



Prospects for U.S. Nuclear Modernization

The remarks below were delivered at a symposium on “U.S. Nuclear Modernization” hosted by National Institute for Public Policy on February 23, 2021. The symposium focused on contemporary issues in the U.S. nuclear modernization program and prospects for the future.

Franklin C. Miller

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I have been asked to lead off today’s discussion by speaking to three topics in particular:

- The U.S. modernization record and previous U.S. nuclear modernization cycles;
- Comparing U.S. nuclear strategy and posture to that of near-peer adversaries; and
- The impact of declaratory policy on deterrence.

Each of these topics could be the subject of an entire symposium, but I will summarize my comments briefly.

Modernization

Let me begin by asserting that we are at a critical moment with regard to the viability of the U.S. strategic deterrent in the 2030’s and beyond. Although I hate to use that now-overused phrase, “inflection point,” that is really where we are today. It is worth remembering that the foundations of today’s Triad—the Minuteman ICBMs, the SSBN force, and the B-52s—were laid in the last years of the Eisenhower Administration and in the early years of the Kennedy Administration. Twenty years later, the Reagan Administration picked up and expanded programs, which began their gestation in the Ford and Carter Administrations, to recapitalize the Triad.

Twenty years after that, the George W. Bush Administration should have undertaken a similar recapitalization but did not. There were two reasons for this. First was a fundamental misreading of the aims and intentions of Vladimir Putin. Second was a monocular focus on the wars in Iraq and Afghanistan without regard to developments in the wider world.

And so, we find ourselves today relying on the fruit of the Reagan program, but that fruit is overripe. We have a force which will shortly require modernization or retirement: there is little ground in between.



Let's look at a few examples.

The ALCM-B air-launched cruise missile entered service in 1982 with an expected operational life of 10 years; it is still in the force today. It is plagued with reliability problems and is no longer sufficiently stealthy to evade the most modern enemy air defenses. Without its replacement, the Long Range Stand Off (LRSO) weapon, the B-52s' role in our nuclear deterrent disappears.

In addition, with regard to the bomber force, there are only 19 B-2s, and yes, these airplanes are also approaching their 30-year point. A force that small cannot be sustained for a lifespan like that of the B52, which is now entering its seventh decade of service. The B-21 aircraft is vital to augment and then replace the current fleet of B-2s.

The Ohio-class ballistic missile submarines (SSBNs) will have to begin retiring in the early 2030s at an approximate rate of about one per year; the replacement program for building Columbia-class SSBNs is now on track, but it must be kept on track. Dangerous ideas such as slipping the schedule or reducing the proposed buy of a minimum of twelve boats will cause major perturbations in the industrial base, resulting in increased cost and further delay.

As a former official, I can say that one thing which bureaucrats do not understand or appreciate is how major industrial programs operate. The Columbia program must be kept on pace. And by the way, the focus on the SSBNs—while necessary—ignores the fact that the Trident II missile system also requires updating and eventual replacement. In the last budget cycle, the Congress slashed funding for work on the D5 life extension (LE2) program, which is designed to keep the missile viable until the mid-to-late 2030s. If funding for that work is not restored and the program not allowed to proceed, we could well face a crisis in the so-called backbone of our nuclear deterrent in the next decade.

The debate over the Ground-Based Strategic Deterrent (GBSD) is one of which you are all aware. However, you may not be aware that the GBSD program has three parts: the missile itself, the physical infrastructure of silos and launch control facilities, and the command and control (C2) system. All three of these major subsystems have been life extended over the past 50 years, but we have reached the end of our ability to continue to do so. We cannot extend this fifty-year-old system another several decades. The GBSD program integrates the modernization of all three elements. If you want a viable Triad, you must proceed with GBSD.

So, we are now facing the unhappy need to modernize across the board because of our failure to begin modernizing at least some elements of the strategic Triad in the George W. Bush



years. But make no mistake, there is not a lot of time left. As former Secretary of Defense Ash Carter put it in 2017:

The Defense Department cannot further defer recapitalizing Cold-War era systems if we are to maintain a safe, secure, and effective nuclear force that will continue to deter potential adversaries that are making improvements in their air defenses and their own nuclear weapons systems. The choice is not between replacing these platforms or keeping them, but rather between replacing them and losing them altogether.¹

Comparative Strategy

The issue of comparative strategy is an interesting question which deserves its own seminar. U.S. nuclear deterrent policy is virtually unchanged since the Kennedy years; our nuclear weapons serve to deter nuclear attack on ourselves and our allies and, as a last resort, to deter major non-nuclear strategic attack.

Over the past decade and a half, Russian nuclear strategy has evolved into one seeking to menace and intimidate Moscow's neighbors (who also happen to be our allies). It also appears that the Kremlin leadership contemplates the use of low yield nuclear weapons to consolidate aggressive gains accomplished by conventional means. Chinese nuclear strategy remains, as it always has been, opaque, but there are emerging suggestions that Beijing is studying the Russian model.

So, the difference between the U.S. approach to nuclear weapons as a defensive tool, and the Russian and possibly Chinese approach to those weapons serving as offensive tools, could not be clearer.

There is a second difference in the way we and our potential major adversaries look at nuclear weapons. The Russian and Chinese military leaderships have evolved an all-encompassing view of future war, which integrates elements of gray area operations, conventional attack, cyber attack, and nuclear weapons. The United States continues to view nuclear weapons as something almost disconnected from other uses of our military power. The line in the Department of Defense is usually: "We don't need to think about that—its STRATCOM's (U.S. Strategic Command's) problem." Yet, there is a critical need for us to understand what the other sides' holistic planning means and to at least begin to address it in our thinking if not in our planning.

¹ Ashton Carter, "Nuclear Deterrence: Still the Bedrock of US Security," *The American Interest*, April 6, 2017, available at <https://www.the-american-interest.com/2017/04/06/nuclear-deterrence-still-the-bedrock-of-us-security/>.



Declaratory Policy

Let me conclude by commenting briefly on the issue of declaratory policy.

Declaratory policy is the scene setter, not the scene. It expresses our peacetime aspirations and intentions, and as such is of great importance in explaining to friend and foe alike what we intend to do.

But deterrence rests essentially on the combination of capability and will. If we do not have the capability to underwrite our declaratory policy, we will appear weak and increase the odds of our being tested. If we do not demonstrate that we have the will to use our capability when we or our allies are threatened, we will be tested. In either case, deterrence is weakened.

It is not too fine a point to make that whether we follow through on strategic modernization is a test of both capability and will: capability, which if not modernized will be found lacking, and will to carry out the program on which deterrence rests in the future.

John R. Harvey

John R. Harvey is former Principal Deputy Assistant to the Secretary of Defense for Nuclear, Chemical and Biological Defense Programs and former Director, Policy Planning Staff of the National Nuclear Security Administration.²

I want to thank David Trachtenberg, Keith Payne and the gang at NIPP for inviting me to participate before this very knowledgeable group and with the august members of this panel. What I hope to achieve in brief remarks is, first, to address the prospects for continued bipartisan support for modernization of U.S. nuclear forces in the new administration and Congress. Then I will do what David actually asked me to do which is review modernization with a focus on NNSA's role.

Many of us take as a given that U.S. nuclear forces help prevent major wars and promote strategic stability among the major powers. But the set of exquisite capabilities—the people who design, develop, secure, plan, operate and maintain nuclear forces and the associated R&D, manufacturing and operational infrastructure that supports this effort—are no less a factor in assuring allies and deterring adversaries. Over the next few decades this set of

² Many issues addressed in my remarks are developed in further detail in the following publications: John R. Harvey, "Modernizing the U.S. Nuclear Arsenal—The Road to 2030 and Beyond," in *Fit for Purpose? The U.S. Strategic Posture in 2030 and Beyond*, Brad Roberts, Editor, LLNL CGSR, October 2020 and John R. Harvey, "Anticipating the Biden Nuclear Posture Review," *Real Clear Defense*, September 9, 2021.



capabilities will be tested in very complex modernization programs that will involve the near simultaneous replacement of every leg of the aging triad, a major upgrade to the nuclear command and control (NC2) system that links nuclear forces with Presidential authority, and recapitalization of NNSA's aging warhead production infrastructure. There is little flexibility to absorb further triad modernization delay without affecting robust nuclear deterrence in future years. As former Secretary of Defense Ash Carter said: either we replace aging platforms and systems or we must remove them from service—there is no other choice.

On modernization, the first order of business is sustainment: ensuring that today's nuclear triad, U.S. dual-capable fighter bombers and associated NC2 remain operational until modern replacements are available. Recall the major replacement programs underway in DoD:

- Modernize the sea-based deterrent with a new Columbia-class ballistic missile submarine to replace the Ohio-class submarines deployed since the 1980s.
- Develop a follow-on ICBM—the so-called GBSD—to replace the aging Minuteman III (MMIII).
- Field a new B-21 strategic bomber.
- Field a Long-Range Standoff missile to replace the current air-launched cruise missile.
- Meet deterrence commitments to allies with a nuclear-capable F-35 Joint Strike Fighter deployed with the life extended B61-12 bomb.
- Develop and field, in the next decade, a nuclear-armed SLCM.
- Field a “next-gen” NC2 system that is responsive to both advancing threats and the evolving vision for modern conflict.

For NNSA, a no-less important series of programs is being executed:

- Complete on time and cost four warhead life extension programs—the B61-12 bomb, the W76-1 (now completed) and W88-alt SLBM warheads, and the W80-4 for LRSO.
- Field a low-yield warhead for the Trident D-5 SLBM (also completed).
- Plan to retain the B83 bomb in the nuclear stockpile.
- Accelerate by one year the W78 ICBM warhead LEP (called the W87-1).
- Start work on a next Navy SLBM warhead—the Mk7/W93.
- Advance concept and feasibility studies for a modern nuclear SLCM warhead.
- Carry forward nine large capital construction projects in various stages of execution. Among them:
 - Provide enduring capability and capacity to produce plutonium pits at a rate of no fewer than 80 pits per year by 2030.
 - Restore safe, environmentally-sound manufacture of highly enriched uranium (HEU) components at the Y-12 plant.



- Ensure the necessary reactor capacity, and availability of sufficient unobligated low enriched uranium (LEU), to produce an adequate supply of tritium for nuclear warheads.
- Ensure continuity in U.S. capability to develop and manufacture secure, trusted rad-hard microelectronic systems beyond 2025 to support stockpile modernization.
- Sustain the personnel, computational, experimental, and test capabilities needed to assess annually the safety and reliability of the nuclear weapons stockpile as well as to design, develop, and produce modern nuclear warheads as needed in the future.
- Continue the process of transforming the NNSA itself, and its culture, to become an efficient, cost-effective, organizationally coherent entity for working cooperatively with the Department of Defense in overseeing the U.S. nuclear stockpile. More on this later.

There are three major risks to successful completion of this intensive modernization effort. First is program execution risk. Slips in individual programs, coupled with serious shortfalls in the aging warhead production infrastructure, can degrade deterrence from not having forces available sufficient to meet targeting needs. The entire work program reflects a modernization challenge not experienced in over 40 years, since the days of the Cold War, and we should anticipate significant technical and programmatic challenges in completing it on time and cost.

Second is the risk from evolving threats. The modernization program underway is not creating more nuclear weapons with exquisite new military capabilities, but simply replacing what we have today with modern versions. Is such a program sufficient to address threats that will evolve significantly over the 50-70 years that these systems are to remain in the field? More succinctly, is the force we are rebuilding the force we need for 2030 and beyond?

A third risk is to a continuing bipartisan consensus on modernization. Early in his second term, in part due to Mr. Putin's reckless behavior in Crimea, Mr. Obama moved out aggressively on nuclear modernization and received strong support from Congress, in part, because he packaged modernization with a commitment to avoid programs involving new warheads or fundamentally new military capabilities and completed the New START treaty (NST) with Russia.

The Trump team put together a nuclear review and modernization program for nuclear forces that drew on much of what it inherited from Mr. Obama. The 2018 *Nuclear Posture Review* (NPR) is thoughtful, balanced and in the mainstream of U.S. nuclear policy. As a result, bipartisan support in Congress for nuclear modernization continued. In the run-up to passage of the FY20 (and 21) National Defense Authorization Act (NDAA) Minuteman, for



example, there were few disputes between the Democrat-controlled House and the Republican-controlled Senate.³ In the final bills, passed by both Houses, all issues in dispute were resolved favorably, and nearly all of the associated funding was appropriated consistent with the President's budget request.

Mr. Biden in his first week in office agreed to extend New START which, in my view, was a "no brainer", not necessarily for its purported benefits for strategic stability (of which there are some), or for its role advancing U.S. nonproliferation goals (highly arguable), or to assure allies (valuable), or for the transparency it provides into each other's nuclear weapons programs (highly useful). Rather, its most important benefit will be to foster continued bipartisan support for the modernization program.

Can we count on continued bipartisan support as the Biden administration, and the Democrat-controlled Congress, ramp up activities on the FY22 and 23 budgets? I am sort of a "glass half full guy" so let me touch on a few points about why I am optimistic:

- SecDef Austin, notwithstanding needed schooling on nuclear issues, very importantly reiterated in his testimony words from the past two presidential administrations along the lines that nuclear deterrence is DoD's Job #1.
- DepSecDef Hicks indicated strong support for the triad in her confirmation hearings.
- Colin Kahl, the nominee for Under Secretary of Defense for Policy (USDP), is pragmatic and a centrist.
- Leonor Tomero, while perhaps not a devotee of the Frank Miller-John Harvey-Keith Payne-Brad Roberts-Elaine Bunn-Rob Soofer school of nuclear policy, was an influential staffer on a committee that sustained nuclear modernization programs over six years and two Presidents.
- Sen. Jack Reed and Sen. Jim Inhofe, while reversing their roles as Senate Armed Services Committee (SASC) chair and ranking member, and with able support from key staff Jon Epstein and Adam Trull, are likely to continue in lockstep their bipartisan approach to modernization.
- Sen. Angus King, independent from Maine, and Nebraska Sen. Deb Fisher, a strong advocate for modernization, who become chair and ranking on the SASC Strategic Subcommittee, are likely to continue that tradition.
- Rep. Adam Smith, chair of the House Armed Services Committee (HASC), in his stated commitment to deterrence and in his realist view that Congress supports vigorous modernization and there's not much he can do to disrupt it, has not imbibed, so far, the Kool Aid from the anti-nukes.

³ Areas of contention involved (1) whether to slow down GBSD, the replacement program for Minuteman III, by cutting its funding; (2) whether to cut funding for two NNSA programs (warhead pit production, the W87-1 LEP) that support GBSD; (3) whether to field a low-yield warhead for Trident; (4) whether to proceed on a study for a new nuclear SLCM; (5) whether to adopt a "no first use" policy; and (6) whether to retire the B83 bomb.



- Rep. Mike Rogers from Alabama, highly competent and knowledgeable about nuclear and space issues, is an apt replacement for the retiring Mac Thornberry, the ranking member on HASC, in working with Rep. Smith on modernization.
- Reps. Jim Cooper of Tennessee and Mike Turner of Ohio, both strong advocates for modernization and who just today held a hearing on Russia's aggressive modernization program, are now chair and ranking member, respectively, on the HASC strategic forces subcommittee.
- Sen. John Tester, Democrat from Montana and a backer of GBSD, is to chair the Senate Appropriations Defense Subcommittee.
- Finally, opponents of certain modernization programs are losing the debate. Those who oppose GBSD because they think we can stretch out MMIII a few more years, who don't believe we need to move forward with urgency on pits, who question the need for the W93, who would advance NFU in U.S. declaratory policy, or who would un-deploy the W76-2, simply have not made a compelling case for these actions to Congress or the American public. In the intellectual arena, they have come up short—rather than respond in their appeals to Congress to solid arguments opposed to their positions, they ignore them. Members of Congress and staff see this and react accordingly.

NNSA's Transformation

Let me turn to NNSA's transformation. Those who pay close attention to the evolution of the NNSA and its organization might agree that enormous progress has been made under the leadership of Lisa Gordon-Hagerty:

- Lisa has been a strong and effective manager, as well as a strong proponent of the prudent program initiated by President Obama and advanced by his successor to modernize the Triad. Very importantly, she has strengthened project management at NNSA, and set and advanced clear priorities for the work.
- She has taken a bipartisan approach in advancing nuclear modernization on the Hill and has gained the respect and trust of congressional members and staff from both sides of the aisle by fostering a highly effective partnership with Congressional Defense and Energy authorization and appropriations subcommittees.
- She has promoted "One Team" at NNSA, above all, by advancing cultural change within the organization. Along these lines, for the first time in NNSA's history (believe it or not!) she fully engaged NNSA's labs and plants in "drill down" deliberations on the nature, scope, and priorities of the nuclear weapons work program and the resources required to carry it out.
- She has taken hard decisions to manage risk within the nuclear enterprise by declining to implement recommendations of the Defense Nuclear Facilities Safety Board that do not provide safety benefits commensurate with their high cost.



- Lisa secured an unheard of, nearly 20%, plus up for nuclear modernization in the FY21 budget that was in essence fully sustained by Congress.
- They said it couldn't be done! She killed the abominable, grossly expensive, Mixed Oxide Fuel Fabrication (MOX) program and advanced a much cheaper approach—dilute and dispose—to getting rid of 34 MT of excess plutonium.
- Cooperation and transparency between the DoD and NNSA on the oversight of the U.S. nuclear stockpile is generally viewed by officials in both departments as perhaps being the best it has ever been under Lisa.
- The 2014 Augustine-Mies Report to Congress on NNSA, and many earlier studies and reports, highlighted shortfalls in many of these areas; Lisa Gordon-Hagerty, more than any other NNSA administrator to date, has produced results in addressing them.

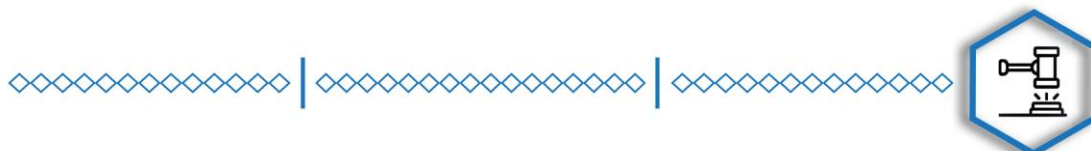
She was fired last November in my view for only doing her job but that's another story that we can leave for the discussion. Leave it to say that the Biden nominee for the next NNSA administrator, still to be determined, will do well if he or she can carry forward the progress achieved by Lisa at NNSA.

Plutonium Pits

Let me turn to plutonium pit manufacture. During the Cold War the U.S. was producing 1000-2000 pits per year some years. Today we can hardly produce any. Recapitalizing U.S. plutonium pit production infrastructure, and increasing pit production capacity, is essential for a modern nuclear deterrent. From day one on the job, Lisa made pit manufacture her number #1 priority and has secured a way ahead on plutonium that has received bipartisan support.

First, we must answer the question: Why “no fewer than 80 pits per year by 2030?” There are three key reasons. Today, with a much smaller stockpile, known requirements for pit production 10-20 years out can be assessed and used to help size needed facilities. U.S. ICBM and SLBM modernization draw attention to two warheads—the W87-1 for GBS and the W93 for Trident D-5 and its follow-on. Each will require newly manufactured plutonium pits—you simply can't get around that. Second, many pits in our stockpile are aging, will soon approach their estimated minimum lifetime, and will need to be replaced. Third, known production needs cannot be the sole sizing criteria for pit capacity. One must include some excess capacity for unknown contingencies including unanticipated technical problems (e.g., pits age out faster than we thought)⁴ or to adverse geopolitical changes (e.g., Russian breakout requiring additional U.S. warheads in response). Thus, 80 pits per year is a

⁴ Work carried out in the early 2000's culminated in a 2006 assessment of minimum pit lifetime to be in the 80-100-year range for what were then seen to be the most important pit failure mechanisms. At that time, a comprehensive work program was recommended to nail down additional uncertainties from other potential failure modes. A recent study by an NNSA advisory board concluded that this work program has not yet reached fruition.



judgement call and not tied to locked-in requirements. Eighty per year, by the way, is at the lower limit of my comfort level.

Today, pit production is done largely at two facilities at Los Alamos. Actual production is carried out in the highly secure PF-4 facility and involves the melting, casting, machining of plutonium pits, and related hazardous operations involving multi-kilogram quantities of plutonium. PF-4 storage capacity must accommodate in the range of hundreds of kilograms of plutonium, both as feed stock and finished pits. Analytical support to pit production—the so-called plutonium analytical chemistry and materials characterization work—has been carried out at the aging Chemistry and Metallurgy Research (CMR) facility and, if it hasn't already, will shortly transition to a new radiation lab. This work is inherently less hazardous because it entails lab analysis involving multi-gram-level, not kilogram-level, quantities of plutonium. Both PF-4 and CMR have been operating for over 40 years, and while safe and secure operations have been the norm and PF-4 seismic upgrades have been achieved, these two facilities do not meet all of today's modern safety standards.

The current plan is to establish 30 pits per year production capacity at Los Alamos National Laboratory's (LANL's) PF-4 by 2026 and, second, to field, at the former MOX facility in South Carolina, an additional capacity of 50 pits per year (for a total of 80 per year) by 2030.

We must not underestimate the technical challenge of building and certifying new plutonium pits for the stockpile. When we last produced pits in quantity in the 1980s, we were able to qualify pit manufacture with underground nuclear tests. Today, we must certify production technologies and processes that, no matter how much we try to tie it to previous processes and technologies, will inevitably have differences. The challenge for stockpile stewardship is to assess that these differences will not degrade pit performance. I am confident, the lab directors are confident, that the stockpile stewardship program can achieve this. But it is by no means a "slam dunk".

Conclusion

The U.S. nuclear arsenal beyond 2030 will not look much different from today's—there will be a Triad but a modern one with life-extended warheads and enhanced NC2. Some U.S. programs will be initiated or bolstered to respond to technological advances or evolutions in deterrence strategies. In taking such steps, the U.S. nuclear posture will continue to meet deterrence needs against any potential adversary. Very importantly, while Russia's aggressive modernization provides context for the U.S. program, it is not the cause of it—because of its aging systems, the U.S. must modernize whether or not Russia does. Lastly, the big uncertainty is, well, uncertainty. We should expect to be surprised and the means to respond to surprise—a robust and responsive nuclear R&D and industrial base—will be essential.



Matthew R. Costlow

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As Deputy Secretary of Defense Kathleen Hicks indicated during remarks at her confirmation hearing, it appears the Department of Defense will begin writing a Nuclear Posture Review at some point in the near future, just as the Clinton, Bush, Obama, and Trump administrations have done previously, albeit in slightly different forms. My esteemed fellow panelists, having been involved in previous Nuclear Posture Reviews, can attest to the many different factors that influence how a Nuclear Posture Review can turn out—with some factors being obvious, like threat perceptions and defense budgets, and other factors perhaps less obvious, such as clashing personalities and organizational clout. When faced with these uncertainties, it is unwise to make bold predictions about the precise policies that the Biden administration will adopt in its Nuclear Posture Review, but the best guide may be to look back at where the Obama and Biden administration ended back in 2016 and early 2017.

Threat Environment

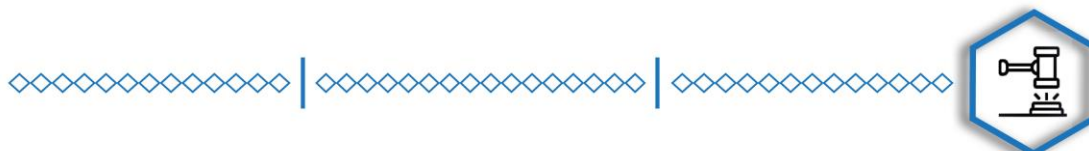
Beginning in 2009, the Obama administration sought a “reset” of the U.S.-Russia relationship, which arguably reached its zenith when both states signed the New START Treaty in 2010.⁵ By 2014, however, the relationship had soured due to Russia’s invasion of Ukraine, plus U.S. diplomats were privately conveying to their Russian counterparts their concerns about a missile system they believed might violate in the Intermediate Range Nuclear Forces (INF) Treaty.⁶ By the next year, 2015, Obama administration officials testified that Russia was once again a serious threat; as one official described, Russia had become “... one of our most pressing and rapidly evolving strategic challenges...”⁷ Soon after, then-Secretary of Defense Ash Carter began emphasizing that the United States was returning to an era of “great power competition” with Russia and China—a competition in which nuclear weapons played a significant role.⁸

⁵ The White House, “U.S.-Russia Relations: ‘Reset’ Fact Sheet,” *ObamaWhiteHouseArchives.gov*, June 24, 2010, available at <https://obamawhitehouse.archives.gov/the-press-office/us-russia-relations-reset-fact-sheet>.

⁶ On the INF Treaty violating system, see, Daniel Coats, “Director of National Intelligence Daniel Coats on Russia’s Intermediate Range Nuclear Forces (INF) Treaty Violation,” *DNI.gov*, November 30, 2018, available at <https://www.dni.gov/index.php/newsroom/speeches-interviews/item/1923-director-of-national-intelligence-daniel-coats-on-russia-s-inf-treaty-violation#:~:text=Earlier%20this%20week%2C%20Director%20of%20violation%20of%20the%20INF%20Treaty.&text=The%20treaty%20banned%20GROUND%20launched.between%20500%20and%205%2C500%20km>.

⁷ Robert Scher, “Statement of Robert Scher, Assistant Secretary of Defense for Strategy, Plans, and Capabilities,” House Armed Services Committee, Subcommittee on Strategic Forces, April 15, 2015, p. 10, available at <https://www.hsdl.org/?abstract&did=794064>.

⁸ Ash Carter, “Remarks by Secretary Carter to troops at Minot Air Force Base, North Dakota,” *Defense.gov*, September 26, 2016, available at <https://www.defense.gov/Newsroom/Transcripts/Transcript/Article/956079/remarks-by-secretary-carter-to-troops-at-minot-air-force-base-north-dakota/>.



By the end of the Obama administration, it was commonplace for U.S. defense officials to tout the importance of U.S. nuclear modernization, as typified by Secretary Carter’s remarks at Minot AFB in September 2016: “America’s nuclear deterrence is the bedrock of our security. And the highest priority mission of the Department of Defense.”⁹ In that same speech, Secretary Carter stated that recent Russian actions “raise serious questions about its leader’s commitment to strategic stability,” while China was “growing its [nuclear] arsenal in both quality and quantity.” And how might nuclear weapons be employed in the future? Secretary Carter explained, “Today, however, it’s a sobering fact that the most likely use of nuclear weapons is not the massive nuclear exchange of the classic Cold War-type, but rather the unwise resort to smaller but still unprecedentedly terrible attacks, for example, by Russia or North Korea to try to coerce a conventionally superior opponent to back off or abandon an ally during a crisis.”¹⁰

In the nearly five years since Carter’s speech, it is evident that the Obama administration’s views of the security environment were largely shared by the Trump administration—that is, nothing in the past five years seems to indicate that the fears of growing nuclear threats were unfounded. Thus, the Biden administration, if it approaches a Nuclear Posture Review from the standpoint of a clear-eyed assessment of the nuclear threats in the world, as the Obama and Trump administrations did, then it will likely see a continued role for U.S. nuclear weapons to deter such threats and assure allies in the face of such challenges. Clearly the Biden administration may share many of the same threat perceptions as the Obama administration in its later years, but this does not necessarily mean that they will adopt the same approach to U.S. nuclear modernization as one of the means to counter those threats.

U.S. Nuclear Modernization

As part of the price for securing Republican support for passing the New START Treaty in the U.S. Senate, the Obama administration committed to modernize the U.S. nuclear arsenal—which at that point was needed across all three legs of the nuclear Triad of land-based intercontinental ballistic missiles (ICBMs), submarines (SSBNs), and bombers—not to mention nuclear command, control, and communication (NC3) and the nuclear infrastructure to produce warheads. At the time, the most controversial nuclear modernization programs were the B61-12 gravity bomb—which consolidated four different B61 types into one variant, and the new air-launched cruise missile—later called the Long-Range Stand Off Weapon (LRSO). One could make a good case that these weapons were controversial simply because they were the first in a series of modernization decisions, not because of any inherently destabilizing characteristic of the weapons. After all, the United States was consolidating four different weapon types into one modern and safe variant with

⁹ Ibid.

¹⁰ Ibid.



the B61-12—thus taking multiple weapon types out of the active U.S. stockpile. With LRSO, the Obama administration made spirited defenses testifying before Congress, arguing in part that the United States was simply replacing a capability it had had since the 1980s—a capability that would retain the deterrent effect of the bomber force, assure allies, and present a limited, prudent option for Presidents to consider should deterrence fail.¹¹

Less controversially, the Obama administration began studies on modernizing ICBMs, replacing Ohio class SSBNs, and developing a new nuclear-capable bomber—and successfully persuaded Congress in most cases to fully fund each effort.

Incredibly, the current U.S. nuclear modernization program can without exaggeration be labelled the “Obama modernization program plus” as the Trump administration added only minor supplements to the modernization efforts it inherited from the Obama administration, namely the W76-2 low-yield warhead for submarine-launched ballistic missiles and the sea-launched cruise missile (SLCM). It is a testament to the adaptable nature of the U.S. nuclear Triad that even as threats shifted in the post-Cold War environment, both the Obama and Trump administrations continued finding value in a diverse set of mutually-reinforcing capabilities within the Triad—and then sought to modernize them, with only minor changes deemed necessary by the Trump administration. Even more remarkably, a number of former senior Obama administration officials endorsed the Trump administration’s supplements to the U.S. nuclear modernization program.¹² The first supplemental program the Trump administration proposed, the W76-2 low-yield warhead, was small in scope and modified only a “small number” of warheads.¹³ The second supplemental program, the SLCM, was reintroducing a capability that the United States had previously, thus not a radical departure from previous policy.

In summary, it is clear that the Biden administration is inheriting a nuclear modernization program, 90% of which began under the Obama administration—and the other 10% which began under the Trump administration has the support of multiple former senior Obama administration officials. Again, it is far from clear that the Biden administration—even if

¹¹ For examples of such defenses, see the testimony from Panel II, U.S. Senate Energy and Water Development Subcommittee Hearing, Senate Appropriations Committee, “Hearing to Review Budget Requirements & Justification for the Nuclear Cruise Missile,” July 13, 2016, available at <https://www.appropriations.senate.gov/hearings/hearing-to-review-budget-requirements-and-justification-for-the-nuclear-cruise-missile>.

¹² See especially, Sandy Winnefeld and James N. Miller, “Bring Back the Nuclear Tomahawks,” *Proceedings*, Vol. 143, No. 5 (May 2017), available at <https://www.usni.org/magazines/proceedings/2017/may/bring-back-nuclear-tomahawks>; and, John R. Harvey, Franklin C. Miller, Keith B. Payne, and Brad R. Roberts, “Continuity and Change in U.S. Nuclear Policy,” *Real Clear Defense*, February 7, 2018, available at https://www.realcleardefense.com/articles/2018/02/07/continuity_and_change_in_us_nuclear_policy_113025.html.

¹³ John Rood, “Statement on the Fielding of the W76-2 Low-Yield Submarine Launched Ballistic Missile Warhead,” *Defense.gov*, February 4, 2020, available at <https://www.defense.gov/Newsroom/Releases/Release/Article/2073532/statement-on-the-fielding-of-the-w76-2-low-yield-submarine-launched-ballistic-m/>.



ideological allies with the Obama administration—will adopt and sustain the current U.S. nuclear modernization program, but if it does, it will sit firmly within the mainstream of past nuclear policies.

U.S. Nuclear Declaratory Policy

Finally, it is useful to comment on the nuclear weapon policy positions that the Obama administration ended on, since those positions affected its views on the number and type and status of nuclear weapons it believed the United States needed, and the Biden administration may find it a useful starting point for its own thinking on the topic.

On declaratory policy, the Obama administration reportedly examined adopting a nuclear “no first use” or “sole purpose” policy in 2016, but ultimately chose not to. According to media reports, multiple U.S. allies including the United Kingdom, France, South Korea, and Japan contacted the Obama administration to express their opposition to a U.S. adoption of a “no first use” policy.¹⁴ And, according to one former senior Obama administration official, this allied opposition included a call from Japanese Prime Minister Abe’s office itself.¹⁵ In addition, other former senior Obama administration defense officials do not currently favor adopting a “no first use” policy.¹⁶

Where to From Here?

While defense commentators regularly play Washington D.C.’s favorite game—extrapolating who gets which policy position as an indicator for future defense policies—it is useful to remember the famous Harry Rowen quote, “The Pentagon is like a log going down the river with 25,000 ants on it, each thinking he’s steering the log.” That is to say, external events have just as much say as internal policy on shaping U.S. nuclear policy as evidenced by the Russo-Ukrainian conflict in 2014 and the Soviet-Afghan conflict in 1979. Both the Obama and Carter administration, respectively, entered office with plans for de-emphasizing nuclear weapons in U.S. nuclear policy, but outside events convinced many executive and defense

¹⁴ See Paul Sonne, Gordon Lubold, and Carol E. Lee, “‘No First Use’ Nuclear Policy Proposal Assailed by U.S. Cabinet Officials, Allies,” *The Wall Street Journal*, August 12, 2016, available at <https://www.wsj.com/articles/no-first-use-nuclear-policyproposal-assailed-by-u-s-cabinet-officials-allies-1471042014>; and, Josh Rogin, “Obama Plans Major Nuclear Policy Changes in Final Months,” *The Washington Post*, July 10, 2016, available at https://www.washingtonpost.com/opinions/global-opinions/obama-plans-major-nuclear-policy-changes-in-his-final-months/2016/07/10/fef3d5ca-4521-11e6-88d0-6adee48be8bc_story.html.

¹⁵ Tomoko Kurokawa, “Determinants of the Nuclear Policy Options in the Obama Administration: An Interview with Jon Wolfsthal,” *Journal for Peace and Nuclear Disarmament*, Vol. 1, No. 2 (2018), p. 503.

¹⁶ See especially, Brad Roberts, “Debating Nuclear No-First Use, Again,” *Survival*, Vol. 61, No. 3 (2019), pp. 39-56; James N. Miller, “No to No First Use – For Now,” *Bulletin of the Atomic Scientists*, Vol. 76, No. 1 (2020), pp. 8-13; and John R. Harvey, “Assessing the Risks of a Nuclear ‘No First Use’ Policy,” *War on the Rocks*, July 5, 2019, available at <https://warontherocks.com/2019/07/assessing-the-risks-of-a-nuclear-no-first-use-policy/>.



officials that modernizing the U.S. nuclear arsenal was a prudent response to external threats.

Given this possibility, if not likelihood, that unforeseen external events will shape the Biden administration's nuclear policies, where can we reasonably expect U.S. nuclear policy to go in 2021 and beyond?

The Biden team will likely face pressure from the more progressive side of the Democratic Party to issue a "no first use" pledge and perhaps make unilateral cuts to the U.S. nuclear force.¹⁷ These ideas and others are manifest in documents like the "Alternative Nuclear Posture Review," published by the organization Global Zero, and authored in part by the late Bruce G. Blair.¹⁸ Reports such as these are out of the mainstream of U.S. nuclear policy as is clear from previous Republican and Democratic administrations, and Congresses, going back into the Cold War—nevertheless, they represent a vocal minority.

On the other hand, there is another faction of the Democrat Party, in my estimation a plurality, that is familiar with nuclear weapon issues and more or less content with the current U.S. nuclear modernization program and will likely follow President Biden's lead if his administration supports it. For example, Senator Tester of Montana, a firm supporter of nuclear modernization, was recently named to be the Chairman of the powerful Senate Defense Appropriations subcommittee.

The final faction of the Democratic party are those members who are not well versed in nuclear weapon issues and can be persuaded one way or the other, and its these members that most independent think tanks and activist groups are trying to reach. For instance, the most recent report by George Perkovich and Pranay Vaddi "Proportionate Deterrence: A Model Nuclear Posture Review," seems aimed at the persuadable middle who may be wary of radical changes to U.S. nuclear policy and posture yet are inclined to make a minor or token changes to signal their commitment to long-term nuclear disarmament.¹⁹

Which faction wins out, what events influence everyone, and what unforeseen "X factor" enters the debate remains to be seen, but it appears the Biden administration will face a threat environment that is not much better, and may be worse, than that which faced the

¹⁷ See, for example, a letter signed by Senators Markey, Feinstein, Franken, Boxer, Merkley, Sanders, Warren, Brown, Leahy, and Wyden to then-President Obama, July 20, 2016, which advocated for a "no first use" policy and cancelling the LRSO. Available at <https://www.markey.senate.gov/imo/media/doc/7-20-16%20EJM%20Letter%20to%20President%20Obama%20on%20Nuclear%20Weapons.pdf>.

¹⁸ Bruce G. Blair, with Jessica Sleight and Emma Claire Foley, *The End of Nuclear Warfighting: Moving to a Deterrence-Only Posture* (Washington, D.C.: Global Zero, September 2018), available at <https://www.globalzero.org/wp-content/uploads/2019/02/ANPR-Final.pdf>.

¹⁹ George Perkovich and Pranay Vaddi, *Proportionate Deterrence: A Model Nuclear Posture Review* (Washington, D.C.: Carnegie Endowment for International Peace, 2021), available at https://carnegieendowment.org/files/Perkovich_Vaddi_NPR_full1.pdf.



Obama administration—making the possible argument that international conditions now allow for a change in policy, like adopting a “no first use” policy, or a change in posture, such as eliminating LRSO, a much more difficult case to make. In addition, the Biden administration’s early focus on assuring U.S. allies and partners—who also face an increasingly dangerous threat environment –complicates any potential major change in policy or posture, as allies and partners have reportedly lobbied vigorously against such changes in the past.

The one long term trend to watch, however, is the increasing cost of the U.S. nuclear modernization—a cost that was anticipated long ago but is now becoming a greater reality as programs move from paper studies to beginning to production. The costs of nuclear modernization should never be explained in a vacuum, however, as many of those who favor disarmament tend to do—citing the figure that it may cost upwards of \$1 trillion dollars to modernize the U.S. nuclear triad, while neglecting to mention that that cost is spread over 30 years, the much lower cost of nuclear weapons compared to conventional weapons in the overall defense budget, the value of nuclear weapons that last until the 2070s and 2080s in a dynamic threat environment, etc.

As always, the money that the Biden administration proposes to Congress for funding the U.S. nuclear modernization program in its budget will speak louder than any speech or rhetoric as to its true intentions. Historically, U.S. nuclear policy is not prone to radical departures from previous policies—usually the changes that do occur are more evolutionary than revolutionary. This dynamic has served the United States well in the past, and now the Biden administration must consider whether it should continue to do so in the future.

Robert Soofer

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No discussion of nuclear modernization is complete without a look at the relationship between arms control and modernization. Are they compatible? Are they at odds? Can you have one without the other? This presentation begins with a broad discussion of the range of views, then narrows to some specific caveats and recommendations for an approach incorporating both arms control and nuclear modernization.

Three Views

There are a range of views regarding the relationship between arms control and nuclear modernization. At the risk of some oversimplification, we can group these views into three categories: Disarmers, Arms Control Cynics, and Deterrence Realists.



The **Disarmer** believes nuclear modernization is the antithesis of arms control. Modernizing nuclear forces demonstrates a lack of good faith in negotiations; it is a waste of money; stokes the arms race; and is contrary to the goal of disarmament. This view discounts the leverage of warm production lines because it assumes the parties are already self-interested in reducing arsenals—no leverage is needed. Most important, this view holds that refraining from nuclear modernization is necessary in order to set a disarmament example for other states to follow, which is a prerequisite for arms control and nuclear disarmament.

The main critique of this view is that it ignores reality: Russia, China, North Korea and other nuclear states have been expanding their nuclear capabilities despite U.S. restraint. As former Obama defense secretary Ashton Carter observes, “During the past 25 years, the United States has made no major new investments in its nuclear forces, yet other countries have conducted vigorous buildups. This history does not support the contention that U.S. investments fuel the nuclear programs of others.”²⁰

The **Arms Control Cynic** is at the other end of the spectrum. The central tenets of this approach are that the United States should not rely on arms control for its security; that arms control becomes a substitute for making the hard and difficult decisions to modernize our aging nuclear forces; and that arms control treaties constrain U.S. freedom of action in dealing with the growing Russian and Chinese dangers. This view remains worried that ever lower numbers of nuclear forces pose dangers for a survivable U.S. nuclear deterrent and messages to allies that we are less likely to extend the nuclear umbrella on their behalf.

The critique of this approach is that it ignores the difficulty of gaining support for a build-up of U.S. nuclear forces in absence of arms control, especially in the post-cold war era. It assumes the President and Congress will take advantage of the freedom of action granted by the lack of arms control treaty restraints. History, again, suggests otherwise. Just look at the difficulty the Trump administration had in deploying the low yield SLBM warhead and in pursuing a new nuclear sea-launched cruise missile—both of which had no New START treaty or arms control implications.

Congress is unlikely to support new nuclear programs in the absence of arms control. Speaking to Trump Administration witnesses, Senator Menendez, the Democratic Chairman of the Senate Foreign Relations Committee, had this to say: “I also want to remind the administration that bipartisan support for nuclear modernization is tied to maintaining an arms control process that controls and seeks to reduce Russian nuclear forces, which inevitably means promoting military- and fiscally-responsible policies on ourselves. We are not interested in writing blank checks for a nuclear arms race with Russia. And we don’t

²⁰ Ash Carter, “Evaluating the Nuclear Posture Review,” Harvard Kennedy School Belfer Center Newsletter, Spring 2018, p. 5, available at <https://www.belfercenter.org/sites/default/files/files/publication/Spring%202018%20Newsletter.pdf>.



want to step off our current path of stability to wander again down an uncertain road filled with potentially dire consequences.”²¹

Likewise, Brian McKeon, a senior advisor the President Biden and understood to be nominated for Deputy Secretary of State, observed that, “Supporters of arms control will surely be reluctant to buy into a long-term modernization plan that does not involve a realistic plan for mutual restraint between the two countries with the largest nuclear arsenals.”²²

Finally, we come to the **Deterrence Realists**. This camp understands nuclear deterrence and arms control to be twin pillars in the nation’s approach to deterring nuclear dangers and reducing nuclear threats. This has been the traditional approach of the United States since the dawn of the nuclear age.

For example, even while the Eisenhower administration was building the U.S. nuclear arsenal from 1,000 to 20,000 weapons it was pursuing the Atoms for Peace initiative and the precursory to the Open Skies Treaty; the Nixon Administration began development of the MX ICBM, the Trident SLBM and the B-1 bomber even while it concluded the ABM Treaty and the SALT Agreement; the Clinton Administration was known for its “lead but hedge” policy—lead in nuclear reductions but hedge against an uncertain future; the George W. Bush Administration pulled out of the ABM Treaty, yet achieved a two-thirds reduction in deployed nuclear weapons under the Moscow Treaty; President Obama negotiated the New START treaty, yet provided a commitment to modernize each leg of the nuclear triad; and finally, the Trump Administration continued implementation of the triad modernization—proposing the addition of a nuclear sea-launched cruise missile—yet also pursued trilateral nuclear arms control with Russia and China.

The Deterrence Realist also appreciates the **political nature of arms control**, both in its domestic and international aspect. The U.S. must be seen to have a viable alternative to the disarmament narrative. The deterrence realist hopes that the really harmful effects of arms control may be limited through effective negotiation, mutual and balanced reductions, and verification and enforcement of agreements. Most important, the Deterrence Realist understands that at lower numbers of nuclear weapons, the remaining force must be, without a doubt, survivable, ready, sufficiently diverse in delivery systems and yields to

²¹ Opening statement of Sen. Robert Menendez in “Status of U.S.-Russia Arms Control Efforts,” *Hearing Before the Committee on Foreign Relations, United States Senate, One Hundred Fifteenth Congress, Second Session*, September 18, 2018, p.4, available at <https://www.foreign.senate.gov/imo/media/doc/09%2018%2018%20Status%20of%20US%20Russia%20Arms%20Control%20Efforts.pdf>.

²² Brian McKeon, “Recalling the Senate Review of New START,” *Arms Control Today*, Vol. 49, October 2019, available at <https://www.armscontrol.org/act/2019-10/features/recalling-senate-review-new-start>.



provide the U.S. president the flexibility with which to tailor deterrence in a wide range of circumstances, and to hedge technical and geopolitical uncertainty.

The Early Biden Approach

We must wait to see which of these approaches will be adopted by the new administration. No doubt, there will be tension between the disarmers and the deterrence realists, just as there was in the Obama Administration.

Early signs are encouraging. It may have been a mistake to extend the New START treaty fully for five years; an incremental extension, which the Russians were open to, would have provided leverage to pursue the next round of negotiations.

Yet, in announcing the President's decision to extend the New START Treaty by five years, Secretary of State Blinken noted that: "The New START Treaty is only the beginning of efforts to address 21st century challenges; the "U.S. will use the time provided by a five year extension of the New START treaty to pursue with the Russian Federation, in consultation with Congress and partners, arms control that addresses all of its nuclear weapons"; "we will also pursue arms control to reduce the dangers from China's modern and growing nuclear arsenal"; and "we remain clear eyed about the challenges that Russia poses to the United States and the world."

Pursuing all Russian nuclear weapons as well as arms control to address the nuclear dangers posed by China builds on the Trump administration approach, aligns with the traditional deterrence realist approach, and should receive bipartisan support.

Five Caveats

First, U.S. and allied security will depend not on any particular treaty, but on whether nuclear modernization proceeds over the next decade and whether we maintain survivable and flexible nuclear forces with a range of delivery systems and yields. This must be the organizing principle. All other considerations are subordinate to doing what it takes to maintain common ground on nuclear modernization and maintaining forward based nuclear weapons. This entails support for arms control.

Second, a less obvious danger to the future of U.S. and allied nuclear deterrence capability is the international nuclear ban movement, codified in the Ban Treaty that has recently been ratified by 50 nations. Fortunately, our NATO and Asian allies have not supported the treaty, but there will be pressures to do so. There was a close scare in Belgium last year.

Recall that politics is local. If politicians don't have an alternative to the ban treaty, then they could lose their local elections. This could oblige them to support the ban movement when otherwise they understand the importance of nuclear deterrence. This is problematic. If one



NATO country joins the ban treaty, this could trigger other parliaments in other countries to do the same. To be sure, this would have a more profound negative effect on nuclear deterrence than any shortcomings of the New START treaty. Arms control poses a solution, and alternative to the Ban Treaty. In this way, it supports nuclear modernization and nuclear alliances.

Third, if and when we pursue arms control negotiations with Russia, we must avoid the danger of agreeing only to further strategic force reductions just because they are easier to achieve in a New START follow on agreement. We must address the disparity in Russian and U.S. non-strategic nuclear forces. This notion should not be in dispute, yet there are voices in the disarmament community calling for lower New START force levels as an initial step.

As a reminder, Henry Kissinger noted in his 2010 congressional testimony that New START is “probably the last agreement on strategic arms that can be made without taking tactical nuclear weapons into account. It is also approaching the end of what can be achieved by bilateral negotiations on the subject between the U.S. and Russia. Growing arsenals and proliferation will soon impose a multilateral context.”²³ To which SFRC Chairman Senator John Kerry replied, “With respect to the tactical nuclear weapons, there is, I think, a complete agreement in this committee and in the administration that that is the next step, that we cannot proceed further, in a sense.”²⁴

Fourth, disarmers need to understand that nuclear force modernization facilitates arms control, because at lower force levels, the survivability and readiness of the remaining force provides a hedge against changes in the strategic environment, adversary breakout, or cheating. As then Vice President Biden observed, investments in the nuclear weapons complex are “not only consistent with our nonproliferation agenda; they are essential to it. Guaranteeing our stockpile, coupled with broader research and development efforts, allows us to pursue deep nuclear reductions without compromising our security.”²⁵

Fifth, arms control without modernization will fail because the U.S. will have no leverage in negotiations. Warm production lines for ICBMs, LRSO, bombers and submarines provide an incentive for Russians to negotiate. Without such leverage and with a five-year extension to NST, the Russians have every incentive to maintain the status quo where the U.S. limits its strategic forces and Russia continues to expand its non-strategic nuclear forces. Likewise,

²³ Prepared statement of Henry Kissinger in “The New START Treaty,” *Hearings Before the Committee on Foreign Relations, United States Senate, One Hundred Eleventh Congress, Second Session*, May 25, 2010, p. 170, available at [https://www.foreign.senate.gov/imo/media/doc/042910 to 071510 Transcript The%20New%20Start%20Treaty%20TD%20111%20053.pdf](https://www.foreign.senate.gov/imo/media/doc/042910%20to%20071510%20Transcript%20The%20New%20Start%20Treaty%20TD%20111%20053.pdf).

²⁴ Senator John Kerry in *Ibid*, p. 172.

²⁵ “Remarks of Vice President Biden at National Defense University-As Prepared for Delivery,” February 18, 2010, available at <https://obamawhitehouse.archives.gov/the-press-office/remarks-vice-president-biden-national-defense-university>.



U.S. nuclear modernization and the potential to outpace China provides an incentive for China to come to the table. Eliminating a leg of the Triad makes it easier for China to contemplate parity with the U.S. and Russia. If arms control with China fails, then nuclear modernization will be all the more important as China grows its nuclear forces.

Conclusion

The failure to follow-through with the Obama-Trump nuclear modernization plan could have the following negative consequences:

- The nuclear balance of forces will continue to deteriorate as Russia and China expand their nuclear arsenals.
- The disparity between the U.S. and Russia/China will call into question the credibility of U.S. nuclear assurances, leading to less coherent alliances and perhaps prompting nuclear proliferation by our allies. Failure to modernize will message allies that the U.S. is more interested in disarmament than deterrence.
- U.S. nuclear arms control negotiators will have little leverage, while the lack of U.S. nuclear arms control initiatives will bolster the nuclear ban movement.
- Reneging on President Obama's commitment to Congress to modernize each leg of the nuclear triad in return for the Senate's advice and consent to ratify New START will unnecessarily strain relations between Republicans in Congress and the President. This will undermine the prospects for arms control and other means for reducing nuclear dangers.

