

A REPORT OF THE CSIS
NEXT GENERATION WORKING
GROUP ON U.S.-RUSSIAN
ARMS CONTROL

Beyond New START

ADVANCING U.S. NATIONAL SECURITY THROUGH ARMS CONTROL
WITH RUSSIA

Cochairs

James M. Acton
Michael S. Gerson

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CSIS | CENTER FOR STRATEGIC &
INTERNATIONAL STUDIES

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Cover: President Barack Obama, center-left, and President Dmitry Medvedev of Russia, center-right, attend the expanded delegation bilateral meeting at Prague Castle in Prague, Czech Republic, April 8, 2010. Official White House photo by Pete Souza, <http://www.flickr.com/photos/whitehouse/4503430059/in/set-72157623682876539/>.

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THE NEXT GENERATION WORKING GROUP

In July 2010, the Project on Nuclear Issues (PONI) at CSIS convened the Next Generation Working Group (NGWG) to study the next steps in U.S.-Russian nuclear arms control. The NGWG consists of 14 leading young professionals from academia, government, think tanks and non-governmental organizations with experience in arms control and other nuclear issues. All working group members are participating in a purely personal capacity. As such, the views expressed in this report are exclusively the personal views of working group members and do not necessarily reflect the official positions of any organization to which they are affiliated.

The working group met regularly for more than nine months, exploring issues and obstacles, developing potential solutions, and reaching a final consensus. Members visited Moscow, Sandia National Laboratories (SNL), Los Alamos National Laboratory (LANL), and the Nevada National Security Site (NNSS) as part of the study. All working group members endorse this report's general policy thrust and judgments, though not necessarily every finding and recommendation. Each working group member was offered the opportunity to express any dissenting views. None chose to do so.

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EXECUTIVE SUMMARY

U.S.-Russian arms control continues to be an important tool for advancing the national security of the United States as well as that of its allies. Since Russia's strategic forces remain, for the foreseeable future, one of the few existential threats to the United States, enhancing strategic stability through arms control—and thus further reducing the probability of nuclear use—should remain an important U.S. goal.

The United States and Russia enter the next round of arms control negotiations with divergent capabilities, interests, and objectives. Washington is principally interested in limiting Moscow's nuclear forces, in particular its tactical nuclear weapons (TNWs). Moscow, by contrast, is primarily interested in limiting U.S. nonnuclear capabilities—especially ballistic missile defense (BMD) systems and conventional prompt global strike (CPGS) weapons. Despite repeated U.S. assurances that these systems are not focused on Russia, Moscow remains concerned that they could undermine its strategic deterrent. Consequently, success in the next round of negotiations will require each side to adequately address the other's concerns.

The Next Generation Working Group (NGWG) believes that the United States should seek the following from further U.S.-Russian arms control:

- A single limit on all warheads (strategic, tactical, deployed, and nondeployed);
- A limit on operationally deployed strategic warheads and launchers;
- A ban on the deployment of new types of silo-based intercontinental ballistic missiles (ICBMs) armed with multiple independently targetable reentry vehicles (MIRVs);
- An enhanced verification regime for strategic forces; and
- A new comprehensive verification regime for all warheads.

To achieve these goals, the United States must address Russia's concerns about BMD and CPGS. To this end, the NGWG recommends that the United States should

- Continue to pursue mutually beneficial BMD cooperation with Russia;
- Focus, to the extent practical, on BMD capabilities and deployment locations that help demonstrate to Russia that these systems will not be capable of undermining its assured second-strike capability;
- Deliberately and publicly tie the size and technological sophistication of U.S. BMD capabilities—especially the deployment of boost-phase systems—to the evolution of the missile threat from Iran, North Korea, and other states of concern;

- Establish with Russia a formal mechanism to share intelligence and review assessments of ballistic missile threats on an ongoing basis; and
- Develop a formal transparency and inspection regime with Russia on CPGS as a confidence-building measure.

In addition, the NGWG does not oppose the principle of counting CPGS systems toward the central limits of a future arms control treaty, but there is disagreement within the working group on how high those limits would have to be to accommodate current and future U.S. security requirements.

The next round of arms control will involve a wide number of highly complex and politically charged issues. Rather than attempting a single overall negotiation, the NGWG recommends that negotiations be broken down into multiple tracks conducted in parallel. The Arms Control and International Security Working Group of the U.S.-Russia Bilateral Presidential Commission provides an excellent venue for scoping out the issues and planning formal negotiations. Our recommendation is that formal negotiations between the United States and Russia be conducted in three separate tracks:

- Strategic, tactical, and nondeployed warheads
- Strategic stability (conventional prompt global strike and force structure)
- Ballistic missile defenses

The NGWG believes that the goal of the third track should be to identify pathways and mechanisms for cooperation and confidence-building on BMD, *not* to develop a formal treaty that would place meaningful limits on U.S. missile defenses. The goal of each of the other parallel tracks should be a legally binding agreement dealing with a subset of issues.

The overarching goal of negotiating formal and legally binding arms control agreements should not prejudice or overshadow more informal transparency and confidence-building measures that can be developed and implemented through the arms control process. Such measures could be stepping-stones to more formal arms control agreements and would be useful deliverables in their own right. The United States and Russia should, for example, focus on cooperatively developing a verification system for a single limit on all warheads. As part of this objective, the United States and Russia should

- Develop procedures to build confidence in the implementation of the 1991 and 1992 Presidential Nuclear Initiatives (PNIs) by verifying the *absence* of tactical nuclear weapons at facilities where they used to be stored;
- Declare the number of warheads at centralized storage sites and agree to conduct reciprocal inspections for verification; and
- Consolidate tactical and nondeployed strategic warheads at a few centralized sites.

Informal transparency, confidence-building, and cooperation could also be used to help address Russia's concerns about BMD. An important component of this would be to complete the U.S.-Russian and NATO-Russian joint assessments of ballistic missile threats as well as the NATO-Russian framework agreement on BMD cooperation. Subsequent U.S.-Russian cooperation could focus on shared early warning, about which both states have already expressed an interest.

Finally, if the United States is to agree to a single limit on all warheads at a level requiring significant cuts in its stockpile of nondeployed warheads—and we believe it should—it must develop an alternative strategy for mitigating geopolitical and technical risk. Building upon ongoing efforts to revitalize the United States’ nuclear weapons production infrastructure, the United States should move toward a model that we term “science-based understanding and engineering-based sustainment” (SUES). SUES would create and use a “trickle” production capability to “refabricate” U.S. nuclear warheads on a continual basis. Nuclear explosive packages would be manufactured according to existing, trusted designs, while improvements could be made to nonnuclear subsystems that improve the safety and security of warheads. Refabricated warheads would be introduced into the stockpile to replace older warheads on a one-for-one basis. By enhancing confidence in the reliability of the stockpile and ensuring the continued viability of all skill sets in the U.S. nuclear weapons complex, SUES would enable a shift away from a large stockpile of nondeployed warheads for risk mitigation and thus allow significant reductions in the nondeployed stockpile in the next round of arms control.



BEYOND NEW START

ADVANCING U.S. NATIONAL SECURITY THROUGH ARMS CONTROL WITH RUSSIA

Introduction

With the entry into force of the New Strategic Arms Reduction Treaty (New START), the U.S. and Russian governments are turning their attention to the next steps in arms control. In the United States, there is broad agreement in both the executive branch and the Senate that further arms control could be in the U.S. national interest. As a condition to providing its advice and consent to the ratification of New START, the U.S. Senate required the president to certify that

the United States will seek to initiate, following consultation with NATO allies but not later than one year after the entry into force of the New START Treaty, negotiations with the Russian Federation on an agreement to address the disparity between the nonstrategic (tactical) nuclear weapons stockpiles of the Russian Federation and of the United States and to secure and reduce tactical nuclear weapons in a verifiable manner.¹

This requirement is consistent with a long-standing bipartisan interest in arms control as well as with the Obama administration's own ambitions. In its 2010 Nuclear Posture Review (NPR) report, the administration identified the goal of pursuing follow-on reductions to New START that are "broader in scope than previous bilateral agreements, addressing all the nuclear weapons of the two countries, not just deployed strategic nuclear weapons."²

The Russian government has also expressed interest, *in principle*, in further arms reductions. On April 1, 2009, in a joint statement with President Barack Obama, President Dmitry Medvedev committed Russia to "pursue new and verifiable reductions in our strategic offensive arsenals in a step-by-step process, beginning by replacing the Strategic Arms Reduction Treaty I (START I) with a new, legally-binding treaty."³

In practice, however, Moscow appears reluctant to engage in further arms control. Russia is increasingly concerned about U.S. *conventional* capabilities and their effect on its security. Its most acute concern is that future ballistic missile defense deployments might undermine its nuclear deterrent. However, it has also expressed concerns about high-precision conventional weapons, the conventional balance in Europe, and the weaponization of space. Moscow has repeatedly emphasized that further progress in nuclear arms control will be contingent upon the United States addressing these concerns. Indeed, Russia has linked progress on tactical nuclear weapons, a key

1. U.S. Senate, *Resolution of Advice and Consent to Ratification of the New START Treaty*, December 22, 2010, para. (a).(12).(A).(i).

2. U.S. Department of Defense, *Nuclear Posture Review Report*, April 2010, 30.

3. America.gov Archive, Joint Statement by President Obama and President Medvedev, April 1, 2009, <http://www.america.gov/st/texttransenglish/2009/April/20090401125216xjsnommis0.8078381.html>.

U.S. priority in the next round, to progress in resolving its concerns about U.S. conventional capabilities. For instance, the Russian Duma has indicated that

possible reductions and limitations on *nonstrategic* nuclear weapons should be considered in conjunction with other problems in the sphere of arms control, including deployment of missile defense systems, plans to establish and deploy nonnuclear strategic systems, the danger of space militarization, and the existing qualitative and quantitative imbalance of conventional forces [italics added].⁴

While Russia is principally interested in limiting U.S. conventional capabilities that it believes could threaten its strategic deterrent, it is also interested in curtailing the United States' "upload potential"—that is, the U.S. ability to augment its force of deployed strategic warheads relatively quickly by uploading nondeployed strategic warheads onto delivery vehicles that, to ensure compliance with New START, are loaded with fewer warheads than they can carry.

The United States and Russia therefore enter the next round of arms control negotiations with highly divergent objectives: Washington is principally interested in Moscow's nuclear forces; Moscow's main interest is in U.S. nonnuclear capabilities—ballistic missile defense in particular. Although this asymmetry is not new, it is of an unprecedented magnitude and will significantly complicate the next round of negotiations. Success will require considerable ingenuity and persistence. Nonetheless, in spite of their many differences, the United States and Russia also have some fundamental interests in common, of which the most important is reducing the risk of nuclear war. These shared interests should create strong incentives for cooperation.

This report offers the recommendations of the Next Generation Working Group (NGWG) for the next round of U.S.-Russian arms control. It argues why effectively verifiable arms control is in the U.S. national interest; maps out the asymmetry in the interests, objectives, and capabilities of the United States and Russia; and offers suggestions for navigating this array of obstacles. Recognizing that much will inevitably depend on the outcome of a challenging series of negotiations, this report also pays attention to the process of arms control.

We do not presuppose that the next round of arms control must culminate in a single treaty encompassing all salient issues. It might result in a number of narrower agreements. Moreover, while the United States and Russia should seek to negotiate legally binding agreements on some issues, others might be better managed more informally. We believe that negotiators should take a pragmatic approach and pursue promising opportunities—whether for informal cooperation or for formal agreements—as and when they arise.

As part of our analysis of and recommendations for the next round, we also discuss management of the U.S. nuclear weapons stockpile. The United States maintains a large stockpile of nondeployed strategic warheads. These weapons are retained to mitigate the risk of either a systemic technical failure in any type of warhead that it currently deploys or a significant deterioration in the international security environment. For the United States to make significant cuts in this portion of its nondeployed stockpile, an alternative risk mitigation strategy will be required. This report proposes such an alternative.

In recent months, there has been discussion about whether the next round of arms control should be multilateral, involving China, France, and the United Kingdom as well as the United

4. NGWG translation. Original Russian statement available at http://www.szrf.ru/doc.phtml?op=1&nb=00_00&year=2011&div_id=4&iss_id=276&doc_id=34975.

States and Russia. Certainly, both the United States and Russia have an interest in eventually bringing other states into the arms control process, and, indeed, there is much that France, China, and the United Kingdom could do now to contribute. For example, these three states could agree voluntarily to conduct a data exchange similar to that already implemented by the United States and Russia under New START.

That said, given the much greater size and sophistication of the U.S. and Russian nuclear arsenals compared with those of the other nuclear-armed states, the NGWG believes that there is space for at least one further round of formal bilateral negotiations before U.S. and Russian security interests require the involvement of others. Moreover, whatever the challenges of bilateral arms control—and, as we highlight below, they are considerable—they are still significantly smaller than the challenges of trying to balance the interests of five states in multilateral negotiations.

The Value and Objectives of U.S.-Russian Arms Control

There is a long-standing bipartisan interest in U.S.-Russian arms control that now stretches back over four decades. Yet, as the negotiation, signing, and ratification of New START demonstrated, there is also significant debate within the U.S. defense and foreign policy communities about its continued utility in the current and emerging international security environment. The NGWG believes that further U.S.-Russian arms control is an important and worthwhile undertaking. We do not, however, advocate arms control merely for arms control's sake. It is not an end in itself. Rather, the objective of arms control with Russia is to enhance U.S. national security as well as that of its allies. Arms control negotiations and agreements should be designed and assessed with this central goal in mind.

The Enduring Value of U.S.-Russian Arms Control

Arms control can enhance U.S. national security in several ways. First, and most important, it is a valuable tool for maintaining and strengthening strategic stability between the United States and Russia. There are two components of strategic stability—arms race stability and crisis stability.⁵ The NGWG defines arms race stability as a condition in which neither side has or perceives an incentive to build up its nuclear arsenal. We define crisis stability as an enduring condition in which neither the United States nor Russia has or perceives an incentive to use nuclear weapons out of the fear that delay might lead to the other side gaining an advantage by using nuclear weapons first. While the chances of a nuclear conflict between the United States and Russia are extremely low, its consequences would be catastrophic. Because Russia's nuclear arsenal remains, for the foreseeable future, one of the few existential threats to the United States, further reducing the probability of nuclear use by enhancing strategic stability through arms control remains an important U.S. objective.

Throughout the nuclear age, the goal of stable strategic relations between the United States and Russia (and before that the Soviet Union) has received strong bipartisan support. As President George H.W. Bush described in his 1991 submittal letter of START to the Senate, “The fundamental premise of START is that, despite significant political differences, the United States and

5. Within our definition, crisis stability includes, but is broader than, first-strike stability.

the Soviet Union have a common interest in . . . enhancing strategic stability.” More recently, the Obama administration’s Nuclear Posture Review report accorded strategic stability with Russia a high priority.

Arms control can contribute to strategic stability in two key ways. First, it can be used to build and maintain confidence in the survivability of each side’s nuclear forces. Under current conditions, a critical component of strategic stability between the United States and Russia is mutual confidence that both sides’ forces are sufficiently survivable that neither could gain a meaningful advantage by striking first. A lack of confidence in either Washington or Moscow could weaken U.S. security by creating incentives for arms buildups; by opening up possibilities for miscommunication and miscalculation, especially regarding the perceived intent of a nuclear buildup; by exacerbating geopolitical tensions; and by potentially generating preemptive pressures in a severe crisis or conflict out of the fear—whether real or imagined—of an impending first strike. By placing constraints on certain U.S. and Russian capabilities and by privileging others, arms control can be used to encourage and codify force structures and deployment patterns that favor survivability and an assured second-strike capability.

In addition, arms control efforts are not limited to treaty-mandated constraints. They also include more informal confidence-building measures that can contribute to strategic stability. As we detail below, arms control can be used to build confidence that U.S. programs of concern to Moscow—including ballistic missile defenses and high-precision conventional weapons—do not, in fact, pose a threat to Russia’s strategic deterrent.

Second, arms control can enhance appropriate transparency into each side’s nuclear forces. Appropriate transparency can make a significant contribution to enduring strategic stability. Knowledge of the size, composition, and attributes of the other state’s strategic forces, as well as an understanding of the future trajectory of that force, provides an important degree of predictability in U.S.-Russian nuclear relations. Such predictability enhances stability by counteracting the tendency to base force planning on worst-case assumptions.

Given the continued opacity of Russia’s strategic modernization, the transparency created by arms control is considerably more useful to the United States than it is to Russia. Indeed, one of the most important ways that New START enhances U.S. national security is by creating new inspection provisions to preserve the essential transparency that had been temporarily lost with the expiration of START I. While the New START verification regime will be in force for the next decade, it is in the U.S. interest to ensure that a successor is in place well before New START expires to avoid another gap in transparency.

Beyond the central objective of enhancing strategic stability, arms control is also a valuable tool for maintaining and strengthening broader U.S.-Russian relations. There is great value in the arms control process—the long, occasionally contentious series of meetings, discussions, and bargaining that occurs during the course of negotiations. This process provides a forum for Washington and Moscow to learn more about each other’s views, better understand each other’s strategic culture and perspectives, and discuss other important issues of mutual interest. New START, for example, played an important role in cementing the “reset” in U.S.-Russian relations, which in turn appears to have contributed to Moscow’s increased support for U.S. objectives in a number of other areas, including support for United Nations (UN) sanctions on Iran and allowing the United States to transit cargo through Russia to Afghanistan.

U.S.-Russian arms control may also play a useful role in enhancing nonproliferation efforts. While bilateral arms control agreements—and individual U.S. or Russian decisions on nuclear weapons—are unlikely to have a direct effect on the nuclear choices of countries that have violated their nonproliferation undertakings (such as Iran and North Korea), they may help to garner greater international support for nonproliferation initiatives.

Many of the measures that are widely seen as being necessary to enhance the nonproliferation regime—tougher sanctions on proliferators, tighter export controls, and strengthened safeguards on states’ nuclear programs—require broad support among nonnuclear weapon states party to the Nuclear Nonproliferation Treaty (NPT) to implement.

However, many nonnuclear weapons states, particularly members of the Non-Aligned Movement (NAM), have been unwilling to provide substantial support to these efforts, arguing the United States and Russia have not done enough to fulfill their commitment to Article VI of the NPT, which obliges all state parties “to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a Treaty on general and complete disarmament under strict and effective international control.” While some members of the NGWG are skeptical that U.S. and Russian progress toward fulfilling Article VI is a primary factor in countries’ decisions whether to support nuclear nonproliferation efforts, others believe that U.S.-Russian arms control could help address this complaint and hence bolster the nonproliferation regime.

More controversial is whether the eventual elimination of nuclear weapons—an objective articulated by President Obama—should be a goal of U.S. policy. The NGWG is divided about whether the pursuit of global nuclear abolition is in the U.S. national interest. However, we are in full agreement that valuable near- and medium-term national security objectives can be advanced through further U.S.-Russian arms control and that the next round of negotiations can and should be pursued without coming to an agreement on the feasibility or desirability of pursuing abolition.

Additional Benefits of the Next Round of Arms Control

With the exception of the Intermediate-Range Nuclear Forces (INF) Treaty, U.S.-Russian agreements on offensive nuclear arms have always focused on strategic systems. “Strategic” and “tactical” systems are usually distinguished on the basis of range. This distinction, however, is somewhat arbitrary—any use of a nuclear weapon, whatever the range of the delivery system, would have strategic consequences. Indeed, there is now significant bipartisan interest in the United States in including tactical nuclear weapons (TNWs) in the next round of U.S.-Russian arms control.

According to publicly available information, Russia possesses and deploys a considerably larger number of TNWs than the United States. In addition to greater numbers, Russia also has more diversity in weapon systems. Whereas the United States is believed to currently maintain only one type of TNW—gravity bombs delivered by land-based aircraft—Russia’s TNW arsenal, by contrast, is believed to include gravity bombs (deliverable by land- and sea-based aircraft), cruise missiles, air defense systems, antisubmarine weapons, surface-to-air and air-to-surface missiles, depth bombs, and torpedoes.⁶

6. For estimates of the U.S. and Russian TNW arsenals, see Robert S. Norris and Hans M. Kristensen, “U.S. Nuclear Forces, 2011,” *Bulletin of the Atomic Scientists* 67, no. 2 (2011): 74; and Norris and Kristensen, “Russian Nuclear Forces, 2011,” *Bulletin of the Atomic Scientists* 67, no. 3 (2011): 67–74.

Over the last few years, both states have unilaterally reduced their TNW stockpiles and deployments. For example, the 2010 NPR report announced that the United States would retire the nuclear variant of the submarine-launched Tomahawk Land-Attack Cruise Missile (TLAM/N), thereby eliminating all sea-based tactical nuclear systems. Russia has claimed that it has also reduced its TNW arsenal to well below its level at the end of the Cold War. Yet, there is still a large asymmetry in the overall size of U.S. and Russian TNW capabilities.

While there is broad agreement within both the United States and NATO that the next round of arms control should include TNWs, there is much less agreement about what the United States and its allies want to achieve from TNW arms control. The NGWG has identified three ways in which negotiations—and hopefully an agreement—on TNWs would contribute to the security of the United States and its allies.

First, given lingering concerns about the physical security of Russia's TNW arsenal,⁷ arms control could potentially increase confidence in effective security against theft, diversion, or accidents. In particular, if Russia and the United States could agree to consolidate their TNWs at fewer locations, more resources could be expended on the security of each site.

Second, there is considerable uncertainty about the size and disposition of Russia's TNW stockpile and about the role that TNWs play in Russia's deterrence and operational military doctrines. Negotiations on TNWs would be very useful for increasing transparency in this area. It bears emphasizing that there is a tension between security and transparency—for example, revealing the location of TNWs could increase their vulnerability to attack—so a careful balance would need to be struck. Fortunately, there is a vast array of information that both sides could release without compromising national security, such as the size and composition of their TNW arsenals and the role they assign to these weapons. Moreover, such information would not necessarily need to be placed in the public domain. An exchange of information exclusively between the U.S. and Russian governments would provide transparency without raising concerns about how this information might be used by third parties. The NGWG believes that greater transparency would be a major benefit of TNW negotiations, even if a final agreement could not be reached.

Third, an agreement on reductions, which would necessarily have to involve deeper cuts in Russian than in U.S. tactical nuclear weapons, would diminish the dramatic asymmetry in the size of the two arsenals. This, in turn, would reduce the perceived threat of Russia's considerable TNW capabilities to U.S. allies.

The Next Round: Contrasting U.S. and Russian Objectives

U.S. and Russian interests, objectives, and capabilities are more asymmetric than in previous arms control efforts. Whereas in past negotiations the core issues for discussion dealt with relatively symmetric capabilities—rough numerical parity in warheads and delivery vehicles—the issues for discussion in the next round encompass capabilities in which one side has a significant advantage. Given these asymmetries, reaching an agreement will require that the various issues under consideration be “linked” together. Washington must be willing to address Russian concerns in

7. These concerns appear to derive primarily from the absence of evidence that Russian TNWs are secure, rather than from positive evidence they are not.

one area—such as ballistic missile defense (BMD)—in order to convince Moscow to address U.S. concerns in another—such as TNWs.

U.S. Objectives

The NGWG believes the United States should adopt two primary objectives for the next round:

- Shape U.S. and Russian strategic offensive forces to enhance strategic stability; and
- Reduce the numerical disparity in TNWs, or mitigate its significance, and increase the transparency and security of TNW arsenals.

There is disagreement within the NGWG about whether further reductions in strategic warheads and delivery vehicles should be a U.S. objective in the next round. For some, additional reductions are desirable because they are a step toward the eventual global elimination of nuclear weapons and contribute to nonproliferation efforts by further demonstrating a concrete U.S. and Russian commitment to Article VI of the NPT. Other NGWG members, however, see little value in additional reductions as an end in themselves. They are only willing to consider additional cuts if they enable the United States to further other national security objectives. For instance, we can all agree on the goal of significant reductions in nondeployed weapons in return for the implementation of a more robust model of stockpile stewardship.

Shaping U.S. and Russian Strategic Offensive Forces

The NGWG believes that the United States should use the next round to shape each side's respective nuclear force structures in stabilizing directions.

One important way to strengthen strategic stability—especially crisis stability—would be to eliminate silo-based intercontinental ballistic missiles (ICBMs) armed with multiple independently targetable reentry vehicles (MIRVs). A nuclear first strike against MIRVed ICBMs would generally destroy more warheads than were used in the attack, thereby allowing a state to shift the balance of nuclear forces in a favorable direction. Consequently, in a severe crisis, MIRVed silo-based ICBMs could generate preemptive pressures on both sides—their possessor, fearing a first strike that would eliminate them, might feel pressured into using them quickly; the other side, also fearing preemption, might feel the compulsion to strike MIRVed ICBMs before they could be used. Out of concern for crisis instability, the United States pursued and succeeded in obtaining a ban on all MIRVed ICBMs in START II, though that treaty never entered into force.

Recently, the United States unilaterally modified its ICBM force structure. The United States currently fields just one type of ICBM, the silo-based Minuteman III, which is capable of carrying up to three warheads. The 2010 NPR report stated that each missile is actually loaded with “one to three warheads”⁸ and announced that the entire force is set to be “de-MIRVed,” leaving only one warhead on each missile. Russia, by contrast, continues to deploy highly MIRVed silo-based ICBMs. According to publicly available information, in 2011 about a third of all its deployed strategic warheads were loaded on such missiles.⁹

8. U.S. Department of Defense, *Nuclear Posture Review Report*, 23.

9. Norris and Kristensen, “Russian Nuclear Forces, 2011,” 68.

The Russian government has recently announced its intention to fund research and development into a new silo-based liquid-fueled “heavy” ICBM equipped with many warheads.¹⁰ Ostensibly intended to replace the highly MIRVed SS-18 missile and increase Russia’s ability to penetrate U.S. missile defenses, the new missile might be deployed within the decade. Proponents of this ICBM contend that it serves Russia’s financial interests, since a highly MIRVed system would allow Russia to purchase fewer missiles while still maintaining parity with the United States in deployed warheads.

The NGWG believes that Russia’s continuing reliance on silo-based heavy ICBMs poses problems for stability. Indeed, Russia’s plan is inconsistent with its own recent emphasis on the importance of strategic stability. For example, some Russian officials and analysts are concerned that U.S. high-precision conventional weapons might be able to hold its silos at risk; building more silo-based ICBMs will only exacerbate these fears. Many in Russia also worry about the U.S. ballistic missile defense effort, especially the goal of intercepting adversary ICBMs early in flight before countermeasures or MIRVs can be deployed; building more liquid-fueled missiles, which accelerate more slowly than solid-fueled systems, will only compound these worries.

While it is in the mutual interest of the United States and Russia to maintain a stable strategic relationship, the onus for ensuring stability should not fall exclusively on the United States. Russia too must contribute to stability, including by eschewing cost-efficient yet destabilizing systems and devoting the necessary resources to developing and deploying survivable strategic systems that enhance mutual security.

Accordingly, as part of the next round of arms control, the United States should seek to ban the deployment of new types of MIRVed silo-based ICBMs. This ban should prevent the deployment of a new heavy silo-based ICBM, while allowing Russia to maintain existing systems, such as the SS-18, for the rest of their service lives. Such a ban would also incentivize Russia to place more emphasis on MIRVed submarine-launched ballistic missiles (SLBMs) and mobile ICBMs, which are more survivable and therefore more stabilizing than silo-based MIRVed systems.

Pursuing such a ban has implications for the United States’ own modernization plans as well. The Minuteman III force is scheduled to remain in service until about 2030, and the United States is beginning to consider the requirements for a successor. As the United States develops a follow-on system, it should ensure that it is compatible with any future arms control agreement regarding limitations on MIRVing.

Reducing the Disparity in TNW

In accordance with both the NPR report and the U.S. Senate’s *Resolution of Advice and Consent to Ratification of the New START Treaty*, TNWs must be a principal—though not exclusive—focus of the next round of U.S.-Russian arms control.

For Russia, however, negotiations on TNWs—especially those that involve discussing reductions—are not a high priority objective. Russia views its large TNW arsenal as an important counterbalance to NATO’s superiority in conventional forces. Just as NATO during the Cold War used the threat of nuclear escalation to help deter numerically superior Warsaw Pact conventional forces, Russia relies on nuclear weapons today to help offset its current weaknesses in conventional

10. “Russia to Develop New Heavy ICBM by 2020,” RIA Novosti, December 20, 2010, <http://en.rian.ru/russia/20101220/161856876.html>.

military power. NATO expansion, especially to the Baltic states, increased Russia's perception of the importance of TNWs because it eliminated a buffer between Russia and NATO and created the possibility of NATO military forces being moved even closer to Russian territory.

In response to recent emphasis in the United States that the next round must cover TNWs, Russia has indicated a willingness to enter into negotiations. However, Moscow has been noncommittal on a time frame. Moreover, in keeping with a long-standing position, senior Russian officials have asserted that all TNWs must be stored solely on the owner's homeland before negotiations can commence.¹¹

NATO, however, has rejected unilateral withdrawal as a precondition to negotiations. Although there has been some intense debate about the role of nuclear weapons in NATO doctrine—in particular about the need for forward-deployed weapons—the alliance agreed in its 2010 Strategic Concept that further reductions of TNWs dedicated to NATO “must take into account the disparity with the greater Russian stockpiles of short-range nuclear weapons.”¹²

While the NGWG believes that NATO should not withdraw tactical nuclear weapons from Europe prior to negotiations, we do believe that it should consider the withdrawal of some or all of them as a possible outcome, if the benefits of such withdrawal outweigh the costs. Yet, because there is disagreement within the NGWG about the value of forward-deployed tactical weapons as a tool of assurance as well as the extent to which they lead to genuine burden sharing, we disagree about what would constitute an appropriate reciprocal concession from Russia. In any case, the NGWG believes withdrawal should only be considered if it is accompanied by an alternative form of burden sharing and symbol of the U.S. commitment to NATO, coupled with an enduring display of NATO's collective commitment to the organization as a nuclear alliance.

Reaching agreement on TNWs could prove very challenging. Because Russia is well aware of its advantage in TNWs and of the strong U.S. interest in negotiations, it will almost certainly use TNWs as leverage to bring other issues to the table. According to Russian deputy foreign minister Sergei Ryabkov, “talks about tactical nuclear missiles are impossible without a set of other issues: an imbalance of conventional forces, missile defense, and the deployment of arms in space.”¹³ Others in Russia have linked TNWs to U.S. high-precision conventional weapons, arguing that the former are a potential counterbalance to the latter.

That said, even if the United States and NATO were to address Moscow's list of concerns, it is unclear whether Russia would agree to TNW reductions in the next round. Russia's TNWs also contribute to deterrence against China. While Russian officials are reticent to publicly discuss their concerns about China's political, economic, and military rise, there are growing trepidations in Moscow about the possibility of a significant future threat in the East. Given the growth in the size and sophistication of China's nuclear and conventional capabilities and the uncertainty regarding Beijing's future interests and intentions in the region and globally, Russia might want to maintain a relatively large TNW arsenal to hedge against a downturn in Sino-Russian relations. Russia's concerns vis-à-vis China are, therefore, likely to complicate U.S.-Russian negotiations on these weapons.

11. See, for example, “New START Enters into Force,” Global Security Newswire, February 7, 2011, http://gsn.nti.org/gsn/nw_20110207_2261.php.

12. North Atlantic Treaty Organization, *Active Engagement, Modern Defence: Strategic Concept for the Defence and Security of the Members of the North Atlantic Treaty Organisation*, 2010, para. 17.

13. Quoted in “Russia Rejects Immediate Talks on Tactical Nuke Cuts,” Global Security Newswire, February 8, 2011, http://gsn.nti.org/gsn/nw_20110208_1126.php.

Domestic politics in Russia also play a role. Since TNWs are one of the few areas where Russia perceives marked superiority in its nuclear relationship with the United States, some in Moscow may be unwilling to give up—or even diminish—any area of advantage, regardless of its military utility. Indeed, there appears to be little support for TNW reductions among many key stakeholders. In many cases, the reason appears to have less to do with military or political necessity than with entrenched views and bureaucratic inertia.

Finally, an agreement involving TNWs would require a new, more intrusive verification regime, and some in Russia are at best lukewarm to an agreement that would allow the United States to inspect sensitive areas such as nuclear storage sites.

Russian Objectives

We assess the following as *likely* Russian objectives in the next round:

- Limiting U.S. ballistic missile defense;
- Limiting U.S. conventional prompt global strike (CPGS); and
- Reducing the U.S. advantage in upload potential.

Some Russian officials have also expressed concern about the balance of conventional forces in Europe. In particular, there are some indications that progress on nuclear arms control—particularly involving tactical nuclear weapons—might be connected to progress on the entry into force of the Adapted Conventional Forces in Europe (CFE) Treaty and possibly on the development of yet another conventional forces agreement. It remains uncertain, however, whether Russia will insist on this linkage. As such, the NGWG assesses the following as a *possible* Russian objective in the next round:

- Addressing the conventional balance in Europe.

In addition, on some occasions, Russian officials have signaled interest in addressing other U.S. conventional precision strike capabilities, such as cruise missiles, as well as the weaponization of space. It is unclear, however, how committed Moscow is to including these issues in the next round of bilateral arms control. If Russia insists on adding these to its already long list of objectives, it will create yet another layer of complexity and complication that will decrease the chances of reaching a mutually beneficial agreement.

Limiting U.S. BMD Capabilities

The Bush and Obama administrations have made repeated attempts to convince Moscow that U.S. BMD systems are focused exclusively on emerging missile threats and are not targeted against Russia. Nonetheless, Moscow remains concerned, as Russian deputy defense minister Anatoly Antonov argued, that U.S. BMD “could undermine Russia’s nuclear deterrence forces.”¹⁴

After modest resistance to the U.S. withdrawal from the Anti-Ballistic Missile (ABM) Treaty in 2002, Russia began to voice significant concerns about the Bush administration’s plans for the deployment of Ground-Based Midcourse interceptors in Poland and a radar station in the Czech Republic. While this system was intended to defend against Iran’s developing long-range ballistic

14. Ibid.

missile program, Moscow complained that because it was designed to intercept ICBMs, it also posed a threat to Russia's strategic forces.

Because Iran's efforts to acquire long-range missiles have been proceeding more slowly than expected, the Obama administration modified this plan in favor of the Phased Adaptive Approach (PAA). In its initial phases, the PAA will be focused on targeting the shorter-range missiles that Iran has been most successful in developing.

Nonetheless, Moscow has made clear that the new plan has not completely alleviated its apprehensions. In particular, Moscow is concerned about the fourth phase of the PAA, which includes the deployment of ground-based Standard Missile-3 Block IIB interceptors in Europe beginning around 2020. Although significant research and development of the Block IIB interceptor has not begun, as currently envisioned, this system would have some capability against ICBMs in the ascent phase of flight—i.e., after the rocket motors have stopped firing but while the missile is still rising. Russian experts have expressed considerable concern about this capability. In particular, they worry that the United States could intercept Russian ICBMs early in flight, before countermeasures designed to overcome ballistic missile defense have been deployed.

Beyond the specifics of any planned U.S. system, Moscow is broadly concerned that ongoing U.S. BMD efforts could lay the groundwork for Washington to deploy a more comprehensive and capable system in the future, if it chose to do so. Consequently, even if Moscow were to be adequately assured that the PAA is not focused on Russia, it would likely still be concerned that a future U.S. president might decide to dramatically expand the system with the intent to undermine its deterrent.

As a result, Moscow has consistently made a clear link between progress in ameliorating its concerns about BMD and progress in the next steps in arms control. Notably, on several occasions, senior Russian officials have indicated that their willingness to negotiate on TNWs is contingent on the U.S. willingness to address BMD.

In addition, Russia is taking unilateral steps to ensure the viability of its deterrent. In particular, one justification for research into a new heavy ICBM to replace the SS-18 is the perceived need to penetrate U.S. ballistic missile defenses. Moscow has also said that significant qualitative or quantitative increases in U.S. defensive capabilities could prompt it to take other actions, including potentially withdrawing from New START.

Reaching common ground on BMD could be especially difficult. There is strong bipartisan support in the United States for BMD efforts, and it is unlikely that the Senate would agree to any future treaty that placed meaningful limits on U.S. missile defense capabilities. What might be saleable within the United States is BMD cooperation and confidence-building measures. Whether these more informal steps would be sufficient to alleviate Russian concerns to the point where further arms control becomes possible is far from clear.

Limiting U.S. CPGS

Conventional prompt global strike is a program to develop an accurate, long-range conventional capability to strike a target anywhere in the world within one hour. A concept long under discussion, CPGS is intended to fill the gap between slower, shorter-range conventional cruise missiles and faster, longer-range nuclear-armed ballistic missiles. While deliberations about the full set of

roles for CPGS are still ongoing, the Obama administration has stated that CPGS is intended to be one component of a suite of capabilities designed to locate, track, and strike high-value and time-sensitive targets at strategic ranges in situations where access to the theater of operations is constrained.¹⁵

Russia has made clear that it is concerned that CPGS, like U.S. BMD systems, poses a threat to its nuclear deterrent and is thus far not persuaded by repeated U.S. assurances otherwise. Russian officials and defense analysts are worried that such a capability, if expanded, would weaken Russia's deterrent by providing the United States with the ability to eliminate—or at least severely de-grade—Russian nuclear forces and command and control systems in a preemptive strike without having to cross the nuclear threshold first. Some Russian analysts are particularly concerned about the combined effect of an expanded BMD system and CPGS capability, which might—in theory at least—allow the United States to launch a conventional first strike against Russian nuclear forces and then use its missiles defenses to shoot down any remaining Russian weapons that were launched in retaliation.

Russian apprehensions about CPGS played a role in New START negotiations. The final treaty makes conventionally armed ballistic missiles—one type of CPGS system that was being considered by the United States during the negotiations—accountable under its central limits. However, the Obama administration has recently said that it will not pursue conventionally armed ICBMs or SLBMs and has decided that other CPGS systems that would be accountable under New START (specifically, those that utilize the first stage of an existing ICBM or SLBM) will be limited to a niche capability.

Instead, the current focus of U.S. CPGS research and development is on missile-boosted hypersonic glide vehicles—“boost-glide” systems—that would glide in the upper atmosphere in a non-ballistic trajectory over the majority of their flight. The United States has stated that, because of their non-ballistic trajectory, boost-glide systems that do not use the first stage of an existing ICBM or SLBM would not be accountable under New START. Russia, however, rejects this interpretation, arguing that the states are obligated to discuss whether and how such systems would be regulated under the treaty.

Given the potential for the United States to develop and deploy a CPGS capability that it would not accept as being captured within existing treaty limitations and that is perceived in Moscow as a threat to its deterrent, a key Russian objective in the next round is likely to be placing some kind of constraint—or, more ambitiously, an outright ban—on all kinds of CPGS systems.

Reducing U.S. Advantages in Upload Potential

Differences in U.S. and Russian force structures and the way in which they maintain the reliability of their warheads have led to a significant U.S. advantage in “upload potential.”

The United States last introduced a nuclear weapon with a new design into its stockpile over 20 years ago. As part of its efforts to ensure the continued safety, reliability, and effectiveness of its aging arsenal, it retains a large stockpile of nondeployed warheads. This stockpile serves to mitigate the risk of a technical failure in a class of warheads, as well as to hedge against adverse changes in the international security environment that would necessitate the deployment of a

15. The White House, *Report on Conventional Prompt Global Strike in Response to Condition 6 of the Resolution of Advice and Consent to the Ratification of the New Start Treaty*, February 2, 2011, 5.

larger number of warheads. Russia, by contrast, manufactures warheads on a continual basis and does not retain a large stockpile of nondeployed warheads.

There is also an important asymmetry in the two sides' missile forces. Russia maintains a smaller number of delivery vehicles than the United States, though with more warheads per missile. The United States has more missiles but these are generally deployed with fewer warheads than they can carry.

The extra space on U.S. delivery vehicles, coupled with its large stockpile of nondeployed warheads, apparently gives the United States a greater "upload potential" than Russia—that is, it could probably add additional nuclear firepower to its arsenal more quickly than Russia. Russian officials and defense analysts are concerned about this situation.

While the U.S. upload potential appears to be less of a concern to Moscow than BMD or CPGS, the Russian nuclear expert community has repeatedly raised this issue, and Russia will likely seek ways to address the problem in the next round. Russia's preferred solution would probably be to limit delivery vehicles. Yet, reductions in nondeployed warheads would achieve the same goal. Indeed, the United States has expressed a willingness to discuss nondeployed warheads as part of the next negotiation. However, because a large nondeployed stockpile plays an important role as a technical and geopolitical hedge in the United States' current nuclear posture, reductions in this area will require changes in the U.S. stockpile management program.

Addressing the Conventional Balance in Europe?

Like NATO during the Cold War, Russia currently uses nuclear weapons to offset weaknesses in its conventional forces. Accordingly, it is possible that it may link nuclear arms control—particularly regarding tactical nuclear weapons—to conventional arms control. If it does, the focus of discussion will probably be on the CFE Treaty. Signed in 1990, the original CFE Treaty established equal alliance-wide (NATO and Warsaw Pact) limits on five categories of heavy military equipment and placed sublimits on the quantity of treaty-limited equipment that could be held by any single member of either alliance.

Adjustments to the regime were made during the 1990s to account for the breakup of the Soviet Union, to address Russian security concerns about instability in the Caucasus, and to account for NATO expansion. These culminated in the conclusion of the Adapted CFE Treaty, signed at the Organization for Security and Cooperation in Europe Summit in Istanbul in 1999. However, the United States and its NATO allies have refused to ratify the treaty until Russia complies with several side agreements reached in parallel with the signing of the adapted treaty. Under these politically but not legally binding commitments, Russia agreed to withdraw its treaty-limited equipment and military forces from Moldova and Georgia. It has not yet fulfilled this undertaking.

On December 12, 2007, then Russian president Vladimir Putin suspended Russia's participation in the CFE Treaty, citing primarily NATO's refusal to ratify the adapted treaty. Russia does not accept NATO's linkage of ratification to the withdrawal of Russian troops from Georgia and Moldova; in Moscow's view, these force deployments are strictly bilateral issues. Russia also argued that NATO's 1999 and 2004 expansions increased the alliance's equipment above treaty limits.

The United States and NATO support the Adapted CFE Treaty and have tried to work with Russia to find a mutually acceptable pathway for its entry into force. If a solution cannot be reached by the time the next round of nuclear arms control negotiations begin—as appears

likely—we hope that Moscow will not link CFE negotiations to nuclear arms control discussions that already have to tackle a daunting range of complex issues. However, we recognize that Moscow will set its own negotiating priorities, and the United States must be prepared if Russia does insist on the linkage.

A Way Forward

There is flexibility in the format that the next round of arms control might take. In particular, not all issues have to be managed through treaties. There is, however, much less room for maneuver in the range of issues that Washington and Moscow want to address. The negotiating agenda is set by national interest—as each state defines it—and we see relatively little prospect of either country having a significant influence on which issues the other wants to address in negotiations. To this end, the following are potential elements of a mutually beneficial way forward for the next round of U.S.-Russian arms control.

Delivery Vehicles, Launchers, and Force Structure

The Next Generation Working Group believes that limits on launchers and delivery vehicles should continue to be a core feature of any arms control agreement. Such limits create predictability in the evolution of each side's nuclear forces and hence enhance strategic stability.

New START imposes two limits on launchers and delivery vehicles. It permits each side a total of 800 deployed and nondeployed ICBM launchers, SLBM launchers, and heavy bombers. At any time, however, no more than 700 ICBMs, SLBMs, and heavy bombers may be deployed. The NGWG is divided about whether the United States should seek reductions on strategic launchers and delivery vehicles below New START levels. That said, it is clear that *if* the United States and Russia agree to further reductions, any cuts are likely to be modest. As a result, we believe that whatever limits on strategic delivery vehicles and launchers are negotiated in the next round can be effectively verified by a regime similar to that of New START.

Of course, there are inevitably some areas in which New START's verification regime could usefully be enhanced, and the United States should seek to negotiate such improvements on a reciprocal basis. For example, more frequent inspections and enhanced access during inspections to verify the conversion or elimination of delivery systems would serve U.S. national security interests.

Prior to the 2002 Strategic Offensive Reductions Treaty (SORT), also known as the Moscow Treaty, strategic arms control treaties generally contained sublimits for different types of launchers. SORT contained no such sublimits; indeed, it did not restrict launchers and delivery vehicles at all. While New START went back to imposing limits on total launchers and delivery vehicles, it does not place restrictions on force structure. Like SORT, New START explicitly permits each state party to make its own decisions about “the composition and structure of its strategic offensive arms.”¹⁶

As the size of the U.S. and Russian nuclear arsenals shrink, the NGWG believes that neither deterrence nor strategic stability is best served by using arms control to force the sides to adopt

16. Strategic Offensive Reductions Treaty, Article I; New START, Article II.2.

similar postures. In general, it is better to give each side the flexibility to adopt whatever force structure it deems optimal within the overall limits for delivery vehicles and launchers—provided those forces are oriented in a way that contributes to strategic stability. To this end, the one constraint on force structure that still has considerable value is a limit on silo-based ICBMs armed with MIRVs. Specifically, for reasons explained above, the NGWG believes that the United States and Russia should seek to ban the deployment of any new type of MIRVed silo-based ICBM.

The prospects for such a ban are currently unclear. Yet, regardless of whether a ban on MIRVed silo-based ICBMs can be achieved, any future U.S.-Russian strategic arms control agreement should be generally structured to encourage both sides to deploy forces that contribute to strategic stability. To this end, if the United States and Russia agree to further reductions in strategic forces below New START levels, it is in the interest of both sides to have steeper reductions in warheads than in delivery vehicles in order to ensure the deployment of a lower number of reentry vehicles on each missile.

Warheads

A major goal of the next round of arms control should be an agreement with two limits for warheads:

- A higher limit on all warheads (strategic, tactical, deployed, and nondeployed); and
- A lower limit on strategic deployed warheads.

A Single Limit on All Warheads

Negotiating a single limit on all warheads should be a major goal of the next round of arms control. Today, the United States and Russia each possess about 5,000 warheads of all types in their “active” stockpiles (i.e., excluding those awaiting dismantlement). Provided that the United States can develop a strategy for mitigating risk that does not require retaining a large number of non-deployed strategic warheads—and, as explained below, we believe that should be possible—the NGWG advocates that the United States seek to negotiate a cap that is significantly below current levels. We support this approach for a variety of reasons.

First, and most fundamentally, a single limit would bring all warheads into the arms control regime, thus removing the essentially artificial distinction between strategic and tactical warheads.

Second, a single limit on all warheads would be a useful way of simultaneously managing U.S. and Russian concerns. The United States and its allies are concerned about Russia’s significant numerical advantage in tactical nuclear weapons. Russia, meanwhile, is concerned about the United States’ upload potential, which is a result of its numerical advantage in nondeployed strategic warheads. An arms control agreement that limited all warheads would almost certainly lead to Russia reducing its stockpile of tactical warheads and the United States reducing its stockpile of nondeployed warheads, thus fulfilling one of the top negotiating priorities of each country.

Third, a single limit on all warheads would be easier to verify than a limit on just tactical (or nondeployed strategic) warheads. We see no way for inspectors to distinguish between tactical and strategic warheads without compromising exceptionally sensitive information. A limit on all warheads would remove the need to make this distinction (although such a limit would still pose significant verification challenges).

One potential complication of a single limit on all warheads is that both states possess a significant number of retired warheads that are awaiting dismantlement. According to official statements accompanying the release of the 2010 NPR report, the United States has several thousand warheads in this category; the Russian dismantlement line is at least as long and possibly significantly longer. There is little point in counting warheads slated to be dismantled toward the limit on all warheads. However, Russia and the United States should take steps to build confidence that such warheads would not be returned to active service. To this end, they could agree to

- store warheads awaiting dismantlement separately from active warheads and only at certain designated storage areas (resource and security concerns permitting);
- periodically declare the number of warheads in the dismantlement queue;
- periodically declare the destruction of warheads; and
- perhaps, as discussed further below, permit inspections to verify the above information.

Assuming that present plans for dismantlement go forward, by the time any future arms control agreement is negotiated there will probably be significantly fewer warheads awaiting dismantlement, and the problem they pose will, therefore, be correspondingly smaller.

A Limit on Deployed Strategic Warheads

In addition to a limit on all warheads, we believe that future arms control agreements should continue to place limits on deployed strategic warheads. This approach would provide continuity with SORT and New START.¹⁷ That said, there is disagreement within the NGWG about whether the United States should seek further reductions in deployed strategic warheads below 1,550, the level in New START.

A limit on deployed strategic warheads could create verification difficulties unless counting rules are carefully defined. In particular, the problem of distinguishing between strategic and tactical warheads could arise at any airbase at which both are deployed. We see two potential solutions to this problem, but there is disagreement within the NGWG about which one is preferable. Some of us believe that New START's formula of counting each deployed heavy bomber as one deployed strategic warhead should be carried forward to a future treaty. Others advocate that all warheads at airbases where heavy bombers are based should count toward the limit for deployed strategic warheads.

Is a Limit on All Warheads Verifiable?

Verification unquestionably poses the greatest challenge to our proposal for a single limit on all warheads. Such a limit would require a comprehensive verification system capable of providing reasonable assurance that all warheads, wherever they are stored or deployed, are accounted for. To this end, inspections for the following purposes would certainly be required:

- Verification of the number of warheads emplaced on deployed and nondeployed delivery systems; and
- Verification of the number of warheads in storage.

17. An alternative option would be a limit on all deployed warheads, both strategic and tactical. However, the United States and Russia would realistically be able to agree to such a limit only if it was higher than 1,550. This would have the undesirable effect of creating the appearance that the new agreement allowed both countries to increase the size of their deployed arsenals.

For reasons explained at more length in the appendix, these tasks could prove to be manageable.

Verifying the assembly and disassembly of warheads and the absence of warheads at undeclared locations are much tougher challenges. However, while the U.S. and Russian stockpiles remain in the thousands, we judge that these tasks are not necessary for effective verification, defined in terms of the detection of militarily significant violations. At this stage, too much weight should not be put on areas in which full verification is improbable.

In considering how to move forward, lessons from past strategic arms control agreements are potentially relevant. Historically, verification techniques for strategic forces have been developed in a step-by-step process. The first agreement on strategic offensive arms, the Strategic Arms Limitation Talks I (SALT I) Interim Agreement, limited only launchers and was verified solely through national technical means. The 1987 INF Treaty broke new ground by limiting missiles as well as launchers and facilitating on-site inspections. Finally, under START I, inspectors were permitted to verify reentry vehicles emplaced on ICBMs and SLBMs (as they are under New START). This degree of intrusiveness—and effectiveness—was unimaginable at the start of the SALT process.

Similarly, we believe that the development of a verification system for all warheads should be attempted in a step-by-step process. Russia and the United States should work cooperatively on identifying potential challenges, developing possible solutions, and testing them. The experience gained from solving simpler verification problems could be put toward more complicated ones. While the ultimate goal should be a legally binding agreement limiting all warheads, it would be better to develop a verification system, to the extent possible, away from the negotiating table through cooperation between U.S. and Russian technical personnel.

Indeed, similar processes have yielded results in the past. The 1988 Joint Verification Experiments (where the United States and Soviet Union measured the yield of a nuclear test at one another's test sites) helped pave the way for the ratification of the Threshold Test Ban Treaty as well as the Peaceful Nuclear Explosions Treaty. The Verification and Stability Initiative conducted during negotiations for START I allowed verification techniques to be tested and assisted with the treaty's conclusion.

A good starting point would be to develop protocols for verifying certain aspects of the Presidential Nuclear Initiatives (PNIs). In 1991 and 1992, the U.S. and Soviet/Russian presidents made a series of unilateral, voluntary commitments to consolidate and destroy certain types of tactical nuclear weapons, but these commitments were not intended to be subject to verification. By its own admission, Russia has not yet implemented all of its commitments in full. Moreover, questions have been raised about its compliance with some of those commitments that it says it has implemented. It is very much in the U.S. interest to investigate these questions. For its part, Russia would presumably value greater transparency into U.S. tactical nuclear weapons. Verifying compliance with the Presidential Nuclear Initiatives would, therefore, be a valuable process in its own right—as well as a useful stepping-stone toward a more comprehensive verification system.

As a result of the PNIs, there ought to be a number of facilities in each country where tactical nuclear weapons used to be based but no longer are. A good first step toward the development of a more comprehensive verification system would be for Washington and Moscow to agree to develop procedures that would allow the *absence* of nuclear weapons at such facilities to be verified. If developed successfully, these procedures would allow a commitment to consolidate all tactical nuclear weapons in centralized storage sites—an interim step we advocate below—to be verified

by checking that all such weapons had been withdrawn from bases where they had formerly been deployed. The experience developed through this process could then be applied to the more challenging problem of verifying the number of warheads (tactical and strategic) stored at centralized depots.

Of course, a process such as this would create political as well as technical challenges. The United States and Russia would have to reveal much more to one another than they currently do about where their tactical and nondeployed strategic warheads are (or were) stored. There might be considerable resistance to such transparency, particularly in Russia. Meanwhile, probable Russian requests to inspect current and former warhead storage sites in Europe would require the consent of the NATO allies. These challenges should be tackled sooner rather than later.

Ballistic Missile Defense

More than any other U.S. capability, BMD is at the forefront of Russia's concerns. Consequently, seeking some kind of limit on U.S. BMD systems is likely to be Moscow's highest priority in the next round. While NATO-Russian BMD cooperation has provided a potential pathway for easing Russian trepidations, agreeing how to proceed has been difficult because of disagreements about the structure of a cooperative BMD architecture. The NGWG is fully supportive of efforts to develop mutually beneficial cooperation on BMD. However, even if a framework for cooperation can be developed and implemented, we are skeptical that it will be sufficient to completely address all of Russia's stated concerns regarding current—and especially future—plans for U.S. missile defense systems. As such, even if some form of U.S.-NATO-Russian cooperation is possible, BMD is likely to remain a contentious issue.

In U.S.-Russian nuclear relations, mutual vulnerability is a fact rather than a choice for the foreseeable future. Even if the United States wanted to undermine Russia's nuclear deterrent—which it does not—it would not be possible. The simple fact is that, under foreseeable technological conditions, the offense would hold the decided advantage in a nuclear exchange. Even in combination with a preemptive counterforce attack (which would, of course, raise profound moral questions), expanded ballistic missile defenses could not, for the foreseeable future, deny Russia the ability to inflict unacceptable damage on the United States. Indeed, against Russia, ballistic missile defenses are unlikely to prove “cost effective at the margin” for the foreseeable future—that is, Russia would probably be able to nullify U.S. defenses by building missiles and countermeasures more quickly and cheaply than the United States could build interceptors.

Former U.S. secretary of defense James R. Schlesinger made this point to the Senate during the New START ratification debate. Having argued that, because the United States or Russia could always expand its nuclear forces, strategic offenses outmatched strategic defenses, he stated:

So, in dealing with the major powers, China and Russia, we must be careful, I think, not to convey to them that we are threatening their retaliatory capability . . . It's not because we would not like to have an impenetrable defense, as President Reagan had hoped for. It's just beyond our capability. They can always beat us with the offensive capabilities.¹⁸

18. U.S. Senate, *The New START Treaty: Hearings before the Committee on Foreign Relations*, S. HRG. 111-738 (April 29, 2010), 25.

Nonetheless, Russian fears—and the actions Moscow might take to alleviate these fears—could still prove destabilizing and undermine U.S. national security. They could lead Russia to build up its nuclear forces. Or, in a crisis, the belief that the United States could nullify Russia's nuclear forces might generate an incentive for Moscow to place its strategic forces under less deliberate control, which would increase the chance of the unauthorized use of nuclear weapons. Worse still, Moscow might threaten to use—or even use—nuclear weapons against the United States or its allies. Managing Russia's concerns is, therefore, in the U.S. interest.

U.S. domestic politics will likely play a central role in the U.S. negotiating position on BMD and, as a result, in the overall likelihood of a successful and mutually beneficial agreement. As the domestic debate in the United States over New START forcefully demonstrated, there is strong opposition across the U.S. political spectrum to limitations on missile defenses. Given ongoing advancements in North Korea's and Iran's ballistic missile programs and the potential for these states to develop ICBMs, resistance to significant BMD limitations is understandable. U.S. BMD systems, if effective and carefully calibrated to meet realistic missile threats, can contribute to deterrence and defense against Iran, North Korea, and other emerging threats.

Nonetheless, if the United States wants to achieve its objectives in the next round of arms control, then it must address Russia's concerns about BMD. Accordingly, achieving U.S. goals in the next round hinges on developing an arrangement that strikes an appropriate balance between assuaging Moscow's concerns and ensuring that the United States retains the ability to research, develop, and deploy the capabilities necessary for credible deterrence, assurance, and defense against emerging missile threats. The central challenge of negotiations on BMD will be finding a solution that both meaningfully alleviates Russia's worries and is politically palatable in the United States.

It is clear there is no easy or perfect solution to this challenge. The NGWG has, however, identified two options beyond U.S.-NATO-Russian BMD cooperation that could potentially satisfy the necessary criteria to enable a future bilateral arms control agreement.

First, the size, composition, capability, and geographic location of U.S. BMD deployments appear to matter to Moscow. The United States should, to the extent practical, focus on BMD capabilities and deployment locations that help demonstrate to Russia that these systems do not pose a threat to its assured second-strike capability. For example, the United States could locate future deployments of Standard Missile-3 Block IIB interceptors (and even more capable follow-on interceptors) in geographic areas that would not enable interception of Russian ICBMs. Similarly, the United States should, if possible, restrict the deployment locations and capabilities of BMD enabling systems, such as radars, to areas that do not provide substantial coverage of Russia. By carefully selecting deployment locations for interceptors and enabling systems, the United States might be able to create a ballistic missile defense architecture that would manifestly not pose a threat to Russia's strategic deterrent but would still protect the United States and its allies against emerging ballistic missile threats.

Second, the United States should deliberately and publicly tie the size and technological sophistication of BMD capabilities to the evolution of the ballistic missile threat. The United States should make clear to Russia that its decisions on the number of interceptors, their deployment patterns, and their capability against countermeasures will depend on the growth in the size, range, and sophistication of emerging threats. By making this link clear and explicit, the United States could incentivize Moscow (and possibly Beijing as well) to play a greater role in preventing

and rolling back nuclear and ballistic missile proliferation. For example, since Iran is an important target of U.S. BMD capabilities, Russia's desire to limit BMD efforts would create an incentive for it to put even greater pressure on Tehran.

The United States and Russia should establish a formal mechanism to share intelligence on and review assessments of ballistic missile threats on an ongoing basis. These activities would enable regular discussions of the overall direction of ballistic missile programs, the severity of current and future missile threats, and possible courses of action to mitigate risks. While differences in analysis of ballistic missile threats would not in any way give Moscow a veto over U.S. BMD deployments, intelligence exchanges and joint assessments would provide Russia with the empirical and analytical foundation of any U.S. decision to deploy more robust BMD capabilities. Such insights could help assure Russia that future deployments were not intended to undermine its strategic deterrent.

The United States should also tie the deployment of more sophisticated and capable BMD systems beyond those already planned in the PAA to the development of technologically advanced ballistic missiles by Iran, North Korea, and others. In particular, the United States should assure Russia that it will not deploy boost-phase BMD systems, which would attack enemy missiles in the earliest stage of flight before reentry vehicles and BMD countermeasures are deployed, until the United States deems that one of these states is developing a ballistic missile that could only be defeated with this kind of system.

Such assurances should be in the form of a politically binding commitment conveyed at the highest levels of government rather than as part of legally binding treaty. As part of these assurances, the United States should also make clear that it would not wait for an adversary to deploy sophisticated missiles but would instead field boost-phase systems in time to meet the emergence of any threat that necessitated them. To this end, the NGWG believes the United States should continue to research and develop boost-phase BMD capabilities.

Conventional Prompt Global Strike

CPGS is intended to fill an important gap in U.S. nonnuclear strike capabilities. However, the high unit cost of each weapon, coupled with the fact that the United States has significant forward-deployed conventional strike assets with standoff range (such as conventional sea- and air-deployed cruise missiles), suggests that, in the near term, there are limited missions that would require the use of a CPGS weapon. As with BMD, the NGWG believes that the United States should not design and deploy CPGS weapons with the intent of undermining Russia's deterrent.

The United States agreed in New START to count conventional warheads deployed on accountable ballistic missiles against the treaty's central limits. However, the U.S. government has stated that it currently has no plans to develop or deploy such systems and is on record that other types of CPGS systems—boost-glide systems in particular—would not count under New START.

If Russia insists that some formal limitation on all CPGS systems is necessary for an agreement, the NGWG does not oppose the *principle* of counting all CPGS systems toward the central limits of any future treaty—providing that the security and proprietary equities for CPGS systems are protected. However, we do disagree on the implications this would have for such limits.

Some members of the NGWG believe that the United States should be prepared to commit to deploy CPGS only in small numbers. They observe that senior administration and military of-

ficials have repeatedly described CPGS as a “niche” capability and see little difficulty in counting CPGS systems toward the limits for deployed strategic warheads and launchers, with such limits set at or below New START levels.

Other members of the NGWG believe that, given the growing sophistication and proliferation of ballistic missiles and anti-access/area denial (A2AD) capabilities, the missions for which CPGS would be appropriate could well expand in the future. They believe that the United States should keep open the option of deploying CPGS systems in larger numbers and, therefore, that it should only agree to a numerical limit on CPGS if the central limits were high enough to provide sufficient leeway to meet emerging threats—which in practice means they would have to be higher than New START levels.

All members of the NGWG agree, however, that the United States should seek to develop a formal transparency and inspection regime with Russia regarding deployed CPGS systems. Providing appropriate insight into the size, composition, capability, and location of deployed U.S. CPGS weapons would help assure Russia that these weapons do not pose a threat to its nuclear deterrent. The United States could provide Russia with continuously updated information about the planned overall direction of CPGS systems and grant Russia a limited number of inspections and/or exhibitions of CPGS systems and bases, with the important caveat that such inspections and exhibitions need to be commensurate with U.S. proprietary and security requirements.

Getting the Process Right

The U.S.-Russian Dimension

Given the range and complexity of issues facing the United States and Russia as they embark on the next round of negotiations, the process by which the negotiations are conducted will be an important key to success. There is a very real possibility that, if the process is not carefully planned and executed, negotiations could prove unproductive and acrimonious.

Although there are considerable challenges to reaching another mutually beneficial arms control agreement with Russia, a failure to continue serious engagement on arms control poses serious risks to the bilateral relationship. The concerns of the United States and its allies about Russia’s tactical nuclear weapons will not simply evaporate if arms control drops off the agenda—neither will Russia’s trepidations about ballistic missile defense, conventional prompt global strike, and the U.S. upload capability. Moreover, given that Russia’s concerns could cause serious instabilities, especially in a crisis, the national security interests of the United States are best served by trying to manage these concerns through a well-designed arms control process. Finally, if New START is allowed to expire without replacement, transparency—and thus predictability and stability—will be reduced.

The next round of arms control is unlikely to culminate in a single treaty covering all salient issues. In fact, identifying a single overarching treaty as the goal is likely to be unproductive at best and counterproductive at worst. A more plausible outcome is two or three more limited agreements, each of which deals with one set of issues. More informal transparency and confidence-building measures could also play an important role. At this stage—before negotiations have even begun—it is simply too early to assess what might realistically be possible.

Russia has traditionally expressed a strong preference for legally binding treaties as the goal of negotiations. Indeed, Moscow may well not agree to participate in negotiations if they are framed solely in terms of developing nonbinding transparency and confidence-building measures. To try and ensure Russia's involvement, the United States should be willing to agree that, where formal limits are appropriate, the goal of negotiations should be a treaty. In return, Russia should agree that this goal should not prejudice the development of more informal transparency and confidence-building measures along the way. In areas where binding limits are not the goal of negotiations—ballistic missile defense in particular—the United States and Russia should agree to focus their efforts on confidence-building, including cooperation.

Going forward, the first step is for the United States and Russia to informally scope out the issues and agree on how formal negotiations should be conducted. We believe that the Arms Control and International Security Working Group of the U.S.-Russia Bilateral Presidential Commission is the right venue for exploratory discussions. The commission was designed to be a venue in which the United States and Russia could identify avenues for cooperation and discuss how to capitalize upon them. The Arms Control and International Security Working Group has been underutilized for arms control discussions, largely because the focus of bilateral arms control efforts for most of the time since its inception was the negotiation and ratification of New START. Using this working group for exploratory arms control discussions would help establish it as an important and useful venue for dialogue on strategic issues, even after formal negotiations have begun in their own dedicated forum. Given the complexity of the issues under discussion, it would be desirable to set up subgroups within the working group so that the whole range of relevant issues can be properly examined.

The NGWG advocates that formal negotiations should be broken down into separate tracks. A similar approach was adopted during the Nuclear and Space Talks between the United States and the Soviet Union that began in 1985. These talks were split into three separate tracks—defense and space systems, intermediate-range nuclear forces, and strategic nuclear forces. The initial Soviet position was that the three tracks were interlinked. However, Moscow subsequently agreed to conduct talks on intermediate-range forces separately, allowing the conclusion of the INF Treaty in 1987. Then, in 1989, it agreed to delink talks on strategic offensive forces from those on defense and space, which paved the way for agreement on START I in 1991.

We believe that three or four tracks will be required to support the next round of arms control. The first track should focus on warheads and, in particular, on how a single limit on all warheads could be defined and verified. This track would handle all questions related to tactical and nondeployed warheads.

In the second track, the United States and Russia should discuss how to enhance strategic stability through agreements on launchers, delivery vehicles, MIRVing, and Conventional Prompt Global Strike.

The third track should focus on ballistic missile defense. This track would be a forum in which the United States and Russia could discuss the implications of BMD cooperation for arms control and identify further opportunities for bilateral confidence-building. As such, it would supplement—and absolutely not replace—any cooperation on ballistic missile defenses that was already under way. In theory, this topic could be accommodated in the second track (strategic stability), but the issue is of such overriding importance that we believe it merits discussion by itself. Moreover, given that the goal of talks on ballistic missile defense would not be a formal treaty placing

limits on missile defense, this issue is best separated from the track on strategic stability where a treaty should be the goal.

Finally, if Russia insists on linking nuclear and conventional arms control, then a fourth track on conventional armed forces in Europe (excluding CPGS and BMD) could be convened, presumably under the auspices of the Organization for Security and Cooperation in Europe with the full involvement of all relevant states.

Even where treaty-based arms control is the goal of a track, the NGWG believes that the United States and Russia should make serious efforts to negotiate informal transparency and confidence-building measures. These steps would not only represent important interim milestones toward legally binding agreements that would demonstrate to stakeholders the value of negotiations, but they could also be useful deliverables in themselves.

For example, negotiations toward a single limit on all warheads could produce agreement on—and be informed by the results of—cooperative verification exercises. As we noted above, verifying the absence of tactical warheads at facilities where they used to be stored would be a useful first step. Further down the line, the United States and Russia could declare the number of warheads at centralized storage sites and agree to conduct reciprocal inspections for verification. Such inspections would provide a valuable opportunity to test the verification procedures that would be needed for a limit on all warheads and also generate increased confidence in “baseline” warhead numbers.

The consolidation of tactical and nondeployed strategic warheads could also prove to be a valuable interim measure. Consolidation is useful as a means to enhance the physical security of nuclear weapons since it allows limited resources to be focused on protecting fewer sites. It would also make the task of verifying a single limit on all warheads somewhat easier and, depending on the location of sites where warheads were consolidated, enhance assurance of NATO’s Eastern European members.

Confidence-building efforts related to ballistic missile defense are already under way. In April 2009, Presidents Obama and Medvedev agreed to conduct a joint assessment of ballistic missile threats. At the November 2010 NATO-Russia Council meeting, held as part of the Lisbon summit, NATO and Russia agreed to a similar exercise. Work on both assessments is ongoing, and their completion would represent significant steps toward a more cooperative approach to ballistic missile defense.

Various other opportunities for cooperation on missile defense exist. In addition to cooperation on theater missile defenses (which NATO and Russia have already agreed to resume), cooperation on early warning appears to be a potentially fruitful initial focus. To this end, the opening of a joint facility for exchanging data on missile launches would be a good first step. In any case, NATO and Russia have already taken the positive step of agreeing to develop “a comprehensive Joint Analysis of the future framework for missile defense cooperation.”¹⁹ Not only would such a roadmap be an important facilitator of cooperation, but its completion would be a significant accomplishment in its own right.

This brief description of potential transparency and confidence-building measures is far from exhaustive. Many other measures related to high-precision conventional weapons as well as tactical and nondeployed strategic warheads and ballistic missile defense are also imaginable. The

19. NATO-Russia Council Joint Statement, November 20, 2010.

point we wish to emphasize here is that the simultaneous pursuit of a legally binding agreement and more informal measures does not create tension; on the contrary, each pursuit is likely to reinforce the other. Given the challenges of the next round of arms control, U.S. and Russian negotiators must be pragmatic and design a process that is not focused exclusively on drafting a treaty.

Engaging with Allies and the Broader International Community

Given the importance of assurance in U.S. nuclear policy, the United States must engage with its allies to understand their priorities and gain their support for further arms control with Russia. This will be particularly important because of the inclusion of tactical nuclear weapons in the next round of negotiations. The strenuous efforts made by the Obama administration to engage with its allies during the Nuclear Posture Review form a solid foundation for the next steps.

It is important that the United States engages with all of its allies, not just those in NATO. The Asian allies of the United States have their own interests that do not always align with those of NATO. For example, the idea of consolidating Russian tactical nuclear weapons east of the Urals could spark concern in Japan (and, to a lesser extent, South Korea). The United States should, therefore, consult with all its allies in order to prevent one U.S. ally (or group of allies) from perceiving that its security was weakened for the sake of another ally (or group of allies) in a different region.

In addition, if the United States and Russia hope to gain nonproliferation benefits from their arms control endeavors, then they must, to the extent possible, communicate progress in negotiations to the broader international community. Recognizing that there are significant limits to what can be said publicly about ongoing negotiations, we believe that the informal transparency and confidence-building measures advocated above would be important interim deliverables that could prove very useful as public indicators of progress.

U.S. Nuclear Weapons and Stockpile Management

The NGWG believes that a key target for the next round of arms control should be a limit on all warheads (strategic, tactical, deployed, and nondeployed) that is well below current levels. This goal has significant implications for the management and sustainment of the U.S. nuclear stockpile.

The current approach of the United States to managing its nuclear weapons stockpile is termed “science-based stockpile stewardship.” In essence, this approach involves developing improved scientific understanding of how nuclear weapons work to enable the identification and prediction of potential problems. Any significant problems, whether related to aging or original design flaws, are corrected in periodic and infrequent efforts termed Life Extension Programs (LEPs). Each LEP involves “specific solutions to extend the lifetime of each particular warhead or bomb,” including “refurbishing and replacing certain components as necessary.”²⁰ Coupled with limited direct surveillance activities of the stockpile (which could usefully be enhanced), science-based stockpile stewardship has enabled the United States to maintain high confidence in its stockpile in the absence of nuclear explosive testing.

20. U.S. Department of Energy, National Nuclear Security Administration, “Life Extension Programs,” <http://nnsa.energy.gov/ourmission/managingthestockpile/lifeextensionprograms>.

Nonetheless, LEPs have extremely long lead times and occur infrequently. The United States, therefore, retains a large reserve of nondeployed strategic warheads as a risk mitigation strategy or “hedge.” Should a systemic fault arise with one of the warhead types currently deployed, the United States could compensate by loading reserve warheads onto existing delivery vehicles. In addition, nondeployed warheads could also be uploaded should a deteriorating international security environment demand such a response.

The NGWG supports significant reductions in the U.S. stockpile of nondeployed warheads in return for an alternative risk mitigation strategy based on an upgraded nuclear weapons production infrastructure, coupled with efforts to continually exercise all relevant skills bases.

To this end, we propose that the United States move toward an enhanced stewardship model that we term “science-based understanding and engineering-based sustainment” (SUES). Under this model, the United States would create and use a “trickle” production capability to continually “refabricate” U.S. nuclear warheads from scratch. Nuclear explosive packages would be manufactured according to existing, trusted designs, while improvements could be made to nonnuclear subsystems that improve the reliability, safety, and security of the warheads. To ensure consistency with current national policy, changes to nonnuclear components should neither improve the military characteristics of the warhead nor create the need for nuclear explosive testing. Refabricated warheads would be introduced into the stockpile continuously to replace older warheads on a one-for-one basis. In short, under SUES, discrete LEPs would become more continuous and the stockpile stewardship program would continually refabricate the entire U.S. stockpile every few decades.

The United States would not be able to implement SUES today because it lacks sufficient capability to produce pits (the nuclear cores of warheads). Planned investments in the U.S. nuclear weapons complex—including in the Chemistry and Metallurgy Research Replacement facility to be built at Los Alamos—would enhance the U.S. ability to produce pits by roughly an order of magnitude. This would help enable the trickle production capability we envisage and should allow the implementation of SUES.

SUES does not represent a revolution in stockpile management; it would be evolutionary. The Obama administration has already set out its vision of a “revitalized infrastructure” that would allow the United States to reduce its “reliance on large inventories of nondeployed warheads to deal with technical surprise . . . [and] also serve to reduce the number of warheads retained as a geopolitical hedge, by helping to dissuade potential competitors from believing they can permanently secure an advantage by deploying new nuclear capabilities.”²¹ The NGWG believes that SUES would help advance this vision by offering several advantages compared to the current program.

First, and most obviously, refabricating warheads would mitigate any possible aging effect by limiting the age of all warheads—and all warhead components—in the stockpile. The question of the aging of pits is a particularly controversial issue. The unclassified summary of a 2007 report by the defense advisory panel, JASON, stated that most types of pits “have credible minimum lifetimes in excess of 100 years as regards aging of plutonium.”²² However, it became clear to the NGWG during our work that there is some disagreement on this point from some who are cur-

21. U.S. Department of Defense, *Nuclear Posture Review Report*, 41. See also, U.S. Department of Energy, National Nuclear Security Administration, *FY 2011 Stockpile Stewardship and Management Plan Summary*, May 2010, 2.

22. R.J. Hemley et al., “Pit Lifetime,” JSR-06-335, MITRE Corporation (January 11, 2007), 1.

rently responsible for ensuring the reliability of the stockpile at the U.S. National Laboratories. We are in no position to adjudicate this dispute, but we believe that continued debate and concern over the issue is not in the U.S. national interest. Accordingly, we advocate SUES—which would involve using trickle production to refabricate pits—as a way to create enhanced confidence in the reliability of warheads among those who are currently responsible for certifying the stockpile. This enhanced confidence would, in turn, enable deep reductions in the number of nondeployed warheads retained for technical risk mitigation.

Second, there is a risk that the existing approach to LEPs will not utilize *all* design, engineering, and production skills bases continually. Based upon existing knowledge of plutonium aging, it is possible that many LEPs will reuse existing pits instead of fabricating new ones from precursor materials. Moreover, as currently envisaged, there will be many decades between successive LEPs of the same warhead type. The United States is likely to continue to reduce the number of weapon types in the stockpile for a number of reasons that include arms control and efficiency considerations. Given the limited time span of the implementation phase of each LEP, there may simply not be enough discrete LEPs in the future to ensure that the full range of capabilities needed to maintain the U.S. nuclear stockpile is continually exercised.

If key skills bases are not exercised, they could atrophy—as occurred in the 1990s and early 2000s—with serious consequences for stockpile management. For example, if the United States was to discover a flaw in the original design of a warhead, it might need to manufacture a large number of modified components (nuclear or nonnuclear) relatively quickly. Under current stockpile management practices, there is a risk that this might not be possible because the relevant skill base had deteriorated. By contrast, SUES would prevent atrophy and hence provide the United States with a way to manage such problems without retaining a large number of nondeployed warheads.

Indeed, if the United States did discover a major flaw in a warhead and was incapable of manufacturing modified components quickly, it might decide it had no choice but to test a nuclear weapon. By ensuring the continued viability of the U.S. production capability, SUES would reduce the chances that the United States would ever need to resume nuclear testing.

The need to avoid atrophy of skill bases is also important if the United States is to shift its geopolitical risk mitigation strategy from nondeployed warheads to a revitalized infrastructure. The Obama administration's goal of "dissuad[ing] potential competitors from believing they can permanently secure an advantage by deploying new nuclear capabilities" requires the United States to have the capacity to respond in kind. Some members of the NGWG also believe that if geopolitical circumstances change, the United States might want to build warheads with new capabilities. Since SUES would ensure a robust production complex with all relevant capabilities at the ready, it would maintain the U.S. ability to build new warheads in the future if necessary.

SUES represents a comprehensive approach to stockpile management. Specifically, it would ensure that the engineering capabilities needed to produce and sustain warheads remain robust and are placed on an equal footing with the investments in capabilities needed to enhance scientific understanding of the stockpile. Both types of capabilities—engineering and science—are critical to ensuring the long-term viability of the stockpile.

The NGWG recognizes that the shift to SUES and the continual refabrication of warheads would carry some significant costs. However, we emphasize that the infrastructure investments already being made should help incorporate an eventual shift to this new trickle production paradigm.

We also note the political advantages of SUES. Over the past decade, much of the debate about stockpile stewardship has focused on whether to develop warheads with a “new” design. Advocates of new warheads contend that this would address many of the challenges associated with the existing model of science-based stockpile stewardship. Members of the NGWG disagree on whether, as a matter of principle, the United States should build warheads with new designs and, indeed, whether doing so would actually constitute a solution to all of the problems of science-based stockpile stewardship. However, we recognize that, for the time being, the issue may be essentially moot. The 2010 Nuclear Posture Review report explicitly rejects “new” warheads. Even had it not, Congress has consistently refused to fund their manufacture, and we see little prospect of a reversal of this decision in the foreseeable future. Because SUES would involve refabricating existing types of warheads rather than designing and building new ones, we believe it would represent a politically acceptable model of stockpile stewardship.

We have not attempted to determine by how much SUES would allow the United States to cut its nondeployed stockpile. To be credible, such an analysis would have to be based on information unavailable in the public domain. Moreover, the answer would depend on the value ascribed to being able to rapidly increase deployed warhead numbers. Nonetheless, we believe that SUES would allow significant cuts in the U.S. nondeployed stockpile and hence enable an important component of the next round of U.S.-Russian arms control.

In particular, SUES would help address U.S. concerns about Russia’s greater ability to manufacture warheads. Moscow has little choice but to retain this capability: its warheads are reported to have much shorter service lives than U.S. equivalents, requiring Russia to manufacture warheads continually. However, Russia lacks the upload potential that the United States retains (in part because its warheads cannot be stored for as long as U.S. warheads can). The asymmetry in U.S. and Russian approaches to stockpile management will make it increasingly difficult to reach agreement on further arms control. By narrowing the gap between the two states’ stockpile management efforts, the adoption of SUES by the United States would help facilitate an agreement that encompassed all warheads while simultaneously providing the United States with a robust stockpile stewardship and replenishment program that meets its current and future needs.

Conclusions

There can be little doubt that the next round of arms control poses some truly daunting challenges. Underlying these challenges is a significant asymmetry between the interests, capabilities, and objectives of the United States and Russia.

Moscow’s primary goal is to curtail U.S. nonnuclear capabilities. In particular, it is concerned that ballistic missile defense and conventional prompt global strike could, if significantly expanded, undermine its strategic deterrent. Russia sees arms control as a potential remedy. The conventional balance in Europe is also a matter of concern, and Moscow may try to link this issue to nuclear arms control negotiations. Moscow’s principal—and perhaps only—interest regarding nuclear weapons in the next round is in curtailing the U.S. upload potential.

Washington’s interests, by contrast, lie with Russian nuclear weapons. Russia’s strategic forces remain one of the few truly existential threats faced by the United States. Consequently, it is firmly in the U.S. national interest to try to bolster strategic stability through arms control. U.S. allies face

a second existential threat in the form of Russian tactical nuclear weapons. They hope and expect that the next round of arms control will move toward addressing their concerns.

Summary of How Further U.S.-Russian Arms Control Could Advance the U.S. National Interest

| U.S. Interests | Potential Benefits of Arms Control |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Enhancing strategic stability | Prevent the deployment by Russia of a new highly MIRVed, liquid-fueled, silo-based ICBM; Secure an enhanced verification regime for strategic forces; Persuade Moscow that Russia is not the target of U.S. BMD efforts or CPGS and thus reduce the chances of instabilities in a crisis that might lead to nuclear use; Gain improved understanding of Russia's strategic forces, including a detailed understanding of current and future systems; Moscow's doctrine for their use; plans for future strategic forces; and methods of production, distribution, operation, support, maintenance, and retirement; Reduce U.S. military requirements with respect to Russia because of enhanced confidence in strategic stability. |
| Mitigating the disparity in tactical nuclear weapons | Gain a more detailed understanding of the size and composition of Russia's tactical nuclear weapon arsenal and of the role of such weapons in Russia's military doctrine; Enhance the physical security of Russia's TNWs by consolidating them at fewer sites. |
| Other U.S. interests | Gain access to Russian missile launch warning data, including data about missile launches from Iran; Bolster the U.S.-Russian relationship and hence secure Russian cooperation in advancing U.S. interests, especially with respect to non-proliferation; Demonstrate continued commitment to Article VI of the Nuclear Non-proliferation Treaty. |

To make progress requires significant trade-offs. Indeed, the scale of concessions demanded by some Russian officials in public statements has caused some justified consternation in the United States. We respond with two points:

- The NGWG fully recognizes that any arms control treaty is not automatically a good treaty. Every treaty must be judged on its merits, the key metric being whether it enhances U.S. national security and that of its allies. Accordingly, if Russia insists upon unacceptable conditions or offers inadequate concessions, the United States can and should refrain from concluding an agreement.

- Though Russia will ask much of the United States during the next round of negotiations, the United States can and should ask much of Russia. Indeed, as the table above demonstrates, it is worth emphasizing how much the United States stands to gain through arms control.

Gaining Russian agreement to this list will be challenging, and there is no guarantee that beginning a new round of arms control negotiations will lead to a successful outcome. However, we firmly believe that it is in the U.S. interest to try.

Appendix: Warhead Verification

As noted in the main text, a single limit on all warheads would require a comprehensive verification scheme capable of providing reasonable assurance that neither the United States nor Russia had exceeded the limit by a militarily significant quantity.²³ In theory, four separate tasks could be required:

- Verifying the number of warheads emplaced on deployed and nondeployed delivery systems;
- Verifying the number of warheads in storage;
- Verifying the assembly and disassembly of warheads; and
- Verifying the absence of warheads at undeclared locations.

The first of these tasks—verifying the number of warheads emplaced on delivery systems—would probably be relatively straightforward. While complex negotiations will inevitably be required (not least to ensure that the operation of dual-capable aircraft on nonnuclear missions is not impeded), there appears to be no fundamental difficulty in extending New START’s procedures for counting the number of warheads on deployed strategic delivery vehicles to nondeployed strategic delivery systems and tactical delivery systems.

A fundamentally new departure for arms control would be verifying the number of warheads in storage facilities. Warheads are stored at or near bases where delivery systems are deployed and, if they are in reserve or awaiting dismantlement, at centralized facilities. From a technical perspective, verifying the number of nuclear weapons at such facilities appears to be relatively straightforward. “Managed access” provisions could be developed to allow inspectors to enter storage vaults and count the number of warheads present. (In practice, as is usual in arms control verification, it would be sufficient for inspectors to verify some agreed fraction of the warheads declared to be present; they would not need to count every warhead on every inspection.) If vaults contain objects that could be mistaken for warheads, inspectors could use radiation detectors to verify that any suspicious objects are, in fact, nonnuclear. Such technology, which was developed for the INF treaty, was used successfully during the lifetime of that treaty and was subsequently adopted by both START I and New START.

Crucially, for inspections of storage vaults, it would not be necessary to tackle the difficult task of verifying that declared items really are warheads. It would not be in the interest of the host state to cheat by declaring that an item other than a warhead is a warhead. For the same reason, in New

23. Many of the issues in this section are analyzed in considerable depth in National Academy of Sciences, Committee on International Security and Arms Control, *Monitoring Nuclear Weapons and Nuclear Explosive Materials: An Assessment of Methods and Capabilities* (Washington, D.C.: National Academies Press, 2005), 45–108.

START inspections to verify the number of warheads emplaced on SLBMs and ICBMs, all objects declared to be warheads are simply assumed to be warheads. (By contrast, inspectors can use radiation detectors to verify that an item declared to be nonnuclear is, in fact, nonnuclear.)

That said, verification negotiations will almost certainly prove extremely difficult. Russian analysts are privately very skeptical of the feasibility of inspecting storage vaults and doubt Moscow would consent to such inspections. Nonetheless, inspections of warhead storage facilities are exactly the kind of concession Moscow will have to make if it expects the United States to take equally significant steps in addressing Russian concerns.

Verifying the assembly and disassembly of warheads would be a much harder task. Part of the challenge is that the facilities at which such operations take place are intrinsically more sensitive than storage vaults. An even greater challenge, however, would be verifying that objects slated for dismantlement are actual warheads. Here (in contrast to inspections of storage vaults) it might be in a state's interests to cheat by declaring an object other than a warhead to be a warhead. Since the late 1990s, Russia and the United States have worked—both individually and cooperatively—on developing technology (involving “information barriers”) that would enable inspectors to verify objects as warheads without disclosing sensitive national security information. More recently, the United Kingdom and Norway have also conducted joint research into this problem. However, there is broad agreement that much more work is needed to develop this technology (and on methods for establishing a chain of custody during the dismantlement process).

The final task—verifying the absence of warheads at undeclared facilities—would be by far the most difficult. It is not completely inconceivable that Russia and the United States would allow “challenge inspections” at undeclared facilities—such inspections are allowed under the Chemical Weapons Convention. However, challenge inspections would only be useful if there was an agreed way of demonstrating that an undeclared item was a warhead. Moreover, challenge inspections would only be as effective as the intelligence available to guide them. Obtaining intelligence about where small numbers of undeclared warheads might be located could be a very difficult task and further detracts from the utility of challenge inspections (although they might still have some deterrent value). Moreover, it might sometimes be undesirable to follow up on evidence of undeclared warheads because doing so could compromise sources and methods. Furthermore, the failure to discover a violation during an inspection would have huge political ramifications. Indeed, given this array of challenges, it is hardly surprising that the challenge inspection provisions of the Chemical Weapons Convention have never been invoked.

In the final analysis, the verifiability of a single limit on all warheads requires political judgment. While the U.S. and Russia retain thousands of warheads, we judge that an effective verification scheme could be developed from inspections to verify warheads emplaced on delivery vehicles and those in storage. At this point, verifying the assembly/disassembly of warheads and their absence at undeclared locations is only of secondary importance.



ABOUT THE NEXT GENERATION WORKING GROUP MEMBERS

James M. Acton, cochair, is a senior associate in the Nuclear Policy Program at the Carnegie Endowment for International Peace. A physicist by training, Acton has written extensively about deterrence, arms control, and disarmament, nuclear energy, and nonproliferation. His most recent publications include an Adelphi book, *Deterrence during Disarmament: Deep Nuclear Reductions and International Security*, and a Carnegie report, *Low Numbers: A Practical Path to Deep Nuclear Reductions*. He is coauthor of a second Adelphi book, *Abolishing Nuclear Weapons*, and coeditor of its follow-up volume, *Abolishing Nuclear Weapons: A Debate*. Acton is the joint UK member of the International Panel on Fissile Materials and has provided expert evidence to the UN Secretary General's Advisory Board on Disarmament and the Blue Ribbon Commission on America's Nuclear Future. He has published in *Bulletin of the Atomic Scientists*, *Foreign Affairs*, *Jane's Intelligence Review*, the *New York Times*, *Nonproliferation Review*, and *Survival*. During the Fukushima crisis, he appeared on CNN's *State of the Union*, NBC *Nightly News*, CBS *Evening News*, PBS *News Hour*, and MSNBC's *Rachel Maddow Show*.

Michael S. Gerson, cochair, is a research analyst and project director at the Center for Naval Analyses (CNA), where his research focuses on nuclear and conventional deterrence, nuclear strategy, arms control, missile defense, and WMD proliferation. Since joining CNA in 2006, he has regularly provided research and analysis on deterrence and nuclear issues to the U.S. Navy, and in 2007 he participated in the conceptual development and initial drafting of the Navy's maritime strategy, *A Cooperative Strategy for 21st Century Seapower*. In 2009, he served as a staff member on the Nuclear Posture Review, where he was a lead author of a study on international perspectives on U.S. nuclear policy and posture. He has guest lectured on deterrence and nuclear issues at John Hopkins School of Advanced International Studies, George Washington University, New York University, and Moscow State University, and has given briefings and talks at various places including U.S. Strategic Command, the Carnegie Endowment for International Peace, Stanford University's Hoover Institution, the New America Foundation, the NATO Defense College (Rome), and the Institute of World Economy and International Relations of the Russian Academy of Sciences (Moscow). He has published articles on the history of U.S. nuclear strategy, nuclear and conventional deterrence theory, U.S. nuclear policy, and contemporary deterrence challenges. He is a graduate of the University of Texas and the University of Chicago.

Alexandra Bell is an adviser at the U.S. Department of State. Previously, Bell was the project manager at the Ploughshares Fund, where she also served as special assistant to the president. During the 2008 election, Bell worked on arms control and nonproliferation issues for the Obama campaign. Prior to Ploughshares, Bell was a research assistant for nuclear policy at the Center for American Progress. She has worked with the Study Group on the Economics of Security and was an international reporter for ATV News in Hong Kong. Her articles have appeared in *State Magazine*, the *Huffington Post*, *The Hill*, *Real Clear World*, *Politica Exterior*, *Royal Services United Institute Journal*, *Democracy Arsenal*, *Good*, *Progressive Fix*, the *Asheville Citizen-Times*, and *Think*

Progress. From 2001 to 2003, Bell was a Peace Corps volunteer in southwest Jamaica. Bell received a master's degree in international affairs from the New School and a bachelor's degree in peace, war, and defense from the University of North Carolina at Chapel Hill. Bell is a Truman National Security Fellow and serves as codirector for the Washington, D.C., chapter.

Elbridge A. Colby is a research analyst at the Center for Naval Analyses. He served as policy adviser to the secretary of defense's representative to the New START talks, serving on the delegation in Geneva and then as a point man for the treaty ratification effort. Previously, he served as an expert adviser to the Congressional Strategic Posture Commission and in a number of other government positions, including with the Office of the Director of National Intelligence and the President's Silberman-Robb WMD Commission. He has been an adjunct staff member with the RAND Corporation and is a consultant to the Lawrence Livermore National Laboratory, U.S. Strategic Command, and other government bodies. He has written chapters and articles on strategic, proliferation, and intelligence issues in a variety of edited volumes, journals, newspapers, and weblogs, and has spoken at universities and conferences in the United States, Europe, and Asia. A term member of the Council on Foreign Relations and a member of the International Institute for Strategic Studies, he is a graduate of Harvard College and Yale Law School.

Jeffrey Fields is a senior policy analyst in Washington, D.C., where he works on long-term issues related to international security, nonproliferation, strategic surprise, and countering weapons of mass destruction. Previously, he served as a foreign affairs officer at the State Department in the Bureau of International Security and Nonproliferation. He also worked as a research associate at the James Martin Center for Nonproliferation Studies as well as the Center for Strategic and International Studies (CSIS). He received a PhD from the School of International Relations at the University of Southern California.

Michael C. Horowitz is an associate professor of political science at the University of Pennsylvania and a senior fellow at the Foreign Policy Research Institute. His research focuses on military innovation by state and non-state actors, nuclear proliferation, the intersection of religion and international relations, and the role of leaders in international politics. His first book, *The Diffusion of Military Power: Causes and Consequences for International Politics*, was published by Princeton University Press in 2010. His work has been published in *International Organization*, *International Security*, the *Journal of Conflict Resolution*, the *Washington Quarterly*, *Orbis*, and elsewhere. He received a PhD in government from Harvard University and a BA in political science from Emory University.

Whitney Raas is a nuclear engineer at the U.S. Department of Defense. Prior to working for DOD, she was employed by the U.S. Department of State as a policy analyst, where she had primary responsibility for technical assessments of nuclear arms control treaties, including the Comprehensive Nuclear Test Ban Treaty and the Fissile Material Cut-off Treaty, and for analysis of the Iranian and North Korean nuclear issues. She was also a key player in the development of the 2010 Nuclear Posture Review and was a member of and an adviser to the U.S. delegation to the 2010 Nuclear Non-Proliferation Treaty Review Conference. Before the State Department, Raas was a research analyst at the Center for Naval Analyses where she was involved with assessing counterinsurgency strategies in Afghanistan, spending six months in Khost and Nuristan provinces working on government development and reconstruction efforts. She holds a PhD in nuclear engineering and an MS in political science from the Massachusetts Institute of Technology.

Caroline S. Reilly is a second-year PhD candidate at the Woodrow Wilson School of Public and International Affairs at Princeton University. She received her undergraduate degree in aerospace engineering from MIT in 2006 and subsequently completed a master's degree from the War Studies Department at King's College London, where her thesis investigated the technical consequences of conflict in space. Prior to Princeton, Reilly was a research assistant with the RAND Corporation, focusing mainly on strategic force planning and policy analysis. She is also involved with the Project on Nuclear Issues' 2011 Nuclear Scholars Initiative and the Institute on Global Conflict and Cooperation's 2011 Public Policy and Nuclear Threats Program.

Matthew Rojansky is deputy director of the Russia and Eurasia Program at the Carnegie Endowment for International Peace. An expert on U.S. and Russian national security and nuclear weapons policies, his work focuses on relations among the United States, NATO, and the states of the former Soviet Union. From 2007 to 2010, Rojansky served as executive director of the Partnership for a Secure America (PSA), an organization that seeks to rebuild bipartisan dialogue and productive debate on U.S. national security and foreign policy challenges. Prior to PSA, Rojansky clerked for Judge Charles E. Erdmann at the United States Court of Appeals for the Armed Forces, the highest court for the U.S. military. He has also served as a consultant on the Arab-Israeli conflict and as a fellow at Stanford University's Center for International Security and Cooperation. He is frequently interviewed on TV and radio, and his writing has appeared in the *International Herald Tribune*, *Jerusalem Post*, and *Moscow Times*. Rojansky holds a BA from Harvard College and a JD from Stanford Law School.

Benjamin Rusek works as a program officer for the Committee on International Security and Arms Control (CISAC) at the U.S. National Academy of Sciences (NAS) on projects related to nonproliferation, arms control, and the misuse of science and technology. Rusek manages CISAC's interaction with the Chinese People's Association for Peace and Disarmament in Beijing and CISAC's subpanel examining threats related to biological weapons and dual-use biotechnology, and he also serves as program staff on CISAC's "Track II" dialogues and CISAC-administered National Research Council studies. Outside of the NAS, Rusek is the chair of the Executive Board of International Student/Young Pugwash (ISYP) and frequently works with the Nobel Peace Prize-winning Pugwash Conferences on Science and World Affairs. Previously, he held various positions at the Henry L. Stimson Center, the Arms Control Association, and the National Air and Space Museum (as an Ohio State University John Glenn Institute Policy Fellow). Rusek has political science degrees from Ohio State University and Purdue University, where he was the president of Purdue University Student Pugwash.

Michelle Smith is an associate at Oxford Analytica, a global analysis and advisory firm. She works with clients in the energy sector and focuses on Russia and Central Asia, nuclear energy, energy security, and technology policy. Prior to joining Oxford Analytica, Smith worked at the Council on Foreign Relations, where she provided research support to the Independent Task Force on U.S. Nuclear Weapons Policy and served as the writer and producer of an interactive guide to nuclear energy. She holds an MA in international affairs from George Washington University, a BA in political science from Miami University, and also studied in St. Petersburg, Russia. Her work has been published in the *Bulletin of the Atomic Scientists*, *Foreign Policy*, and the *International Herald Tribune*.

Jonathan S. Snider is a policy analyst in Washington, D.C., and a research associate at Penn State University. Previously, he was a technical scholar at the Center for Global Security Research at the Lawrence Livermore National Laboratory and a research assistant at the Japan Nuclear Cycle Development Institute. Snider received a master's degree from the University of Virginia and a bachelor's degree from the Edmund A. Walsh School of Foreign Service at Georgetown University. Currently, he is finishing his doctoral degree in political science at the University of California, Davis. His doctoral dissertation addresses the question of whether the elimination of nuclear weapons is strategically desirable. His research on this question is supported by a fellowship from the George C. Marshall Foundation.

Andrew (Drew) Walter was, during the development of this report, a senior member of the Technical Staff at Sandia National Laboratories. As a member of the Strategic Studies Department, he supported Sandia's executive leadership in exploring and defining long-term strategies for the Labs. His work included coordination of efforts to better integrate policies and technologies related to "all things nuclear" and leadership of a study assessing the impacts to the nation and Sandia of a significant reduction in the size of U.S. nuclear forces. Before joining the Strategic Studies Department, Walter spent three years analyzing, designing, and implementing security systems for nuclear weapons and other critical national assets as a member of Sandia's Security Systems and Technology Center. He received a BS and MS in mechanical engineering (aerospace option and thermal fluids concentration) from the Rochester Institute of Technology, where his research focused on unmanned micro air vehicle aerodynamics and applications. He is a member of the Board of Advisers of the CSIS Project on Nuclear Issues.

John K. Warden is a research assistant and program coordinator for the Project on Nuclear Issues (PONI) at CSIS. He leads a number of PONI activities—the Nuclear Scholars Initiative, International Outreach, and the Next Generation Working Group on U.S.-Russian Arms Control—and also coordinates the CSIS US-Japan-ROK Track II Nuclear Dialogues. As part of the project staff, he supported the CSIS reports *Exploring the Nuclear Posture Implications of Extended Deterrence and Assurance* as well as *Technical Challenges Associated with the New U.S. Nuclear Agenda* and has been a frequent contributor to the *PONI Debates the Issues* blog. After receiving a BA from Northwestern University, he joined CSIS as a recipient of the William J. Taylor debate internship.

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