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### **The Cost of Nuclear Deterrence**

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### **Introduction**

Debates regarding how much the United States should spend on nuclear weapons are as old as the nuclear deterrent itself. While an overwhelming majority of people involved in nuclear modernization decisions during the Cold War, including members of Congress, understood the need for funding U.S. nuclear deterrence, the consensus on the need to fund the nuclear mission got much more fragile after the fall of the Soviet Union collapsed, largely as a consequence of a diminished threat perception.

Arguments about how much the United States needs to spend on nuclear deterrence, are with increasing frequency, heard alongside arguments about *whether* the United States should fund a nuclear deterrent at all. The expectation in the early 1990s was that nuclear deterrence will



## INFORMATION SERIES

Issue No. 485 | April 8, 2021

---

lose relevance because we have reached the “end of history,” a state in which all international conflicts will be solved through diplomacy and international institutions rather than through brute force. The first post-Cold War *Nuclear Posture Review* (NPR), written in 1994, pursued a “lead but hedge” strategy, and while the United States massively decreased the number of its nuclear weapons to lead, it let its nuclear infrastructure atrophy as if forgetting about the hedge.<sup>1</sup> Needless to say, U.S. nuclear modernization efforts grinding to a halt had no appreciable effect on U.S. adversaries and competitors who did not share American assumptions about the state of the post-Cold War world.

Today, China and Russia continue to modernize their nuclear forces, including reportedly conducting low-yield nuclear weapon experiments the United States stopped in 1992.<sup>2</sup> The United States has not deployed a new nuclear warhead design since the late 1980s, stopped a large majority of its warhead design activities in the early 1990s, let its nuclear weapon complex atrophy, and took a procurement holiday from modernizing its nuclear delivery systems. As a consequence of this largely unilateral restraint (also pursued by France and the United Kingdom), it is likely that America’s adversaries are narrowing the gap in nuclear warhead technologies, if not surpassing the United States in some areas.

Lagging behind in this class of “ultimate” weapons could incur political and diplomatic penalties for the United States and its allies that are dependent on U.S. nuclear weapons for their own security. Many American allies possess the technology to develop their own nuclear forces should they feel the United States’ assurances are no longer credible. There are some indications of increasing doubt in the minds of some allies. For example, two-thirds of South Koreans support a “domestic nuclear weapons program” according to a poll from 2013.<sup>3</sup> To make matters more complicated, North Korea emerged as a nuclear-armed state since the end of the Cold War, increasing the complexity of interactions among nuclear-armed players and their allies. North Korea continues to invest tremendous wealth to advance its nuclear weapon and ballistic missile programs at the expense of meeting the basic population needs – and its programs are causing significant concerns in both the United States and South Korea.

U.S. nuclear delivery systems are on average older than the airmen and sailors who operate them. These systems are often in service decades past their original service lives. The B-61 gravity bomb and the Minuteman III intercontinental ballistic missile (ICBM) are two examples. So far, the United States has managed to extend their service lives, but further extensions are only possible assuming unacceptable risk to the crucial mission they perform.

Nuclear warhead infrastructure is often a less considered component of the nuclear enterprise. Every NPR since the end of the Cold War emphasized the importance of a flexible and resilient nuclear weapons production complex. Yet, despite public statements to the contrary, investing in infrastructure and pursuing policies that would provide for flexibility and resilience has not been a priority of successive administrations. Consequently, the nation’s nuclear weapon



## INFORMATION SERIES

Issue No. 485 | April 8, 2021

---

infrastructure is underfunded and faces myriad challenges that span from an aging workforce and the inability to retain and train the next generation of scientists to the modernization of aging facilities. More than half of the National Nuclear Security Administration's (NNSA) facilities are more than 40 years old, nearly 30 percent date to the 1940s Manhattan Project, and 12 percent are considered excess or no longer needed.<sup>4</sup> The NNSA reported \$2.5 billion worth of deferred maintenance as of February 2019.<sup>5</sup> The NNSA is facing an ambitious warhead sustainment and modernization schedule in the coming decades and its potential inability to deliver on time could negatively impact delivery system modernization.

### **Why the Cost of Nuclear Deterrence Matters**

The U.S. Air Force operates two of the three legs of the nuclear triad: intercontinental ballistic missiles and bombers.<sup>6</sup> David Trachtenberg, former Deputy Under Secretary of Defense for Policy, testified in March 2019, saying, "A robust and modern U.S. nuclear deterrent helps ensure the United States competes from a position of strength and can deter nuclear attack and prevent large-scale conventional warfare between nuclear-armed states for the foreseeable future."<sup>7</sup>

Our nuclear weapons and infrastructure supporting them are old, which translates into commensurate maintenance bills. Even more worrisome is that the net result of trends described above is that the United States must replace all its delivery systems simultaneously and that nuclear weapon modernization will compete against other force modernization priorities in the coming decades. And because the United States "punted" nuclear weapons modernization for so long, it has very little margin to replace the systems without creating gaps in U.S. nuclear capabilities and potentially nuclear deterrence.

Nuclear weapons modernization is "a top priority of the Department of Defense," according to the 2018 NPR.<sup>8</sup> In fact, it is so important that a majority of U.S. nuclear force modernization efforts started under the Obama administration.<sup>9</sup> In his remarks announcing his commitment to creating conditions for a nuclear-free world, President Obama stated, "As long as these weapons exist, the United States will maintain a safe, secure, and effective arsenal to deter any adversary, and guarantee that defense to our allies."<sup>10</sup> Nuclear weapon modernization is an essential component for keeping nuclear weapons "safe, secure, and effective," but it is not free.

Technically speaking, the United States is planning on modernizing only its nuclear weapon delivery systems and nuclear command, control, and communications (NC3) network supporting the nuclear mission. For now, it is not planning entirely new nuclear warheads. Even the W-93, a "new" Navy warhead announced in February 2020, will be based on "existing designs" and components that are currently in the stockpile.<sup>11</sup> U.S. nuclear warheads are sustained through life-extension programs, meaning that rather than designing new nuclear



## INFORMATION SERIES

Issue No. 485 | April 8, 2021

---

warheads with new military characteristics, the United States tries to replicate existing warhead designs to the best of its ability and without underground nuclear weapon testing.<sup>12</sup>

If it is to retain today's capabilities, the United States will have to build at least twelve Columbia-class strategic submarines to replace the current force of fourteen Ohio-class ballistic missile submarines. The Ground-Based Strategic Deterrent (GBSD) is scheduled to replace the Minuteman III ICBM beginning in 2029. The B-21 Raider will initially supplement and eventually replace the current nuclear-capable force of 46 B-52H and 20 B-2A bombers. These systems will carry Long-Range Stand-Off (LRSO) nuclear cruise missiles, a follow-on to the more than 25-year-old Air-Launched Cruise Missile (ALCM). The LRSO will increase the bombers' strike capabilities, particularly in situations in which adversaries possess advanced anti-access and area denial systems. The forward-deployable and nuclear-capable F-35 will replace F-15Es and perhaps allied dual-capable aircraft in Europe.

### **Are Nuclear Weapons Too Expensive?**

Estimating nuclear weapons modernization costs is difficult because some delivery systems perform conventional and nuclear missions (B-21) or have non-nuclear variants that share much of the research and development costs (F-35). It also means that cost estimates have considerable range depending on how their authors account for multiple missions. Therefore, it is important to closely examine assumptions any cost analysis makes about dual-use categories. To make matters more complicated, nuclear weapons modernization involves long time frames, which makes initial cost estimates unreliable. Analysts often adjust their estimates over time as they learn more and refine assumptions. Lastly, nuclear warhead modernization activities are funded by the NNSA and are often lumped together with non-nuclear activities like nonproliferation or environmental clean-up. Since budget categories occasionally change year-to-year, it makes assessing their cumulative value over time even more difficult.

In the recent past, discussions about U.S. nuclear forces costs were made particularly salient by concerns over the 2011 Budget Control Act's (BCA) impact on the Department of Defense's budget. The law mandated caps on discretionary spending (of which defense spending is a part) and instituted a mechanism (sequestration) to cut discretionary spending across the board should these caps be topped. The law required the Department of Defense to bear half of these cuts.

Perhaps the clearest budget estimate in terms of clarifying underlying assumptions up-front is the Congressional Budget Office's (CBO) *Projected Costs of U.S. Nuclear Forces*. The latest publicly available iteration of the document from January 2019 estimates the 10-year costs of nuclear forces between the Department of Defense and the Department of Energy at \$494 billion.<sup>13</sup> The breakdown of the costs are as follows: \$234 billion for strategic nuclear delivery systems and weapons; \$15 billion for tactical nuclear delivery systems and weapons; \$106





## INFORMATION SERIES

Issue No. 485 | April 8, 2021

---

billion for nuclear weapons laboratories and their supporting activities; and \$77 billion for nuclear command, control, and communications. Because bombers are used both for nuclear and conventional missions, CBO attributes 25 percent of the costs of the B-52 and the new B-21 to the nuclear mission and 75 percent to the conventional mission. CBO's budget numbers are perhaps the most authoritative and are often used by members of Congress.

Since nuclear forces take decades to develop and deploy, some oft-cited estimates tally their costs over a 30-year time frame. The longer the time frame, the more uncertainty estimates they entail. These estimates also tend to suggest a more expensive nuclear deterrent. The BCA presented opponents of nuclear modernization an opportunity to portray it as wasteful and argue that resources spent on new nuclear forces would be better spent on other government programs.<sup>14</sup> Similar arguments continue to be made in today's fiscally challenging environment. However, cutting nuclear weapons modernization costs cannot cure this country's fiscal woes.

The Stimson Center 2012 report estimated costs of strategic offensive nuclear forces at \$352 billion to \$392 billion in 2013–2022. The report broadly attributes all funding having to do with nuclear weapons to the nuclear mission, which is a questionable approach given that many nuclear systems primarily perform conventional missions.<sup>15</sup> The January 2014 report by the James Martin Center for Nonproliferation Studies estimated a 30-year cost of U.S. nuclear forces between \$872 billion and \$1,082 billion.<sup>16</sup> The report attributes all bomber costs to the nuclear mission and accounts for some NNSA costs.<sup>17</sup>

Another authoritative estimate of the Center for Strategic and Budgetary Assessments (2015) used somewhat different assumptions and projected cost of nuclear forces during 2015–2039 at \$704 billion in then-year dollars.<sup>18</sup> The report noted that potential nuclear force cuts would not significantly contribute to meet caps mandated by the BCA. Indeed, Congress repeatedly admitted that the Pentagon's budget caps, set to expire in 2016, are unworkable and changed the BCA several times after 2011 to permit higher levels of defense spending than the BCA permitted.

### **Nuclear Weapons Provide a Good Value**

The Trump administration's fiscal year (FY) 2021 budget request includes \$15.6 billion for NNSA's nuclear weapon activities account and \$28.9 billion for the Department of Defense's nuclear weapons modernization effort and operations and maintenance.<sup>19</sup> The Department of Defense's top five research, development, testing, and evaluation programs are the Columbia-class submarine (\$4.4 billion); nuclear command, control, and communications modernization (\$4.2 billion); the B-21 Raider (\$2.8 billion); the Ground-Based Strategic Deterrent (\$1.5 billion); and the Trident II missile life-extension program (\$1.2 billion).<sup>20</sup>



## INFORMATION SERIES

Issue No. 485 | April 8, 2021

---

While this is a significant sum of money, U.S. nuclear forces are not a large budget line in the Department of Defense's budget in real or value terms. Today, nuclear forces take up about 5 percent of the Pentagon's budget, which itself has been a declining part of the federal budget.<sup>21</sup> Even at the peak of modernization, nuclear forces will consume about 6.4 percent of the budget.<sup>22</sup> Nuclear force maintenance and operation takes another 2 or 3 percent of the budget – and is a recurring cost that will not disappear.

In other words, it is important to keep nuclear force costs in perspective. Long-term estimates tend to give an impression that nuclear forces are unaffordable and that opportunity costs of funding them are too high. But they are misleading – and not only because of the uncertainty involved in long-term estimates in general. Consider that when any major defense program is costed-out over a long enough time frame, its total cost will seem significant. This is true of airplanes, tanks, personnel, and even office equipment.

Moreover, over the period between 2004 and 2019, the government paid out \$1.2 trillion in improper payments (waste, fraud, and abuse).<sup>23</sup> Should the government conduct its financial business in a similar fashion to responsible Americans, the amount saved would more than cover the cost of nuclear force modernization over the next 30 years.

The American response to the Wuhan-origin coronavirus and massive government spending the crisis facilitated – more than \$6 trillion in various capital infusions – are likely to impinge on defense spending in the years ahead.<sup>24</sup> For some, the crisis is an opportunity to continue to call for reductions in U.S. nuclear forces. But a closer look at the numbers tells a familiar story; the United States cannot balance its budget on the back of nuclear weapons modernization – and the Department of Defense, more generally. For example, as the Hudson Institute analyst Tim Morrison points out, "Cancelling the GBSB entirely this year would amount to .002% of the defense budget for fiscal year 2021 and .0003% of projected federal spending and .0002% of spending to date on the pandemic."<sup>25</sup> Most important is the benefit Americans receive from the nuclear deterrent, which is foundational to the peace the nation has enjoyed for seven decades. In the words of former Secretary of Defense James Mattis, "America can afford survival."<sup>26</sup>

## Conclusion

As operators and maintainers of two legs of the strategic triad and American tactical dual-capable aircraft, Airmen have a special duty to understand the context in which the nuclear force is funded so that they can make logical and persuasive arguments for continued support to these forces. The nuclear force is in need of recapitalization and it is up to Airmen to explain not only how deterrence works but why American taxpayers are served well by their investment in nuclear modernization. This is not only an obligation for the corporate Air Force



## INFORMATION SERIES

Issue No. 485 | April 8, 2021

---

as its leadership explains the Service's needs to Congress, but the American people have a right to know how their taxes are spent and for what purpose.

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## INFORMATION SERIES

Issue No. 485 | April 8, 2021

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