballistic missile that could be launched from a submarine.

In 1953, when this idea was first proposed to Admiral Robert Carney, the chief of naval operations, he refused to allocate money for it into the Navy budget, deeming the project too risky and expensive. However, his successor, Admiral Arleigh Burke, decided that the projected payoff was so great that it was worth risking scarce dollars on the program. Eventually, it became the most expensive part of the nuclear triad.<sup>11</sup>

The Navy's original analysis showed that the most cost-effective option for the submarine-launched ballistic missile, or SLBM, program was to place 32 missile tubes on each submarine.<sup>12</sup> The nuclear attack submarine community, concerned that the program would not work and undermine its own program, said they could only support 24 missiles on each submarine. The program chief, Admiral William Rayburn, asked if 16 missiles would gain their support. This determination allowed the program to go forward and has shaped submarine requirements to the present day.

Similarly, the fact that the Navy ended up building 41 of these vessels was also more of a historical accident than a strategic calculation. Admiral Burke believed that a force of 40 Polaris submarines, each equipped with 16 missiles, was more than enough for deterrence—even without bombers or land-based missiles. During his tenure in office, which ended in 1961, the Navy funded 19 submarines. Admiral Burke had unsuccessfully tried to get the submarines funded outside the Navy budget, arguing to President Eisenhower that Polaris was a national program.

The Kennedy administration, which increased defense spending dramatically—even before the war in Vietnam—added another 22 submarines before stopping at 41 subs. However, President John Kennedy left open the possibility of a further increase to as many as 47 submarines. He did this as a way to increase Secretary McNamara's bargaining power with the Navy.<sup>13</sup>

When it came time to replace the Polaris submarines with Ohio-class submarines carrying the new Trident missile, the Navy wanted to buy 24 boats, each armed with 16 missiles—similar to the Polaris. However, because of fiscal constraints, Melvin Laird—President Richard Nixon's secretary of defense—directed the Navy to place 24 tubes on each submarine and cut the number of boats by one-third to 18.<sup>14</sup>

In the 1970s, budget constraints forced the cancellation of the B-70 bomber; cut the purchase of FB-111s by 70 percent; cut the procurement of Peacekeeper missiles by 75 percent; and resulted in 12 fewer ballistic-missile submarines being built than originally planned. Despite those cuts, the United States successfully deterred a Soviet Union that possessed larger conventional and strategic forces and also concluded several arms-control agreements.<sup>15</sup>

# The current cycle

As the United States begins a new nuclear modernization cycle, all branches of government should work to avoid the inefficiencies of past cycles. However, conditions have changed since the 1980s. Changes in the domestic political outlook, the international military balance, and the global politics of nuclear weapons will all constrain and complicate the effort to modernize the U.S. arsenal.

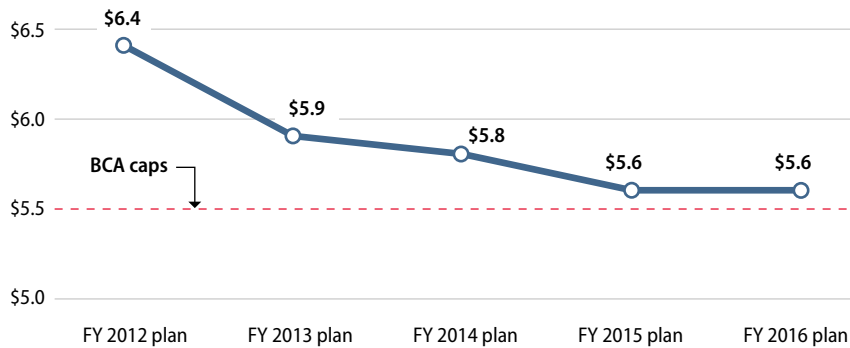
In past cycles, Congress has been a major source of inefficiency in modernizing the nuclear arsenal. Program delays, cancellations, and changes in the quantities of units ordered all impair the ability of the Department of Defense to modernize as efficiently and quickly as possible. Although partisan politics have always had an effect on the arsenal, political scientists find that polarization is increasing, with party ideology scores diverging and each successive Congress passing fewer bills.<sup>16</sup> Nowhere are these effects more prominent than on the politics of the federal budget.

Today, the total national defense budget stands at \$616 billion.<sup>17</sup> Despite widespread concern that the country is not spending enough on defense, this figure—adjusted for inflation—is higher than what the United States spent during all but two years of the Cold War; at the height of the Korean War; and at the very peak of the Reagan administration’s defense buildup.<sup>18</sup> The United States now spends roughly 12 percent more on defense than it does on all discretionary domestic spending. The difference between defense and nondefense spending—\$68 billion—could double the funding for the U.S. Department of State and other international aid programs with enough left over to double NASA’s budget as well.<sup>19</sup>

The Budget Control Act, or BCA, of 2011 and the debt-ceiling fight that preceded it; the sequestration and government shutdown of 2013;<sup>20</sup> and the tendency to fund the government under continuing resolutions are all exemplary of a new and divisive politics that has gripped the federal budget and imposed limits on defense spending. In the last five years, the Obama administration’s 10-year projections of defense spending have declined, meaning the Pentagon has had to scale down its

**FIGURE 1****White House projections of defense spending have declined**

Budget Control Act caps are pushing down expected 10-year spending plans



Source: Amy Belasco, "Defense Spending and the Budget Control Act Limits" (Washington: Congressional Research Service, 2015), available at <https://www.fas.org/sgp/crs/natsec/R44039.pdf>.

plans even as it is approaching a “bow wave” of conventional weapons modernization.<sup>21</sup> (see Figure 1) Last year, Secretary of Defense Ash Carter warned that the Department of Defense was having trouble absorbing “more than three-quarters of a trillion dollars in cuts to its future-years defense spending.”<sup>22</sup> Year-to-year funding degrades the Department of Defense’s ability to plan efficiently for major defense acquisition programs, a situation Secretary Carter called “managerially unsound.”<sup>23</sup> The October 2015 budget agreement between the White House and Congress that set spending levels for the next two years was reached when negotiators agreed to circumvent the BCA caps by using funds placed in the uncapped Overseas Contingency Operations slush fund.<sup>24</sup> Though this deal will alleviate pressures in the near term, the BCA caps and the antagonistic politics that produced them will complicate nuclear modernization through the entire cycle.

As the U.S. nuclear arsenal has adapted to the end of the Cold War, U.S. presidents have taken on new commitments that limit nuclear modernization. The 2010 Nuclear Posture Review was a modest document by most measures and laid the groundwork for today’s nuclear modernization plans, but it also made several commitments that will both constrain and shape modernization. Its pledge to reduce “the role and numbers of U.S. nuclear weapons” and to ensure that “Life Extension Programs (LEP) will use only nuclear components based on previously tested designs, and will not support new military missions or provide for new military capabilities” places material constraints on how the services can modernize.<sup>25</sup> In addition, the 2013 Nuclear Employment Guidance provided for

“increased reliance on conventional or non-nuclear strike capabilities”<sup>26</sup> and also stated a preference to maintain multiple warhead types in each leg of the triad; though it conceded that this requirement is not absolute and that the United States should prepare in some cases to compensate for shortcomings in one leg with systems in another. Lastly, the Nuclear Employment Guidance directs the services to retain “the ability to ‘upload’ strategic delivery platforms in response to geopolitical or technological surprise,” which requires the services to retain excess delivery capacity.<sup>27</sup>

The Nuclear Employment Guidance contained another interesting provision: a determination that the country can “ensure the security of the United States and our allies and maintain a strong and credible strategic deterrent while safely pursuing up to a one-third reduction in deployed nuclear weapons.”<sup>28</sup> This is because the existing arsenal is “more than adequate for what the United States needs to fulfill its national security objectives.” This finding confirms that there is no targeting analysis that mandates an arsenal much in excess of 1,000 warheads. Furthermore, the document does not make this determination contingent on Russian force levels. Although it is unlikely that a U.S. president would order major reductions in the arsenal without reciprocal and verifiable steps from Russia, the guidance suggests that to do so would not damage U.S. national security.

With little prospect of concluding a new arms control agreement with Russia, the recommendations presented below assume that the U.S. nuclear arsenal comprises 1,550 deployed strategic warheads—the level set by the New START agreement.<sup>29</sup> Undertaking a further one-third reduction to 1,000 warheads would require significantly rethinking the U.S. nuclear force structure. A reduction of this magnitude would leave a large quantity of unfilled warhead slots—very expensive empty space—if not accompanied by a commensurate reduction in delivery vehicles. Furthermore, it would be difficult to justify maintaining a triad to support a force of 1,000 warheads. A further one-third reduction would shrink the ICBM force to 300 warheads or fewer. At this level, procurement programs for missile components would have even greater difficulty achieving economies of scale and become something of an artisanal process. It may simply be easier to retire the land leg of the triad altogether.

As geopolitical circumstances change, there will be calls to renege on these commitments. However, steps that dilute or reverse these commitments could do serious damage to the global nonproliferation regime, as well as to relationships with some U.S. allies who remain invested in disarmament. The global politics of nuclear



weapons have changed substantially since the end of the Cold War. President Obama's April 2009 speech in Prague, which renewed the U.S. commitment to seek a world without nuclear weapons, resonated globally and helped to repair U.S. moral authority.<sup>30</sup> In recent years, interest in nuclear disarmament has expanded further. The global movement to explore the humanitarian effect of nuclear weapons has encouraged some countries, including some U.S. allies, to move toward drafting a ban on nuclear weapons. The costs and visibility of nuclear modernization programs are already helping to radicalize this movement, which contributed to the failure of the United Nation's 2015 Nonproliferation Treaty, or NPT, Review Conference and could further damage the nonproliferation regime. Limiting modernization plans could help to bring these countries back into the fold of the NPT,<sup>31</sup> while renegeing on existing commitments could have serious consequences.

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## Current modernization plans

With each major system in the U.S. nuclear arsenal nearing the end of its service life, the United States is initiating several acquisitions programs to replace existing nuclear delivery vehicles. In addition, the Department of Defense is planning to renovate its nuclear command and control systems, or NC3, and the U.S. Department of Energy will refurbish several classes of warheads.

More than two-thirds of U.S. nuclear warheads are deployed on Ohio-class submarines carrying Trident II D5 sea-launched ballistic missiles.<sup>32</sup> Of 14 submarines, two are in overhaul at any given time. To meet the New START treaty limits, the Navy is disabling four missile tubes on each submarine. Under the new system, each of the 12 deployed subs will carry 20 missiles for a total of 240 deployed launchers. Each Trident missile is capable of carrying up to eight warheads, but the missiles are reportedly loaded differentially in order to preserve a range of strike options. To replace its existing SSBNs, the Navy has begun the Ohio Replacement Program. As recently as the fiscal year 2012 budget cycle, the Navy expected to begin detailed design work and early procurement on the first replacement submarine in 2015. However, in 2013, the Navy pushed the program by two years and now expects the first hull to be laid down in 2021, with service expected to begin in 2030. In March 2015, the Government Accountability Office estimated the total acquisition cost of the program at about \$95.8 billion: \$14.5 billion for the lead submarine and \$5.2 billion in FY 2010 dollars for each subsequent boat—a modest increase from their previous estimate of \$4.9 billion.<sup>33</sup>

The air leg of the nuclear triad is more diverse. The nation's bomber force consists of 44 operational B-52H Stratofortress bombers—which carry up to 20 air-launched cruise missiles, or ALCMs—as well as 18 operational B-2A Spirit stealth bombers, which carry up to 16 nuclear gravity bombs on an internal-rotary assembly.<sup>34</sup> In addition, the United States deploys some 180 B61 nuclear gravity bombs at six air bases in Europe as part of an assurance mission, which are compatible with F-15E and F-16 fighter-bomber aircraft. Each of these systems is nearing the end of its service life.<sup>35</sup> The B-52 and B-2 bombers are set to be replaced by the Long-Range Strike Bomber program, which the Air Force hopes will yield 80 to 100 smaller, cheaper, and stealthier aircraft. The Air Force plans to replace the ALCM with the Long-Range Standoff Weapon, or LRSO, which will deploy around 2025 on the outgoing B-52H. However, it will eventually be deployed on B-2 and B-3 bombers as well.<sup>36</sup> Lastly, the B61 gravity bomb is undergoing a complex life-extension program that consolidates three variants into one—the B61-12—and attaches a new guided tail kit that improves the weapon's accuracy and ability to glide to its target.<sup>37</sup>

The land leg of the nuclear triad consists of a single system: the Minuteman III ICBM. First deployed in 1970 with the capability to carry three warheads, the 2010 Nuclear Posture Review directed that each missile carry only one warhead.<sup>38</sup> A total of 450 Minuteman missiles are now distributed across three wings at bases in Wyoming, Montana, and North Dakota and have undergone frequent modernization programs, including recent updates to propulsion, guidance, re-entry, and targeting systems, as well as a new effort to replace the missiles' fuzes.<sup>39</sup> In July 2014, after years of uncertainty, the Air Force completed an analysis of alternatives and opted for a plan to “deploy a new missile in its existing Minuteman infrastructure” rather than to extend the life of the Minuteman III through 2075 or procure a new road-mobile ICBM.<sup>40</sup> The Air Force expects that the program will cost \$62.3 billion in then-year dollars over 30 years, with the first new ICBMs operational in 2029.<sup>41</sup>

The confluence of these new programs will dramatically raise the cost of the nuclear deterrent. The Congressional Budget Office, or CBO, places the nominal 10-year figure at \$348 billion, roughly 75 percent higher than in the past 10 years.<sup>42</sup> Thirty-year costs fall in the range of \$1 trillion.<sup>43</sup>

**TABLE 1**  
**Projected U.S. nuclear force structure under New START treaty, 2018**

	Deployed (nondeployed)	
	Launchers	Warheads
<b>Minuteman III</b>	400 (54)	400
<b>Ohio-class submarines</b>	240 (40)	1090
<b>Strategic bombers</b>		
B-2	18 (2)	
B61-7/-11 and B83 gravity bombs		~100
B-52	42 (4)	
Air-launched cruise missile		~200
<b>Tactical aircraft</b>		
B61-3/4		~180

\*For the purposes of the the New START treaty, each deployed bomber counts as one warhead. These numbers are estimates of the actual number of deployed warheads.

\*Source: Amy F. Wolff, “U.S. Strategic Nuclear Forces: Background, Developments, and Issues” (Washington: Congressional Research Service, 2015), p. 8, available at <https://www.fas.org/sgp/crs/nuke/RL33640.pdf>; Hans M. Kristensen and Robert S. Norris, “US nuclear forces, 2015,” *Bulletin of the Atomic Scientists* 71 (2) (2015), available at <http://thebulletin.org/2015/march/us-nuclear-forces-20158075>.

There is substantial debate about whether this sum is affordable. For example, the nonpartisan congressionally mandated National Defense Panel found that recapitalization of the triad is “unaffordable” under current budget constraints.<sup>44</sup> In early 2015, Under Secretary of Defense for Acquisition, Technology, and Logistics Frank Kendall said, “We’ve got a big affordability problem.”<sup>45</sup>

Supporters of the modernization plans disagree, pointing out that as long as the United States maintains a nuclear triad, many of the costs associated with it are fixed. Because the costs of operating the nuclear force remain relatively low—and because much of the cost of procuring a new weapons system is in research, development, and testing—it is very difficult to selectively wring money from the nuclear enterprise. With few exceptions, real savings are only possible by canceling systems or providing for major cuts in force structure. This fact is even more pressing in the near term. Because much of the spending increase is not due to hit the books until the mid-2020s, when procurement costs on the SSBN and new bomber will materialize, it is especially difficult to find substantial savings in the near term when budget constraints may be most severe. As a result, the authors of an influential Center for Strategic and Budgetary Assessments, or CSBA, report concluded, proposed reductions in the nuclear modernization program would not result in significant savings.<sup>46</sup> Therefore, reallocating funding to other areas is not worth the risk. It is, according to the common refrain, a “hunt for small potatoes,” they said.<sup>47</sup> Because nuclear weapons will represent roughly 5 percent of the total defense budget, “the issue is not affordability—rather, it is a matter of prioritization.”<sup>48</sup>

To say that operating and modernizing the nuclear deterrent will account for no more than 5 percent of the Pentagon budget is roughly true—but this claim obscures more than it reveals.<sup>49</sup> This figure—which the CBO says could reach 6 percent and Pentagon leadership claims could approach 7 percent—is set to rise steadily from its current level of just more than 3 percent of the defense budget. It will reach its peak in 2029 when the height of submarine and bomber procurement drives the total sum to more than \$34 billion.<sup>50</sup> To put this in perspective, in 2029, the Department of Defense will spend about as much on nuclear weapons as the total budget of the U.S. Department of Justice. This sum is more than double NASA’s total budget this year FY 2016.<sup>51</sup> The procurement budget in its entirety is less than 20 percent of the defense budget, whereas the entire shipbuilding budget is only 2 percent.<sup>52</sup>

The defense budget is vast and provides for a wide variety of expenditures. Some of these expenditures, such as research and development of new aircraft, are analogous to those that will be necessary to recapitalize the nuclear triad. Many others, such as the salaries and benefits of 450,000 active duty U.S. Army servicemen and women, are not directly involved in nuclear operations. Many of these expenditures are mandatory or inelastic and cannot be easily adjusted to find more money for nuclear items. While nuclear deterrence represents at least 5 percent of overall defense spending, it will consume far larger proportions of critical accounts such as naval shipbuilding and aircraft procurement. In 2030, the Ohio Replacement Program alone will account for about 8 percent of total defense procurement.<sup>53</sup>

The danger is not that the federal government runs out of money to fund nuclear modernization; it is that members of Congress, the military services, and the Pentagon leadership are unwilling to sacrifice other programs to pay for new nuclear systems. Though the country has known that it would have to fund nuclear modernization, the services have not saved up for the new expenditures and have instead pressed ahead with major procurement programs that they consider vital to their core missions. As a result, both the Navy and the Air Force now say that nuclear modernization would seriously damage their operations if they are not granted additional funding that exceeds congressionally mandated spending caps.

The Navy has estimated that if it were forced to buy the Ohio-class replacement submarine as a part of its normal procurement budget, it would have to forgo construction of as many as 32 other naval vessels.<sup>54</sup> By 2022, the Navy hopes to expand the surface fleet from 273 combat ships to 308 combat ships.<sup>55</sup> To both replace ships that are retiring and expand the fleet, the Navy will have to build 264 combat and support ships before 2046. This<sup>56</sup> effort will increase the shipbuilding budget by about one-third over the next 30 years relative to the past 30 years.<sup>57</sup> With major shipbuilding efforts underway to produce new Virginia-class attack submarines, Ford-class aircraft carriers, and new fleets of destroyers, officials are anxious to avoid letting the new SSBNs “gut the the rest of our shipbuilding programs,” as Secretary of the Navy Ray Mabus recently said.<sup>58</sup> The CBO recently concluded, “[I]f the Navy is not provided additional funding for [Ohio replacement] procurement, the battle force inventory will fall short of the ... force required, and the shipbuilding industrial base will be severely degraded.”<sup>59</sup> When asked, Under Secretary of Defense Kendall told reporters, “We don’t have a solution to that problem right now ... I frankly think the only way we can address it and keep the force structure in the Department of Defense that we would like to have is higher budgets.”<sup>60</sup>

The Air Force has found itself in a similar bind. In the 2020s, the Air Force plans to begin full-rate production of the F-35 multirole attack fighter, the KC-46 refueling tanker, as well as the new Long-Range Strike Bomber.<sup>61</sup> These three programs, plus remote-piloted aircraft, account for 99 percent of the Air Force's acquisition budget and will crowd out all other procurement programs and consume large proportions of future years' research and development budgets.<sup>62</sup> The budget crunch is so severe that the Air Force is reportedly discussing cuts to the F-35 procurement program—long considered taboo because it could set off a cascade of similar reductions in partner countries, which would drive up the cost of the program even further.<sup>63</sup>

The situation is made even more acute by the possibility that nuclear procurement programs could face cost overruns and delays. In past modernization cycles, Congress has often cut programs facing cost overruns. While the nuclear arsenal during the Cold War was large enough to absorb cuts without changes to nuclear strategy, today's slimmer arsenal will have to make significant adjustments to accommodate any such cuts. In recent years, several major defense acquisition programs have incurred significant cost overruns, including the Zumwalt-class destroyer, the Seawolf-class attack submarine, and the F-22 fighter.<sup>64</sup> In each case, Congress severely cut purchase quantities, driving up the cost per unit.

While, at the outset, it is difficult to predict which programs will face cost overruns, it is clear the potential remains for this to occur. Nearly one-third of all major defense acquisitions programs since 1997 have breached legal thresholds for cost growth. On average, procurement programs in 2013 took about one-year longer than they did 20 years earlier, which also contributes to increased costs.<sup>65</sup> Based on the experience of similar past programs, the CBO estimates that cost growth will account for about \$49 billion of the total \$348 billion total cost of U.S. nuclear forces until 2024.<sup>66</sup> Though it is too soon to tell how the major modernization programs will fare, cost estimates of the B61 life-extension program have already expanded rapidly. Over the course of 2011 and 2012, the National Nuclear Security Administration, or NNSA, increased its estimate of program costs from \$4 billion to nearly \$10 billion. The Air Force's estimated cost of the B61 tail kit has also expanded by 50 percent to \$1.2 billion.<sup>67</sup> Other components of the triad are likely to face similar pressures. Analysts widely expect the Air Force to far exceed its \$55 billion estimate for the total cost of the new stealth bomber, previous examples of which have seen very high cost growth.<sup>68</sup> At the same time, cost estimates for programs to replace ICBMs and cruise missiles remain sketchy.

The Pentagon leadership has repeatedly said that the nuclear deterrent is their top priority. Shortly before leaving office in 2014, Secretary of Defense Chuck Hagel declared that the nuclear deterrent is “DOD’s highest priority mission. No other capability that we have is more important.”<sup>69</sup> In theory, this statement may seem to suggest that the Pentagon will fully fund the modernization plans—even if it means cutting other programs. In practice, the Navy and the Air Force are highly invested in their conventional procurement priorities and will resist any cuts. Certainly, the Army and the Marine Corps will resist efforts to cut their budgets in order to purchase nuclear platforms for the Air Force and Navy. Both the Air Force and the Navy, fully aware of the upcoming bow wave of nuclear spending, could have developed their future-years procurement schedules in such a way that allowed them to fund nuclear systems. Instead, they opted to put conventional programs on the books first and then seek supplemental funding for nuclear systems. In this context, statements regarding the priority of the nuclear deterrent may be read as a way of convincing Congress to appropriate these supplemental funds.

As a way of preserving their conventional procurement budgets, both the Air Force and the Navy have asked Congress to establish special funds to purchase the B-3 bombers, as well as the new SSBN.<sup>70</sup> Congress has taken early steps to establish such a fund for the Navy, but the outlook for the Air Force fund is dubious. However, establishment of the funds will not by itself solve the funding problems—and the reality is that they must still be filled somehow. There are two ways that this strategy could help secure funding: either by breaking through the congressionally mandated budget caps or by drawing funding from other Pentagon accounts, including the Army. In this way, the funds are likely to strike up a rivalry between the services over scarce dollars, raising political tensions over the modernization programs even further.

The White House should understand that, while the military services will behave strategically to meet their requirements, Congress may not. Facing a budget request that asks for everything, Congress may choose to prioritize nonessential projects. For example, many members of Congress are moving to fund extraneous programs such as an effort to convert the B61 gravity bomb to a guided weapon; a new cruise missile; and a doomed plan to get rid of excess military plutonium by converting it into fuel for commercial nuclear power plants.<sup>71</sup> These funds would be better spent ensuring that the core systems necessary for deterrence meet their capabilities and numerical requirements.



Even if there was agreement within the Pentagon, Congress does not always share its leadership's prioritization: Many members of Congress will fight to preserve specific defense programs for political or strategic reasons. It is unlikely that Congress will read this request for special national-deterrence funds as a way of ensuring the continuity of these programs. More likely, it will see it as an admission that the programs are highly expensive and not directly required for the services' core missions. It is politically difficult to establish and fully fund new accounts—even if members of Congress agree in principle that the items in that account are worthwhile. It is easier to pare down large costs than to find offsets for the full amount. The best way to protect nuclear modernization funding would be for the services to include the requests in their base procurement budgets and to ask for modest increases to fund conventional systems—but they are unwilling to do this. As a result, prioritizing the nuclear mission will not necessarily make funding the programs any easier. In past decades, the importance of the nuclear mission did not insulate modernization from either politics or cuts. It would be imprudent to trust today's Congress to take a long-term view.

# Recommendations

A rational and realistic plan for nuclear modernization is critical to national security. Current trends will exacerbate acute budget pressures and bring nuclear priorities into conflict with conventional ones. Every dollar spent on nonessential nuclear capabilities endangers one that is needed for systems critical to deterrence, national defense, or important domestic investments. Both recent and distant history suggests that Congress is unlikely to appropriate the full amount requested for the current modernization plans. To ensure that the next nuclear arsenal is balanced, stabilizing, and meets deterrence requirements, the White House must review the current modernization plans to ensure that they are realistic given current fiscal constraints. If it does not, it will be leaving the nuclear force structure to the Congress, which may not make cuts in a strategically or fiscally rational way.<sup>72</sup>

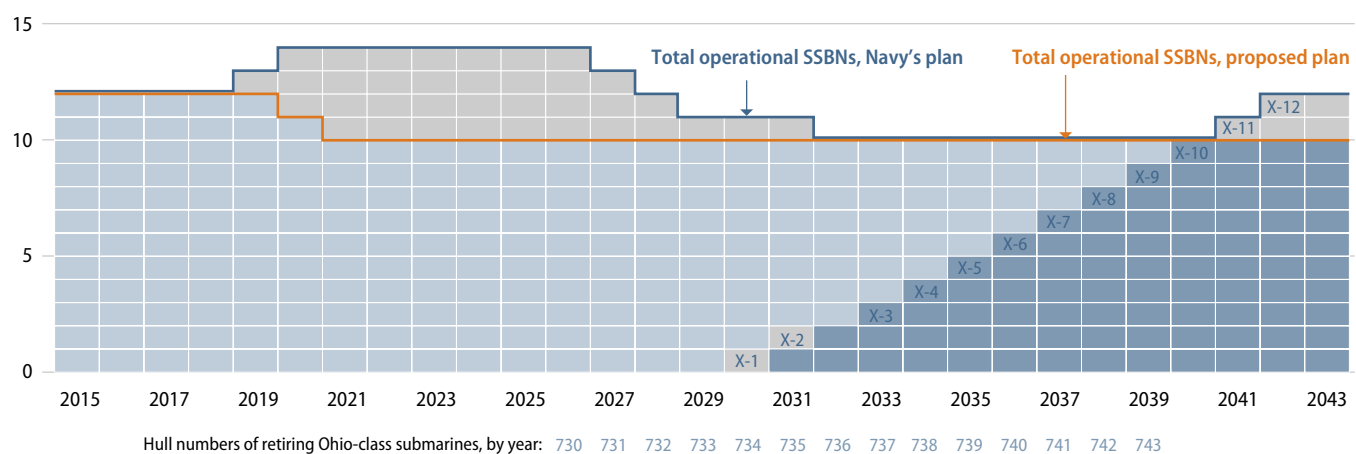
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## Submarines: Reduce the planned number from 12 to 10

The sea leg of the nuclear triad is the most survivable, contains the most warheads, and is the most costly. Accordingly, how to replace the Ohio-class ballistic missile submarines is a question of special concern. Until 2013, the Navy's plan for replacing its SSBN fleet was to shift from 14 Ohio-class submarines in service to 12 replacement submarines known as the SSBN(X). This plan did not entail a change in force structure because, at any given time, two Ohio-class submarines are being refueled, leaving 12 available to rotate on patrols. This schedule meant the Navy would begin to procure the lead SSBN(X) in 2019, with it eventually entering service in 2029. Ohio-class submarines would begin to retire as they reached the end of their service lives—one per year beginning in 2026—with the final ship, the USS Louisiana, to be retired in 2039. As new submarines replace old ones, the total number of SSBNs in service would drop from 14 in 2026 to 12 in 2029, remaining at this total indefinitely. Because the SSBN(X)'s reactor will not require refueling, all ships would be available for patrol throughout their service lives, obviating the need to procure two more ships.<sup>73</sup>

**FIGURE 2**  
**Plan to modernize a fleet of 10 ballistic-missile submarines**

Comparisons between CAP and Navy plans to replace the Ohio-class submarine, 2015–2043



Source: For the Navy plan, see Ronald O'Rourke, "Navy Ohio Replacement (SSBN(X)) Ballistic Missile Submarine Program: Background and Issues for Congress" (Washington: Congressional Research Service, 2015), available at <https://www.fas.org/sgp/crs/weapons/R41129.pdf>.

In its 2013 budget request, the Navy slipped its Ohio-class submarine replacement program two years. (see Figure 2) Under the current plan, procurement of the first SSBN(X) will begin in 2021 and it will enter service in 2030. Because the Ohio-class submarines must still retire on the same timeline, the total number of submarines in service will drop from 14 in 2026 to 10 in 2030, and the fleet will operate with 10 boats for years. In 2041 and 2042, the ninth and 10th SSBN(X) submarines will enter into service and drive the total number of operational subs up to 12. This schedule is somewhat odd in that it seems to provide for two periods of excess capacity: the first when the fleet is at 14 operational submarines between the final Ohio-class refueling period in 2015 and the retirement of the fifth Ohio-class in 2031 and then, again, after 2040 when the final two SSBN(X)s come online.<sup>74</sup>

The plan is an admission that a fleet of 10 subs is sufficient to meet existing deterrence requirements for extended periods. Because every dollar spent on excess capacity endangers a dollar that could be spent on a system necessary for deterrence, it is unlikely that Congress will appropriate funding to expand the fleet to 12 subs after it has been operating with 10 subs for the better part of a decade. The SSBN fleet, like the U.S. arsenal overall, should be sized at its minimum effective level.

Rather than allow the total number of submarines to fluctuate, the Navy should size its fleet to 10 subs for the duration of the modernization cycle. Under this plan, the Navy would complete its ongoing program of refueling Ohio-class submarines as planned. Rather than increase the size of the operational force in 2019, the Navy would retire its four oldest SSBNs, one per year, beginning in 2017 with USS Henry M. Jackson. These retirements would downsize the fleet to 10 submarines by the end of 2020, where it would remain indefinitely. This schedule allows the Navy to delay the SSBN(X) program one more year, beginning production on the first ship in 2022 and having it operational by 2031. Procuring one submarine per year thereafter, a fleet of 10 Ohio-class replacement submarines would be operational by 2040. The CSBA's budget analysis shows that this plan could save \$27.6 billion in then-year dollars over 24 years relative to the current plans.<sup>75</sup>

Due to the excess warhead capacity of the Ohio's Trident missiles, this plan would not require major redistributions of warheads across the triad. A fleet of 10 Ohio-class subs could accommodate their current allotment of 1,090 warheads with 638 excess warhead spaces, while a fleet of 10 SSBN(X) ships would have 190 empty spaces. These extra spaces are a valued commodity for two reasons. They allow the Navy to differentially load their Trident missiles, allowing more flexible strike options, and they represent an ability to upload nondeployed warheads in case of an emergency. While reducing the fleet to 10 submarines constrains these capabilities somewhat, it does not eliminate them entirely.

SSBN operations are structured to meet demanding logistical requirements. With a force of 12 operational submarines, at any given time, the Navy is thought to maintain four to five submarines on hard alert in patrol areas within range of their targets. While these subs are on station, the others are transiting to or from patrols, undergoing maintenance, modification, refit, or exercises. In order to reduce the fleet to 10 subs, the president would have to revise the current required number of submarines that must remain on station at all times. However, this revision is probably not dramatic.<sup>76</sup> Three facts suggest that the current modernization plans are in excess of deterrence requirements: The fact that the Navy plans to operate for a decade with a fleet of 10 subs; the Nuclear Employment Guidance's assertion that current plans are "more than adequate"; and declassified information that shows a steep decline in the rate that SSBNs patrol.<sup>77</sup>

Above and beyond this proposal, the next president should seriously consider reducing the SSBN fleet to eight ships. This option, which the CBO estimated could save \$20.9 billion over the next nine years—as well as more thereafter—would require more serious modifications to the force.<sup>78</sup> A fleet of eight current-generation submarines would only have 190 vacant warhead slots, while eight next-generation submarines could only have 1,024 slots—66 short of the 1,090 warheads programmed to the submarine force under New START. This would severely constrain submarine loadouts and—along with the other cuts—make it difficult for the United States to maintain the same number of deployed warheads after the expiry of the treaty. Furthermore, an eight-submarine fleet could not maintain as many boats on station, requiring a greater revision of deterrence requirements. However, transitioning to eight subs would alleviate significant pressure on Navy shipbuilding. The cost savings over nine years with eight subs is roughly equivalent to a year’s worth of the entire shipbuilding budget—or about the cost of an aircraft carrier, an attack submarine, a destroyer, three small surface combatants, and four logistics ships.<sup>79</sup>

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## Bombers: Cancel the new cruise missile and eliminate the tactical nuclear mission

The air leg of the nuclear triad is the most flexible and diverse. Its primary modernization project is to construct a new bomber to replace the B-52, the B-1B, and—eventually—the B-2 for both conventional and nuclear missions. The Air Force says low-observable aircraft are necessary in order to ensure that they can penetrate increasingly capable enemy air-defense systems and hold targets at risk. In October 2015, Northrop Grumman received a contract to produce between 80 to 100 bombers at a cost of \$511 million per unit in 2010 dollars—well below the Pentagon’s cost target of \$550 million.<sup>80</sup> However, few analysts expect the program to meet this target.<sup>81</sup> The expected delivery date for the first unit—as well as the Pentagon’s projected funding schedule for the bomber—suggest that major development work has already been completed.<sup>82</sup>

Modernization of the triad’s air leg also includes aircraft-delivered munitions. In October 2015, former Secretary of Defense William J. Perry and recently departed Assistant Secretary of Defense Andy Weber recommended cancelling the new Long-Range Standoff Weapon, which is intended to be a replacement for the air-launched cruise missile.<sup>83</sup> Set to retire in 2030, the ALCM allows the B-52 to retain a nuclear mission. Unable to penetrate enemy air defenses, the

B-52 requires the standoff capability of a cruise missile to hold targets at risk. However, the procurement of the stealthy B-3 bomber raises the question of why a penetrating bomber requires a standoff capability. At an estimated cost of \$20 billion for the missile and a program to extend the life of the W80 warhead, the LRSO is an expensive redundancy that is unlikely ever to be used. Sea- or land-launched ballistic missiles are sufficient to hold any target at risk, are more reliable, and possess a shorter time to target.

Additionally, the United States should abandon the tactical nuclear mission. Counting the cost of sustaining the 180 warheads stationed at bases in Europe and the cost of modifying the F-35 to carry the B61, as well as the savings from the cancellation of the B61 life-extension program,<sup>84</sup> the CSBA estimates a potential savings up to \$28.8 billion over 24 years if the weapons were withdrawn immediately.<sup>85</sup> These funds can be at least partially reinvested in new deterrence and assurance steps for NATO that are more closely tailored to the subconventional threats posed by Russia and the Islamic State of Iraq and al-Sham, or ISIS, including rapid-response forces and rotational deployments for U.S. forces.<sup>86</sup> Eliminating the tactical nuclear mission will have a marginal effect on NATO's ability to deter Russian aggression, as the weapons cannot be deployed for months once alerted—and only then on vulnerable nonstealthy aircraft. Removal of the contentious weapons may well do more to enhance alliance solidarity than detract from it. The existing warheads can be withdrawn from European bases at the most politically expedient moment.

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## Land: Gradual reduction in the size of the ICBM force

The role of the ICBM force is to provide an additional hedge against an adversary seeking a first-strike capability over the United States. Each missile is stationed in a hardened silo, which would require that an enemy program at least two warheads to have a reasonable chance of disabling each missile. Because each U.S. Minuteman missile carries only one warhead and because it takes at least two warheads to destroy a hardened silo with any certainty, ICBMs result in a poor exchange ratio for an enemy: A full 60 percent of the Russian strategic arsenal would be required to eliminate the U.S. ICBM force. In short, the ICBM force is thought to serve as a sponge for an enemy's warheads.



ICBMs are less useful in regional contingencies that might result in limited nuclear use. Striking virtually any target in the world requires flying over Russia, which would set off their early-warning system and raise the risk of a major calamity.<sup>87</sup> Furthermore, according to the byzantine logic of nuclear-deterrence theory, a strike that originates in the continental United States places the country at greater risk of retaliation than a U.S. weapon delivered by other means.

The remoteness of a large-scale nuclear exchange means ICBMs are of little relevance to strategic stability today. They are increasingly unlikely ever to be used and do little to help the most pressing extended-deterrence problems that the United States faces today. These considerations have already shrunk the size of the ICBM force to less than half of its Cold War peak, and officials expect to make further reductions in the coming years.<sup>88</sup>

The economics of the ICBM force are complicated. Over the past 20 years, sustaining and operating the Minuteman force has averaged about \$1.4 billion a year—though modernization programs could increase that figure to as much as \$2 billion.<sup>89</sup> As the missiles age, the costs of sustainment could increase. Retiring small numbers of missiles would have little effect on overall costs. To achieve significant savings, the Air Force will have to retire at least one of the three missile wings and close the base associated with it, which would save close to \$500 million over the first five years plus the reduced cost of modernizing each of that wing's 150 missiles.<sup>90</sup> In the near term, the costs of retiring a missile wing limits the savings possible because missiles must be removed from their silos, taken offline, and stored. Then, the silos must be secured and the launch control centers closed.

With this in mind, the United States should limit funding for the ICBM force to what is required to keep it safe, secure, and effective. The Air Force should not move toward milestone A on its program to procure a new missile. Instead, it should make the investments necessary to refurbish the Minuteman missiles in their existing silos. It should rededicate its ICBM research and development program, called Dem/Val, to concentrate on sustaining the Minuteman rather than developing a new missile.<sup>91</sup> A 2014 RAND Corporation analysis found that the 39-year life cycle costs of sustaining the Minuteman could cost \$24 billion to \$35 billion less than the current Air Force plan to procure a new missile with similar specifications.<sup>92</sup>

There is one additional concern with respect to the ICBM force. In order to ensure that the Minuteman remains effective, the Air Force carries out regular tests of retired missiles—usually three or four per year. This schedule will deplete the excess inventory of missile bodies available for testing in 2030, at which point the test program will have to be modified or more operational ICBMs will have to retire in order to provide test missiles.<sup>93</sup> At this point, the Air Force should plan to retire the ICBM wing at Minot Air Force Base, decreasing the force by roughly one-third and redistributing the excess warheads across the triad in ways consistent with whatever arms-control regime is in place following expiry of the New START treaty in 2021. In this way, reducing the number of missiles that require modernization and operation would offset the cost increase of sustaining an older ICBM force. The CSBA’s analysis pegs the cost savings of cutting an ICBM wing at \$9.6 billion over 24 years.<sup>94</sup> However, the savings of this plan will be substantially larger than this sum because it would downsize the NNSA’s ambitious plan to consolidate warheads used on ICBMs so that they are interoperable with SLBMs. The NNSA estimates that this program would produce its first unit in 2030 and could cost between \$9.1 billion and \$14.8 billion in today’s dollars.<sup>95</sup>

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## The process

The upcoming presidential election complicates the effort to bring nuclear modernization spending under control. Though not all of these changes can be made in the Obama administration’s final year, this White House should make every effort to ensure that the next president has the flexibility and information necessary to make the recommended changes. There are several steps that President Obama can take in order to ensure that the next president’s Nuclear Posture Review can make deliberate and informed decisions about the nuclear force structure. The next Nuclear Posture Review will take a year to complete, and in this time, nuclear issues are unlikely to be the first priority in the next administration. Without concerted action from President Obama’s White House, continued progress on certain programs will constrain the next president’s decision making and make it difficult to modify or cancel the programs. Furthermore, expenditures increase with each passing year—so moving quickly is essential to achieving real savings.

First, President Obama should order the Pentagon to generate analysis that can inform the next Nuclear Posture Review. A clear and comprehensive analysis of the fiscal effect of nuclear modernization plans should be ready for the next

administration on day one. This analysis should convey not only the expected costs of the various procurement programs but also their expected effect on conventional modernization systems.

Next, the president should alter guidance and requirements that currently keeps the services from considering alternatives to the current modernization plans. The Nuclear Employment Guidance is a good step in this regard, but the Obama administration can go further in its last year. Specifically, the president should revise the patrol requirements for SSBNs and order the Navy to produce a study that explores the practical effects of reducing the fleet to either 10 submarines or eight submarines. He should also order the Air Force to plan to incrementally modernize the Minuteman ICBM and prioritize research and development accordingly.

Lastly, the White House should take immediate action to cancel the B61-12 consolidation program, as well as the Long-Range Standoff missile. These programs have marginal deterrent effects and are not worth their cost. If they are not cancelled before President Obama leaves office, his successor will find it far more difficult to cancel or modify these programs. To prepare for the day when these capabilities are removed from the force, the United States should begin discussions to inform allies in Europe and Asia of the decision, explain its effect, and discuss compensatory measures as necessary in order to ensure that allied deterrence postures remains strong.

When the next administration takes office, the Nuclear Posture Review should order the immediate reduction of the SSBN fleet to 10 subs and affirm the decision to incrementally modernize the ICBM force in place. It should also seriously consider delaying the Long-Range Strike Bomber and further reducing the SSBN force to eight subs. It should reaffirm U.S. interest in negotiating further arms reductions with Russia, including—if possible—before the expiration of New START in 2021. To this end, the Nuclear Posture Review should also develop new arms-control proposals that will help to limit U.S. and Russian modernization efforts—which are fiscally unsustainable for both countries—in an attempt to stabilize the strategic balance far into the 21st century.

## Conclusion

It is not easy to recommend cuts to the U.S. nuclear arsenal. All other things being equal, the conservative impulse to hedge against uncertainty is prudent. Each nuclear modernization program is supported by a set of reasonable arguments and appears valuable for specific scenarios. Certainly, Russian aggression and China's expansion of its territorial claims require the United States to ensure that it can deter sophisticated adversaries from threatening its allies.

However, these considerations miss the larger picture. There is little evidence that niche nuclear capabilities, such as cruise missiles and tactical gravity bombs, are necessary to deter adversaries—especially in an age where Russia and China calibrate their aggressive actions to remain far below the threshold of where nuclear use would be plausible. And it is important to keep in mind that when it comes to military spending, the United States continues to outspend its adversaries by a wide margin—spending which yields vastly superior conventional forces.<sup>96</sup>

Moreover, all other things are not equal: In an age of finite resources, nuclear modernization programs will crowd out other defense priorities, including systems and programs that are designed to respond to the threats that the United States and its allies face today. Without expeditious action to bring the plans under control, they are likely to provoke pitched political battles that further raise the costs of modernization and imbalance the triad with imprudent cuts. The benefits of retaining redundant or niche systems in the force simply are not worth \$120 billion over 30 years.

While the monetary and opportunity costs are relatively easy to tabulate, the broader costs of nuclear modernization are unappreciated and poorly understood. Rising U.S. expenditures on nuclear weapons are already raising concern around the world among allies and nonaligned states, undoing much of the good will engendered by President Obama's 2009 Prague speech, where he rededicated the country to a vision of a world without nuclear weapons.<sup>97</sup> The start of the modern-

ization cycle comes at an unfortunate time for the global nonproliferation regime, which is facing pressure from nonnuclear-weapon states frustrated at what they perceive is the slow pace of nuclear disarmament.

Lastly, modernization comes at an unfortunate time in international security: Rising tensions with Russia and China mean that these countries are closely watching what the United States does with its arsenal. Increased spending and public assertions that nuclear weapons can help the United States prevail over its adversaries in a crisis could provoke reactions in these countries— and they may feel pressure to ramp up their own modernization efforts in order to ensure that their forces remain survivable. The result, warns former Secretary of Defense William Perry, could be a costly and dangerous new arms race.<sup>98</sup>

Avoiding a new arms race, restraining nuclear proliferation, and maintaining a balanced nuclear deterrent all require decisive action to bring the current nuclear modernization plans under control. The national interest can be better served by investing funds in the conventional weapons systems most relevant to national defense—as well as in America itself—in order to ensure that the United States remains competitive far into the future.

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## About the authors

**Lawrence J. Korb** is a Senior Fellow at the Center for American Progress. He is also a senior advisor to the Center for Defense Information and an adjunct professor at Georgetown University. Prior to joining American Progress, he was a senior fellow and director of national security studies at the Council on Foreign Relations. From July 1998 to October 2002, he was council vice president, director of studies, and holder of the Maurice Greenberg Chair. From 1981 to 1985, he was assistant secretary of defense.

**Adam Mount** is a Senior Fellow at the Center. Previously, he was a Stanton nuclear security fellow at the Council on Foreign Relations. Before that, he worked on nuclear elimination contingencies at the RAND Corporation. Mount's writing has been published in *Foreign Affairs*, *Survival*, *The National Interest*, *The Diplomat*, *Democracy*, and other outlets. He is also a columnist at the *Bulletin of the Atomic Scientists*, where he writes on nuclear strategy and force structure. He holds a doctorate in government from Georgetown University.

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