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Nuclear Modernization: Best Bang for Our Bucks

The next Nuclear Posture Review (NPR) that will inform US nuclear weapons modernization has the difficult task of coming up with a force posture that will keep the United States and its allies safe from an existential attack for decades. (Imagine planners in 1925 tasked with planning a defense posture that would ensure no large-scale conflict occurs through the 1980s and perhaps even the 2000s. In the 1920s, they would know nothing about stealth, radars, the Internet, and a great many other inventions and technologies that have altered warfare.) Maintaining a strong, credible US deterrent has been the most important defense priority since the dawn of the nuclear age. After the Cold War, however, the United States took a fiscal and intellectual vacation from modernizing its nuclear warheads and nuclear-capable delivery platforms. As US delivery platforms reach the end of their service lives and nuclear warheads age, programs to modernize and sustain them face a number of challenges. Fortunately, the NPR offers the Trump administration a unique opportunity to reexamine the existing strategic context, challenges, and assumptions behind the more questionable aspects of current nuclear weapons policy. Recommended policy changes may not require monetary investments and changes in the stated program of record.

Strategic Context and Challenges

For decades before the end of the Cold War, the context of the US nuclear enterprise involved preventing an all-out nuclear war with the Soviet Union as well as other existential threats to the United States and its allies. The end of the Cold War led to a general loss of interest in the nuclear enterprise and deprioritization of related issues both in government and among the public. Misplaced optimism about the future security environment resulted in reductions in US and allied defense budgets and led to changes in nuclear weapon policy that would had been unthinkable during the Cold War.[1] In this environment, US long-range delivery platform modernization stalled.

Today, US nuclear warheads and delivery platforms are old. Our nuclear warheads were built in the 1980s, and some are based on 1970s designs.

The US approach to nuclear weapons modernization changed after the end of the Cold War from building nuclear warheads for about a 10-year operational service life to extending their service lives well beyond their original 10 years and managing them through the Stockpile Stewardship Program. This sustainment program will have to continue for the foreseeable future and will require investments in the aged nuclear production and sustainment complex.

US delivery systems also are scheduled to remain in service well past their original service lives. Bombers will be required for conventional as well as nuclear missions well into the future. They can be recalled, providing decision-makers with a valuable signaling tool. However, during the 1990s, the United States purchased 21 B-2 stealth bombers instead of the planned 132, and their stealth characteristics lasted fewer years than we expected. The bomber leg of the triad continues to rely on B-52 bombers introduced into service in the 1960s. These bombers would not survive in today's contested air environment.

Intercontinental ballistic missiles (ICBM) are the cheapest leg of the nuclear triad to operate and can be launched on short notice. They also require opponents to expend a lot of their own nuclear arsenal before that leg of the triad is overcome, thus undeniably demonstrating their intent to attack the United States. However, the United States decided to decommission its most modern ICBM, the MX Peacekeeper, after the end of the Cold War and instead has continued to rely on the Minuteman III missile, developed and deployed in the 1960s and 1970s. Concerns over Minuteman III survivability had led to the deployment of the MX Peacekeeper, yet almost 30 years later, we find ourselves with the same, albeit well-sustained, Minuteman III missiles in the ground.

Submarines, while expensive, are the most survivable part of the nuclear triad. The *Ohio*-class submarines were introduced into service in the 1980s and were originally planned to serve for 30 years. We now expect them to remain in service until 2042. The submarines are fitted with Trident D-5 submarine-launched ballistic missiles.[2] With the submarine life spans now extended to 42 years, the Navy is facing the unprecedented task of maintaining the boat well past its intended service life. The Navy also faces the challenge of designing a new missile that would be compatible with the *Ohio*-class launch tubes as well as the upcoming *Columbia*-class launchers, all the while trying to find commonalities with a follow-up to the Minuteman III ICBM.

A triad is much more than the sum of its parts. Different systems give the president different options. They also present difficult challenges for adversaries intent on defeating them and force those adversaries to diversify their resources and methods to overcome the triad. That is why all three legs of the nuclear triad must be modernized despite the fiscal challenge. Next-generation nuclear delivery platforms will have to be in service for decades, during which time their operating environment can change drastically and challenge US security. The past three decades have taught us just how fast this can happen. The end of the Cold War and expecting Russia to become a constructive member of the international system are two examples. As late as 2010, the Department of Defense optimistically argued "Russia and the United States are no longer adversaries, and prospects for military confrontation [had] declined dramatically."[3]

After the New Strategic Arms Reduction Treaty (New START) entered into force in 2011, Russia launched the most extensive nuclear weapons modernization program since the end of the Cold War. Even without increasing the prominence of its nuclear forces in its national security posture, Russia is modernizing its nuclear forces much faster than the United States and has a very active and capable nuclear weapons production complex. Its history of arms control violations is a serious concern, particularly because Russia currently deploys about 150 warheads above the New START ceiling.[4] While that is not a violation of the letter of New START since the implementation period starts next year, it is a violation of the spirit of the treaty, particularly since Russia started off below the limits when the treaty entered into force. The US nuclear posture today is predicated on assumptions about Russian behavior that were wrong. But Russia is not the only potential threat to US and allied national security. North Korea continues to test-launch ballistic missiles that are increasingly capable of threatening the US homeland and already has a ballistic missile arsenal that can reach US allies South Korea and Japan. Pyongyang continues to advance its nuclear weapons program, undoubtedly with an eye toward achieving the capability to mate nuclear weapons to its ballistic missiles. Since 2012, North Korea has conducted 78 ballistic missile tests, of which 61 were considered successful.[5] The neighboring state of China is also a challenge. While Chinese nuclear capabilities remain opaque, they are underpinned by a very capable nuclear production complex. China is also a leader in hypersonic technologies that might affect the strategic deterrent relation-

ship between Beijing and the United States over the course of several years. Finally, Iran, while not yet a nuclear weapon state, is flush with cash from the Joint Comprehensive Plan of Action. It will use this cash to undermine the United States and continue to develop ballistic missiles to augment its regional and global position. India and Pakistan remain wild cards, particularly in the regional context.

Fiscal Challenges

The Congressional Budget Office recently estimated that our nuclear forces would cost about $400 billion over the next 10 years.[6] Additional billions of dollars will have to be spent after that as systems enter operational service. While the sum might seem large, even at its peak, nuclear weapons modernization will cost less than 7 percent of the Department of Defense budget. The US nuclear deterrent is not inherently unaffordable, but it will be difficult to execute nuclear weapons modernization if sequestration budget caps remain in place. Additionally, conventional forces like fighters, ships, and munitions are going to reach the end of their service lives in concurrence with the nuclear weapons modernization program. This will create further competition for scarce resources if the budget caps are not lifted. For the value that nuclear weapons provide by deterring a large-scale attack against the United States and its allies, and in the context of a large US federal budget, nuclear weapons modernization is an excellent and cost-effective contribution to US national security. The nuclear weapons triad (ICBMs, submarines, and bombers) will be necessary both for deterrence and to provide future presidents with options should deterrence fail.

Nuclear Posture Review Opportunities

Keeping US nuclear weapons policy as it is completely disregards negative security developments since the 2010 NPR. The 2017 NPR has an opportunity to correct the misconceptions of its 2010 predecessor and also address new developments in the national security environment that have occurred since the end of the Cold War. Some of the most important changes relate to nuclear weapons policy, not necessarily to programmatic aspects of the nuclear weapons enterprise itself. Fortunately, these changes may not require monetary investments or changes in the

current program of record—something desirable given the constrained defense budget.

One of the NPR's great opportunities is a chance to reverse the Obama administration's preference for no new nuclear warheads and no new missions or capabilities for the existing warheads. This policy was predicated upon much more positive and constructive relations with the Russian Federation as well as an anticipation of other countries being interested in the peace and stability of a world without nuclear weapons. But other countries—particularly those that possess nuclear weapons—are simply not interested in such a world.

Some argue that any nuclear weapons policy changes would undermine the New START consensus on the need to modernize the US nuclear triad and short-range nuclear weapons arsenal, particularly the long-range stand-off (LRSO) missile. But that consensus is not enough to enact nuclear weapons modernization, particularly since the bulk of this modernization is scheduled to happen after New START expires. Nuclear weapons modernization must be supported on its own merit for three reasons:

1. The nuclear triad provides the president with the best options in addressing unforeseen contingencies.
2. Components in weapons originally designed for much shorter life spans are nearing the end of the far longer life spans than originally envisioned.
3. The need for nuclear capabilities will persist into the future.

Under the current circumstances, it would be prudent for the United States not to waste its precious resources trying to negotiate a New START extension, a rather one-sided agreement disadvantageous to the United States with a weak verification regime.

Additionally, by contributing to allied assurance, US nuclear weapons are a great tool of US nonproliferation policy. Allies have relied on US extended deterrence in return for not developing their own nuclear weapon capabilities (Japan, South Korea) or keeping their arsenals relatively small (the United Kingdom). To that end, the United States will have to invest in its short-range nuclear weapon arsenal, an investment that includes developing the LRSO missile.

The Trump administration should also honor the Senate's decision not to give its consent to the Comprehensive Test Ban Treaty (CTBT). Such

a step would honor the separation of powers and rule of law. It would also relieve the United States of the obligation not to take actions contrary to the object and purpose of the treaty. The directors of the US National Nuclear Laboratories in the 1990s recommended that the United States permit itself to conduct very small yield–producing experiments, but the Clinton administration insisted on a zero-yield interpretation.[7] It is unclear whether other parties to the CTBT agree with this interpretation, although Russia and possibly China continue to conduct small yield–producing nuclear weapon experiments.[8]

Throughout the Cold War, thousands of American scientists, engineers, decision-makers, and policy makers labored to maintain a credible and militarily effective nuclear deterrent. Even the best and most properly funded nuclear weapons modernization program will fall short if the United States does not develop the necessary human skillset needed to address challenges sure to arise during the course of its nuclear weapons modernization program. This includes developing a cadre of young people well versed in nuclear policy issues, thinking, and practice as well as weapons designers, engineers, chemists, metallurgists, computer coders, and others that can tackle challenging tasks like mating warheads in the current stockpile to delivery systems of the future. Additionally, the United States must invest more resources in preserving the practical knowledge of those who built, designed, and tested weapons in the current stockpile, including skills required for instrumentation of nuclear weapons experiments. Since only limited time for these activities is available, they should be prioritized in the next budget. A strong and capable nuclear production complex is critical to deterrence and assurance as well as to being responsive to threats as they evolve in the future.

The United States must give itself the intellectual freedom to conduct nuclear weapons experiments should a very serious circumstance require it. An example of such a circumstance could be the discovery of a serious flaw in the current warhead stockpile that would require a correction and an experiment to validate such a correction. It may well find itself surprised by unforeseen developments in its stockpile. The United States was not able to conduct a nuclear test series that would validate computer codes used to model and evaluate the performance and safety of nuclear weapons prior to the Clinton administration's decision in 1992 to stop nuclear weapons testing. Additionally, over a long enough timeline, the United States might find itself in need of nuclear weapons

with new capabilities and unforeseen requirements. Such weapons could require nuclear weapon testing. If the administration takes these steps, the United States will be better equipped to revitalize the human component of the future nuclear challenge.

Conclusion

The Trump administration must reexamine assumptions underlying some of the more questionable aspects of US nuclear weapons policy. Furthermore, the national security developments mentioned above and their effect on nuclear weapons strategy and policy must be clearly communicated to Congress, the general public, and our allies. The goal is to continue to provide a safe, secure, reliable, and militarily effective nuclear deterrent and keep Americans and their allies free from nuclear coercion and attacks.

Military history teaches that the United States usually finds itself surprised by conflicts, be it their nature, their location, or both. Due to unpredictable ways in which the security environment develops, the imperative in nuclear weapons modernization ought to be creating and preserving flexibility and adaptability. The NPR is an opportunity to tackle our nuclear challenges and put US nuclear force policy on a sound footing. SSQ

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Notes

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