Foreign Policy
at BROOKINGS

Nuclear Arms Control Choices for the Next Administration

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BROOKINGS
Arms Control and
Non-Proliferation Series
Paper 13 • October 2016

Acknowledgments

I would like to express my deep gratitude to Robert Einhorn, Daryl Kimball, Michael O'Hanlon, Olga Oliker, Marcie Ries, Bradley Roberts, Greg Thielmann, James Timbie, Amy Woolf, and Stephen Young for taking time to review drafts of this manuscript. I would also like to thank Rachel Slattery and her colleagues for their assistance in the production of this paper.

The contents and, in particular, the recommendations are my own.

Support for this publication was generously provided by the Ploughshares Fund and the Carnegie Corporation of New York.

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Introduction and Executive Summary

Arms control has figured on the agenda between Washington and Moscow since the 1960s. Successive U.S. administrations since that of Richard Nixon have pursued negotiated arms control arrangements to limit and reduce the number of Soviet (and Russian) nuclear weapons, to enhance strategic stability, to increase transparency and predictability, to reduce the costs of U.S. nuclear forces, and to bolster America's non-proliferation credentials.

Negotiations on arms control have proceeded in times of both good and difficult relations. At times, progress on arms control has helped drive a more positive overall relationship between Washington and Moscow. At other times, differences over arms control and related issues have contributed to a downward slide in relations. The next president will take office in January 2017, when the overall U.S.-Russia relationship is at its lowest point since the end of the Cold War.

The prospects for a resumed U.S.-Russian dialogue on nuclear arms control now appear bleak. But arms control is, if anything, more important when U.S.-Russian relations are adversarial than when they are working well. While there are few grounds for optimism, the next administration should not exclude the possibility that Moscow might be prepared to reengage. Even if the Russians do not immediately reengage, having a forward-looking arms control approach may be useful for maintaining the support of allies and resisting international pressures to pursue disarmament courses that Washington will not like.

Over the past several years, a clear difference emerged between the U.S. and Russian approaches to arms control. The Obama administration sought further reductions of U.S. and Russian nuclear weapons, going beyond what is required by the New Strategic Arms Reduction Treaty (New START). Moscow focused on related questions, such as missile defense, advanced conventional strike systems, and third-country nuclear forces. If an arms control dialogue is revived, and if the next administration decides to pursue further nuclear weapons cuts, it will have to address the issues raised by Russia.

Nuclear Weapons, Related Issues And Options

The next administration will inherit the modernization program that the Obama administration deemed necessary to meet its strategic force requirements, entailing a new ballistic missile submarine, a new intercontinental ballistic missile (ICBM), a new bomber, and a new nuclear-armed air-launched cruise missile. The next administration will want to review this program, including whether it is affordable; many believe that it is not, or that it can be funded only by taking resources from conventional force capabilities. Questions include: Does the United States need to continue to maintain a triad of submarine-launched ballistic missiles (SLBMs), ICBMs, and bombers? Should the numbers planned by the Obama administration be adjusted? Does the new nuclear-armed air-launched cruise missile provide a redundant capability?

The administration may also want to examine policies regarding how U.S. strategic nuclear forces are

operated. Does it wish to consider adopting a policy of no first use of nuclear weapons, or would it want to declare that the sole purpose of U.S. nuclear weapons is to deter a nuclear attack on the United States or American allies? Would it want to consider proposals to de-alert the U.S. ICBM force, which can be launched in a matter of a few minutes?

As for dealing with Russia on the question of nuclear arms reductions, the administration will have to decide whether and when it might seek to extend the New START Treaty, which expires by its terms in 2021 but can be extended for up to five years. Should Moscow be prepared for negotiations going beyond New START, the administration will have to decide whether—and how much lower—to seek to reduce limits on deployed strategic warheads and deployed strategic delivery vehicles. Will it want to change the counting rules for bomber weapons, which provide a "discount" compared to warheads on ballistic missiles? New START covers only deployed strategic warheads; the next administration will want to consider how to deal with reserve strategic nuclear warheads and non-strategic nuclear weapons, which are unconstrained.

Missile defense has been a difficult issue on the U.S.-Russian agenda for almost twenty years (and it was problematic earlier on the U.S.-Soviet agenda.) Moscow seeks to limit U.S. missile defense capabilities, while Republicans in Congress appear opposed to any limits, leaving a constrained space in which to work this question. In the context of Russian agreement to further nuclear arms reductions, are there options that Washington could exercise, after consulting with NATO, regarding missile defenses in Europe that might be of interest to Moscow?

The Russians have raised advanced conventional strike systems only relatively recently. The main issue appears to be long-range hypersonic glide vehicles, which both sides are developing. Given that the Pentagon sees these as a "niche" capability, could these be constrained in a way that would remove them as a problem issue on the agenda? A separate question is whether and how to deal with conventionally-armed cruise missiles.

Arms control cannot forever remain just a U.S.-Russian enterprise, but expanding the process to bring in third countries is complicated, in part by the disparity in numbers between the United States and Russia, on the one hand, and all other nuclear weapons states, on the other. One might first look at bringing in Britain, France, and China, with possibilities including negotiated numerical limits, unilateral commitments, and transparency and confidence-building measures.

Recommendations

The next president should carry out a nuclear posture review early in her or his term to examine the requirements for U.S. nuclear forces and policy and whether current and planned nuclear forces meet those requirements. Special attention should go to Russia, given the size and variety of its nuclear forces, the more belligerent stance it has adopted toward the West in recent years, and Moscow's loose talk about nuclear use.

The nuclear posture review should examine the U.S. force structure that the new administration inherits and ask if that is the right structure and whether it is affordable. Ideally, requirements, policy, and strategy rather than budgets dictate U.S. force structure, but this is not an ideal world. It would be unwise not to factor the budget situation into the decision process.

The nuclear posture review should reaffirm that the triad of SLBMs, ICBMs, and bombers will be maintained but should suspend the Long-Range Standoff (LRSO) weapon program and take a hard look at whether a nuclear-armed air-launched cruise missile is needed in view of the B-21 bomber's projected stealth and advanced electronic warfare capabilities. While maintaining the triad, the nuclear posture review should consider whether it is necessary to keep the current planned force structure of 700 deployed strategic delivery vehicles. A force structure of 500 deployed strategic delivery vehicles could carry close to New START's permitted 1,550 deployed strategic warheads and produce significant cost savings. Such a force could also readily accommodate a smaller num-

ber of deployed strategic warheads, were there to be a new arms reduction agreement or a decision to make a unilateral reduction in deployed strategic warheads.

The nuclear posture review should consider ways in which to give the president more time to make a decision regarding use of nuclear weapons—hours, even days. The next administration thus should consider whether it needs or wants to maintain the ability to launch ICBMs under attack. An easing of the requirement for prompt launch would have implications for the U.S. force structure, as well as send important signals regarding U.S. strategy and intentions.

The administration should commission a study on moving to a policy in which the United States would state that the sole purpose of its nuclear weapons is to deter a nuclear attack on the United States, U.S. allies or U.S. forces, consulting with allies on this question.

If the next administration adopted some or all of the above recommendations, it would need to decide when and how to roll them out. A major consideration would be the state of the U.S.-Russia relationship. The administration would not want to adopt actions that looked like they ignored or rewarded Russia's recent bad behavior, but it would not want to wait and lock itself into a modernization program that is unaffordable. This will be a tough dilemma.

Parity with Russia matters less today in strategic terms, as the Obama administration and Pentagon have indicated. While parity may be less necessary for strategic stability, it can matter politically. Allies may become concerned if the numbers gap between the United States and Russia appears too large, even if the gap may not have much strategic meaning. Also, negotiating with Russia may become more difficult if the United States has significantly lower numbers. Thus, while not foreclosing unilateral decisions regarding U.S. strategic forces, and in any event at least suspending the decision to proceed with the LRSO, it would be wise for the next administration first to seek to engage Russia in a negotiation aimed at mutual reductions.

When exploring Moscow's readiness to reinvigorate the arms control dialogue, the administration should indicate that, in the context of an agreement that further reduced U.S. and Russian nuclear weapons, it would be prepared to consider measures in the areas of missile defense, advanced conventional strike weapons, and third-country nuclear forces that would address stated Russian concerns. It should make clear that the process also must resolve concerns regarding compliance with the Intermediate-range Nuclear Forces Treaty.

The next administration should seek a negotiation that covers all U.S. and Russian nuclear weapons—strategic and non-strategic, deployed and non-deployed. The U.S. position should seek to limit each country to no more than 2,200 total nuclear weapons, with a sublimit on deployed strategic warheads, the weapons of greatest concern. The U.S. position should seek to limit each side to no more than 500 deployed strategic delivery vehicles. Within such a limit, the United States could deploy a modern, secure and effective strategic triad.

On missile defense, the next administration should reiterate the 2013 proposal for a U.S.-Russian executive agreement on missile defense transparency. In addition, U.S. officials should consult with NATO on indicating that Washington would be prepared to consider steps to cap the number of SM-3 interceptor missiles in Europe, depending on how far Moscow was prepared to go in negotiating nuclear reductions.

As for conventionally-armed hypersonic glide vehicles, the next administration—if it decides that it wants to field such a capability—should offer to negotiate with Moscow a separate agreement limiting each side to no more than 20 or 30 such systems. Conventionally-armed air-launched and sea-launched cruise missiles do not readily lend themselves to limitation, but the next administration could offer a dialogue on cruise missile capabilities and their impact on the U.S.-Russian strategic balance.

As for third-country nuclear forces, the next administration could inform Moscow that, in the context

of a negotiation of a new nuclear arms reduction agreement that covers all U.S. and Russian nuclear weapons, Washington would be prepared to work with Russia to elicit from Britain, France, and China politically-binding unilateral commitments not to increase the total number of their nuclear weapons.

These ideas might make it possible to bridge the gap that has emerged between the United States and Russia on arms control and related issues in recent years. Whether a U.S. approach that incorporated these elements would succeed, particularly in a time of tense bilateral relations, is a proposition to test with Moscow. Even if the Russian government was not prepared to engage, a stated U.S. readiness to pursue a 50 percent reduction in U.S. and Russian nuclear weapons could serve as a powerful sign of American commitment to reduce the nuclear danger. That may prove useful if, or as, international pressure builds for more progress on nuclear disarmament.

CHAPTER 1

Arms Control with a Difficult Russia

Arms control has been a major component of the U.S.-Soviet and U.S.-Russian agenda for five decades. For example, the Reagan administration's four-part agenda with the Soviet Union led with arms control, adding regional conflicts, bilateral issues, and human rights questions. At several points, such as in the late 1960s and mid-1980s, arms control served as the primary channel for discussion between Washington and Moscow, and progress has served as a driver for an improved overall bilateral relationship. At other times, the failure to make progress on arms control or resolve differences over related issues has contributed to a downward slide in relations.

The negotiations between Washington and Moscow have produced a number of agreements limiting and reducing nuclear arms, in one case banning an entire class of nuclear weapons. The sides have conducted those negotiations in times of both good and difficult relations.

The Objectives of Arms Control

Every American president since Richard Nixon in the 1960s has negotiated formal nuclear arms control agreements as a tool to advance U.S. security interests. One objective has been to reduce the number of Soviet, later Russian, nuclear warheads that could target the United States or its allies. Despite significant reductions in nuclear weapons numbers over the past several decades, Russia today—like the Soviet Union before it—is the one country that could physically destroy America. Consequently, U.S. policy has focused on nuclear weapons controlled by Moscow, though containing the spread of nuclear arms to other countries has been another way to mitigate the nuclear threat to the United States. A catastrophic large-scale nuclear exchange is not likely but, in general, the fewer the number of nuclear weapons that could strike the United States, the better for American security and the security of U.S. allies.

Another objective of nuclear arms control—the one that drove U.S. negotiating positions from the late 1960s through the early 1990s in the Strategic Arms Limitation Talks (SALT) and the negotiations on the first and second Strategic Arms Reductions Treaties (START)—has been to promote strategic stability. Strategic stability is seen as having two components. The first is crisis stability, referring to a situation in which neither side has an incentive to use nuclear weapons first in a crisis, recognizing that the other—even after having been struck first—would still have sufficient nuclear weapons to inflict a devastating response. That is the basis for mutual nuclear deterrence. The second component of strategic stability is arms race stability, referring to a situation in which the pressures to develop and deploy new strategic weapons are reduced. During the Cold War, strategic stability estimates focused on the United States, Soviet Union, and their mix of strategic offensive nuclear systems and missile defenses. That is changing. The advent of highly-accurate conventional strike weapons plus the possibility of conflict in the new space and cyber domains, as well as developments in third-country nuclear forces, will complicate future stability calculations.

A third goal of nuclear arms control has been to increase transparency, which is provided, inter alia, through data exchanges, notifications, and inspections. Such measures augment the two countries' national technical means, such as imaging satellites. For example, the 2010 New Strategic Arms Reduction Treaty (New START) makes provision for inspection of the number of warheads deployed on particular strategic ballistic missiles, information the sides presumably could not acquire by national technical means. Transparency measures permit Washington and Moscow to better understand the other's weapons numbers and capabilities, avoid worst-case assumptions, and make smarter decisions about equipping and operating their nuclear forces.

A closely related objective is predictability. With an arms control agreement capping both sides' strategic nuclear forces, the strategic environment is more predictable, which contributes to stability. For example, New START will be in force until 2021 and could perhaps be extended by up to five years. For as long as the treaty is maintained, there is a degree of predictability about Russian force levels that would not be possible absent an arms control regime.

A fifth goal has been to reduce the costs of procuring, maintaining, and operating nuclear forces. They are not cheap. The new U.S. ballistic missile submarine to replace the Ohio-class submarine will cost $5 to $7 billion per boat, and some estimates put the cost of buying and operating U.S. strategic nuclear forces over the next 30 years at $1 trillion. Paying for those forces entails an opportunity cost in the form of defense dollars that cannot be devoted to conventional forces or forgone budget savings.

A sixth goal has been to bolster U.S. arms control credentials in order to increase Washington's ability to achieve its non-proliferation objectives. Even though their nuclear arms have been cut greatly over the past 25 years, the United States and Russia together still account for some 90 percent of the world's nuclear weapons (not including the thousands of U.S. and Russian weapons that have been retired and await dismantlement). Deeper U.S.-Russian nuclear arms reductions would demonstrate that the two leading nuclear powers take seriously their obligation in Article VI of the Non-Proliferation Treaty to pursue nuclear disarmament. Of course, a new U.S.-Russian arms reduction agreement will not persuade North Korea to abandon its nuclear weapons program. It could, however, strengthen Washington's ability to motivate third countries to apply pressure on Pyongyang and to take other steps to reinforce the global non-proliferation regime. That could help reduce pressure on U.S. allies such as South Korea and Japan to develop their own nuclear weapons capabilities.

Other goals also motivate U.S. arms control policy. Arms control progress with Russia can contribute to an improved overall relationship. This could be particularly relevant now, at a time when U.S.-Russian relations are at their lowest point since the end of the Cold War.

Arms control proposals, moreover, can facilitate compensatory steps that would be necessary in the event of failure to reach an agreement, or which could increase the chances of gaining an agreement. For example, the arms control track of the 1979 NATO dual-track decision was necessary in order to maintain allied commitment to proceed with the deployment track and locate U.S. intermediate-range missiles in Europe; those deployments in turn prompted a change in the Soviet approach, enabling a treaty banning all U.S. and Soviet land-based intermediate-range missiles.

A Difficult Russia

In fall 2016, the near-term prospects for a resumed U.S.-Russian dialogue on nuclear arms control appear bleak. The overall political relationship between Washington and Moscow is at a nadir. Despite lengthy exchanges between the U.S. and Russian foreign ministers, Syria remains a point of serious contention between the two countries. The two countries differ sharply over Russia's aggression against Ukraine (which Moscow denies), and there is little evidence to suggest that a settlement of the Russia-Ukraine conflict will be achieved any time

soon. Indeed, Brexit, general elections in France and Germany in 2017 plus signs of potential internal European division may lead Russian President Vladimir Putin to hope for a breakdown in European Union or trans-Atlantic unity that will allow him a freer hand regarding Ukraine.

Problems have arisen with arms control arrangements. Russia suspended its observance of the 1990 Conventional Armed Forces in Europe Treaty in 2008 and has restricted overflights in ways not consistent with the obligations of the 1992 Open Skies Treaty. In 2014, the U.S. government announced that Russia had violated the 1987 Intermediate-range Nuclear Forces (INF) Treaty by testing a ground-launched cruise missile of intermediate range. Moscow also has pulled back on bilateral nuclear threat reduction and non-proliferation cooperation.

It has become increasingly evident that Moscow has adopted a belligerent approach toward the United States and the West. It has challenged the European security order that was codified in the 1975 Helsinki Final Act, in particular violating the cardinal rule: States should not use force to take territory from other states. In recent years, Russian military aircraft more frequently fly near NATO air space, Moscow backs populist politicians and parties that seek to weaken European institutions such as the European Union and NATO, and Russian hackers aggressively operate against Western governments and private institutions in cyberspace. All this takes place against the backdrop of a major Russian military modernization effort, including modernization of Russia's strategic nuclear forces. Putin and other Russian officials have engaged in nuclear saber-rattling of a kind not seen since the Cold War, raising questions as to whether the Kremlin leadership fully appreciates the risks of nuclear brinkmanship. Few in the West speak now about integrating or drawing Russia closer to the Euro-Atlantic community as they did in the 1990s or early 2000s; the Kremlin seems to prefer an adversarial relationship.

Above and beyond such problem areas, where Washington and Moscow have different and clashing interests, domestic politics are a key driver of Kremlin foreign policy, including in Ukraine. During his first two terms as president in 2000 to 2008, Putin based regime legitimacy on a growing economy and rising living standards. He faced a more difficult economic situation when he returned to the presidency for his third term in 2012. Putin now stresses Russian nationalism and Russia as a great power reasserting its place and voice on the world stage as a basis for regime legitimacy. Under his leadership, Russia has taken a clear turn toward greater authoritarianism and self-isolation from Western societies.

Another part of the challenge of dealing with contemporary Russia is that, by all appearances, Putin believes that the West—principally the United States—exploited Russian weakness in the aftermath of the Cold War to take actions such as enlarging NATO and the European Union, which he believes infringe on Russia's traditional sphere of influence. Putin sees such enlargement as driven by the goal of hemming in Russia rather than as a response to the desires of Central European states to fully integrate into European and trans-Atlantic institutions. Putin seems to believe the 2003 Rose Revolution in Georgia, and the 2004 Orange Revolution and 2014 Maidan Revolution in Ukraine were not manifestations of public disaffection with stolen elections or poor governance but sprang from plots organized, funded and directed by Western intelligence services to disadvantage Russia and perhaps even threaten Putin's position in his own country. The reality is very different, but Putin feels aggrieved, and his perceptions, however flawed, shape his policy choices.

While U.S. and Russian interests clash on a number of issues, they converge on other questions, where Washington and Moscow have been able to cooperate. The best examples of late have been their work, together with European Union countries and China, to curb Iran's nuclear weapons program and their cooperation to eliminate Syria's chemical weapons. The bilateral relationship for the foreseeable future will consist of sharp confrontation on some questions mixed with other issues where the two countries cooperate, though the balance over the past several years has shifted in the direction of confrontation.

Many expect this period of tense West-Russia relations to persist for a number of years. U.S.-Russian exchanges on nuclear arms control have been at a virtual standstill for the past three years, and related issues such as Russia's violation of the INF Treaty and differences over missile defense continue to fester. Some Russian officials and analysts appear to believe that the U.S. objective is to develop a combination of nuclear, advanced conventional strike, and missile defense capabilities that would allow the United States the possibility, in a crisis, to strike first. They read U.S. public pronouncements regarding a force that can deter and, if necessary, defeat a potential adversary as reflecting this objective.

There are few grounds for optimism about near-term arms control prospects. That said, one should not completely write them off. Russian officials reportedly have said they might be prepared to reengage on nuclear arms control once the New START Treaty is fully implemented in February 2018. Other factors could affect the Kremlin's calculations. For one, the Russian economy appears to be moving out of recession, but many analysts predict that it is headed for long-term stagnation, which could generate pressures on Moscow's defense spending.

If anything, the downturn in U.S.-Russia relations makes agreements such as New START count more. Having a cap on the other's strategic nuclear capabilities and transparency measures that provide enhanced information and predictability regarding the other's nuclear forces are more valuable in times of tension than when the bilateral relationship is working well. Arms control is more important between states that have adversarial relations than between states with long-established friendly ties (no one in Washington, London, or Paris sees a need for nuclear arms limitation arrangements among the three Western nuclear weapons states).

Moreover, the tone and substance of the arms control dialogue between Washington and Moscow have reversed relatively quickly in the past (often in connection with a change of leadership in one of the capitals). Matters turned around after Barack Obama assumed the presidency in 2009 and dealt with then Russian President Dmitry Medvedev. U.S.-Russian relations bounced back from their previous low following the August 2008 Russia-Georgia conflict to a period of significant cooperation that produced, among other things, New START. That had an earlier antecedent: Following the Soviet walkouts from the START and INF negotiations in late 1983, 1984 became a lost year for U.S.-Soviet relations. The arms talks resumed, however, in early 1985, just as Mikhail Gorbachev came to power in Moscow. By the end of 1987, they had produced the INF Treaty and basic elements of the START Treaty as well as providing an impetus toward the most positive period in U.S.-Soviet relations.

While the president who takes office in January 2017 should not expect such a positive reversal, she or he should not exclude it. If the Russians indicate a readiness to reengage (in 2017 or whenever), Washington will need a position on reducing nuclear forces and related questions. Without appearing too eager, the next administration can and should signal Moscow that it is open to a resumed dialogue on nuclear arms control and related issues. A readiness to engage on issues such as missile defense, advanced conventional strike systems, and third-country nuclear forces will very likely be necessary if Washington wants to bridge the gap in the two countries' approaches to arms control that became clear after 2011.

Even if the Kremlin is not prepared to discuss these questions, the next administration may still see value in having a forward-looking position on arms control. In 1981, no one in President Ronald Reagan's administration expected the Soviets to agree to the zero-zero proposal for intermediate-range missiles, under which the Soviet Union would eliminate its existing SS-20, SS-4, and SS-5 missiles in return for the United States not building planned Pershing II and ground-launched cruise missiles. What zero-zero did do was give the United States a strong proposal that sustained the support of NATO allies for deploying the Pershing II and ground-launched cruise missiles. Several years later, Gorbachev surprised many and accepted the U.S. position, making the INF Treaty possible.

Meanwhile, it appears likely that, at the U.N. General Assembly, a majority of the world's countries will approve—over the objections of the United States, Russia, and other nuclear weapons states—a mandate to launch a negotiation aimed at concluding a ban on nuclear weapons, an approach the nuclear powers deem unrealistic and at variance with the step-by-step method responsible for arms control progress of the past five decades. Some 100 countries, perhaps more, could support such a mandate and join the negotiation. These kinds of things invariably result in more international pressure on the United States than on other nuclear weapons states. Having an arms control approach that would entail further U.S. and Russian nuclear reductions, as well as offer a path to settlement of differences over related questions, could put Washington in a stronger position to withstand such pressure.

Finally, Democrats on Capitol Hill have begun to question the high costs of the planned U.S. strategic force modernization program. Just as some Republican senators conditioned their support for New START ratification in 2010 on the Obama administration's commitment to update U.S. strategic forces, Democrats could condition their support for the outlays needed to modernize those forces on the next administration demonstrating its commitment to seek further nuclear arms control arrangements.

CHAPTER 2

Nuclear Arms Control to Date

Negotiations aimed at limiting and reducing U.S. and Soviet/Russian nuclear weapons and altering the mix of forces in those arsenals date back five decades. They began as efforts to constrain the growth in nuclear arsenals. Beginning in the 1980s, the two countries moved on to negotiate actual reductions, including the elimination of the entire class of land-based intermediate-range missiles. U.S. negotiators sought and had some success in reducing elements of Soviet strategic forces—particularly heavy, multiple warhead ICBMs—that seemed especially threatening. The 2010 New Strategic Arms Reduction Treaty is the most recent agreement. As a result of these treaties and unilateral decisions made in Washington and Moscow, the U.S. and Russian nuclear arsenals today—believed to number about 4,500 nuclear weapons each—are a fraction of what the United States and Soviet Union maintained during the Cold War.

While multilateral negotiations did not produce numerical limits on nuclear weapons, they began in the early 1960s. The 1963 Limited Test Ban Treaty, which prohibited nuclear testing in the atmosphere, underwater or in outer space, was signed by the United States, Russia, and Britain and subsequently opened for signature by other states. In 1968, the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) was concluded in an effort to prevent the spread of nuclear arms. The NPT, which went into force in 1970 and was extended indefinitely in 1995, embodies three basic agreements: The five nuclear weapons states recognized by the treaty (Britain, China, France, Russia, and the United States) agree to pursue disarmament; the non-nuclear weapons states agree to forgo acquiring nuclear weapons; and the non-nuclear weapon states gain access to civil nuclear technology. The Comprehensive Test Ban Treaty, banning all nuclear explosive tests, was signed in 1996 but has yet to enter into force. In addition, much of the world is now covered by regional groupings of states that have agreed to nuclear weapons free zones.

These agreements, particularly the bilateral arrangements concluded between Washington and Moscow, will provide the background and starting point for the next administration when it considers its choices regarding nuclear arms control.

Nuclear Arms Control during the Cold War

By the mid-1960s, both the United States and Soviet Union were well on their way to deploying strategic nuclear triads, consisting of submarine-launched ballistic missiles (SLBMs) on board ballistic missile submarines, land-based intercontinental ballistic missiles (ICBMs), and long-range strategic bombers. That said, they chose different force structures, with the Soviets placing emphasis on ICBMs, while the Americans focused more on SLBMs and bombers. U.S. and Soviet officials launched the first negotiation to cap strategic nuclear weapons, the Strategic Arms Limitation Talks, in 1969.

In May 1972, SALT produced two agreements. The Anti-Ballistic Missile (ABM) Treaty prohibited each country from deploying a nationwide ABM system

and limited each to two ABM sites, one near its capital and one at an ICBM field. Each site could contain no more than 100 ABM interceptor launchers. The treaty limited the location and orientation of large radars, so that they could not be used as battle management radars to guide interceptors to targets.[1]

The logic underlying the ABM Treaty was that, if the United States and Soviet Union were allowed to field unlimited numbers of ABM interceptors, they would have an incentive to add more and more ICBM and SLBM warheads to their arsenals, in order to have confidence in their ability to overwhelm the other's defenses, especially in a situation when they had been struck first. Additional weapons would contribute little to security and only pile up costs. By constraining interceptors and radars, the ABM Treaty made it possible for the U.S. and Soviet militaries to accept some limits on their strategic offensive nuclear arms numbers.

The second agreement was the Interim Offensive Arms Agreement. It limited the number of U.S. and Soviet ICBM and SLBM launchers to the numbers then deployed and under construction. In the agreement, "launcher" was defined as an ICBM silo or a launch tube on a ballistic missile submarine—items that could be counted with the surveillance satellites and other national technical means of that time.[2] The agreement did not constrain warhead numbers.

Although the Interim Offensive Arms Agreement did not specify numbers, it in effect allowed the Soviet Union more ICBM and SLBM launchers. That advantage was offset by the fact that the United States maintained a much larger strategic bomber force, and bombers were not limited. Moreover, the U.S. military had begun the process of placing multiple independently targetable reentry vehicles (MIRVs) on its ICBMs and SLBMs, which meant that the smaller number of U.S. launchers carried more warheads than the Soviet missile force.

In 1974, American and Russian negotiators produced a protocol to the ABM Treaty, which constrained each side to a single ABM site (instead of two) with no more than 100 ABM interceptor launchers. President Gerald Ford and General Secretary Leonid Brezhnev also agreed on guidelines for a SALT II agreement.

President Jimmy Carter and Brezhnev signed SALT II in 1979. The treaty allowed each side no more than 2,250 strategic nuclear delivery vehicles, which it defined as ICBM and SLBM launchers and strategic bombers. It also contained a series of sublimits; for example, each side could have no more than 1,200 launchers for MIRVed ICBMs and SLBMs (a main U.S. goal was to limit Soviet MIRVed ICBMs, for which American negotiators had to agree to include MIRVed SLBMs). SALT II required that the U.S. and Soviet militaries make minor cuts in the numbers of their strategic nuclear delivery vehicles, but it did not directly cap the total number of warheads.[3] By that time, both sides were developing and/or deploying MIRVs on their ICBMs and SLBMs as well as nuclear-armed, long-range air-launched cruise missiles (ALCMs) for their strategic bombers. Strategic warhead numbers on both sides continued to grow.

U.S.-Soviet relations took a downward turn in late 1979, in particular following the December Soviet invasion of Afghanistan. The Senate did not consent to ratification of SALT II. Still, under President Ronald Reagan, who took office in 1981, the United States observed a policy of not undercutting the SALT II limits until 1986, when the United States exceeded the number of ALCM-capable bombers allowed by the treaty. By then, Washington and Moscow were negotiating the Strategic Arms Reduction Treaty, which sought to cover warheads as well as delivery vehicles and provide for reductions, not just limitations. (At the end of the 1980s, the United States and Soviet Union each had over 10,000 strategic nuclear warheads.)

While the basic elements of START were agreed in 1987, the sides needed several years to wrap up the details, in part due to Russian concern about Reagan's Strategic Defense Initiative. President George H. W. Bush and Soviet President Mikhail Gorbachev signed START in 1991, just months before the dissolution of the Soviet Union. START limited

each side to no more than 1,600 strategic nuclear delivery vehicles—ICBM launchers, SLBM launch tubes, and strategic bombers—and constrained each side to no more than 6,000 warheads. The treaty's warhead count was based on attribution: A database listed the number of warheads attributed to each type of strategic missile and bomber, and the treaty prohibited the deployment of any missile or bomber with more than the attributed number of warheads.[4] For example, the Minuteman III was attributed with three warheads, so every Minuteman III silo was counted as three warheads, even if some Minuteman III ICBMs might carry fewer than three. START represented the first negotiated reductions in strategic offensive nuclear forces, reversing the trend of growth that had continued through the 1960s, 1970s, and early 1980s. Of particular interest to the American side, START required a 50 percent reduction in Soviet SS-18 ICBMs, heavy missiles that could carry 10 warheads each.

START's signature followed by nearly four years the conclusion and signature of the 1987 INF Treaty. That agreement provided for the elimination of *all* U.S. and Soviet ground-launched ballistic and cruise missiles with ranges between 500 and 5,500 kilometers. The treaty resulted in the elimination of all U.S. ground-launched cruise missiles and Pershing II and Pershing I ballistic missiles, while the Soviets eliminated all SS-20, SS-4, SS-5, SS-12/22, and SS-23 ballistic missiles.[5] By the end of the treaty's elimination period in mid-1991, the two countries had destroyed some 2,700 INF missiles, along with launchers and other associated equipment.

U.S.-Russian Nuclear Arms Control

The Soviet Union collapsed shortly after the START Treaty—later known as the START I Treaty—was signed in 1991. The collapse left former Soviet strategic weapons systems in Russia, Belarus, Kazakhstan, and Ukraine. Those four countries and the United States concluded the Lisbon Protocol in May 1992. The protocol provided that the four post-Soviet states would take on the Soviet Union's START I obligations. Moreover, Belarus, Kazakhstan, and Ukraine agreed to eliminate all strategic nuclear weapons on their territory and accede to the NPT as non-nuclear weapons states.[6]

The United States and Russia quickly negotiated a START II Treaty, which President Bush signed with Russian President Boris Yeltsin just before Bush left office in January 1993. START II built on START I and limited each side to no more than 3,000-3,500 strategic warheads. The agreement banned heavy ICBMs and ICBMs equipped with MIRVs, key American objectives.[7] However, due to differences between Washington and Moscow over NATO enlargement, NATO's 1999 air campaign against Serbia and missile defense, START II never entered into force. START III negotiations launched by President Bill Clinton and Yeltsin in 1997 never came to fruition.

George W. Bush became president in 2001. At the end of that year, his administration announced its intention to withdraw from the ABM Treaty after it had been in force for nearly 30 years. The Russian government disagreed but did not protest much, though it did formally withdraw its conditional ratification of START II. The Bush administration was not a fan of traditional U.S.-Soviet/Russian arms control measures and originally proposed that Washington and Moscow merely declare their planned level of strategic warheads. However, with the Russian economy in difficult straits and the number of Russian strategic weapons decreasing as older systems aged out, Russian President Vladimir Putin pressed for a treaty. Bush agreed.

In May 2002, Bush and Putin signed the Strategic Offensive Reductions Treaty (SORT). A two-page agreement with no agreed definitions, counting rules or verification measures, SORT constrained each side to no more than 1,700 to 2,200 operationally deployed strategic warheads, the Bush administration's planned number for U.S. strategic forces.[8] SORT was set to expire by its terms on December 31, 2012—the day that the limits were scheduled to take effect. Moreover, the treaty did not limit the number of strategic missiles and bombers (though

those were still constrained by the START I Treaty, whose terms lasted until 2009). Under SORT, the United States counted the actual number of warheads on ICBMs and SLBMs plus the number of bombs and nuclear-armed ALCMs at nuclear-capable bomber bases as "operationally deployed." It is not clear that the Russians employed the same counting rules; some analysts suggested that Moscow did not count bomber weapons as those weapons were not deployed on the aircraft.

START I remained in force until December 2009. Toward the end of the Bush administration, U.S. and Russian experts discussed whether some arrangement in addition to SORT might be agreed as START I lapsed in order to maintain some of START I's monitoring provisions. The U.S. side, however, was not prepared to consider limits on strategic delivery vehicles, which the Russian side sought. No agreement was reached.

Obama's Arms Control Approach

President Barack Obama came into office with ambitious plans in the nuclear area, launching a nuclear posture review and addressing nuclear arms in an April 2009 speech in Prague. In the speech, he stated "America's commitment to seek the peace and security of a world without nuclear weapons" and said he would seek to "reduce the role of nuclear weapons in our national security policy." He added, however, that as long as nuclear weapons existed, the United States would maintain a "safe, secure, and effective arsenal."[9]

A few days before his Prague speech, Obama met with Russian President Dmitry Medvedev and agreed to a new negotiation on strategic arms reductions. Just over a year later, in April 2010, the two signed the New START Treaty, which came into force in February 2011. The treaty returned to a more traditional U.S.-Soviet/Russian arms control approach, limiting delivery systems as well as deployed warheads and incorporating agreed definitions, counting rules, and verification provisions. New START requires that each side reduce its strategic forces to no more than 1,550 deployed strategic warheads on no more than 700 deployed ICBMs, SLBMs, and nuclear-capable bombers by February 2018. New START also limits each side to no more than 800 deployed and non-deployed ICBM and SLBM launchers and nuclear-capable bombers (a non-deployed missile launcher is a launcher that does not contain a missile). The treaty counts the actual number of warheads on deployed ICBMs and SLBMs and attributes one warhead to each deployed bomber. It will remain in force until February 2021, and it can be extended for up to five years beyond that date.[10]

The Obama administration negotiated New START as a first step, with START I due to expire at the end of 2009, and hoped to secure an agreement providing for deeper cuts later. When signing New START, Obama made clear his desire for further U.S. and Russian nuclear arms reductions. He called for bringing into the negotiating process reserve (non-deployed) strategic nuclear weapons and non-strategic nuclear weapons. That raised the possibility that all U.S. and Russian nuclear arms might be on the table. In 2013, based on follow-on studies to the 2010 nuclear posture review, the administration concluded that the United States could reduce the number of its deployed strategic warheads by up to one-third, and Obama advanced such a proposal for reducing the limits in New START by up to one-third, which would have cut the number of deployed strategic warheads to 1,000 to 1,100.

The Russians, however, showed little interest in further reductions in nuclear forces at the time. They conditioned discussion of limits on non-strategic nuclear arms on prior withdrawal of American nuclear weapons from Europe. (While U.S. officials allowed that this might be an outcome of a negotiation, they rejected it as a precondition.)

The Russians began to shift their focus to questions about non-nuclear capabilities that they asserted affected the strategic nuclear balance and should be taken into account, such as missile defense. Although NATO and Russia agreed in late 2010 to explore a cooperative approach to missile defense

in Europe and seemed to make progress in early 2011, the sides did not reach agreement. The Russian government increasingly expressed concern about U.S./NATO plans to deploy American SM-3 missile interceptors in Romania and Poland to defend against possible ballistic missile threats coming out of the Middle East, particularly Iran. Moscow claimed that the SM-3 interceptors posed a threat to Russian ICBMs. Washington argued that the SM-3s lacked the velocity to successfully engage ICBM warheads, especially as ICBMs would be heading toward the United States and away from Poland and Romania. Some Russians asserted that the SM-3 launchers could contain offensive, nuclear-armed surface-to-surface missiles.

Russian officials called for the United States to commit in a legally binding agreement that U.S. missile defenses would not be directed against Russian strategic missiles, adding that such an agreement should be accompanied by "objective criteria"—limits on the number, location and velocity of missile interceptors.[11] The Obama administration declined to negotiate such a treaty. Given Republican opposition to any agreement that might constrain missile defenses, such a treaty would have had no prospect of receiving consent to ratification in the Senate.

In spring 2013, U.S. officials proposed an executive agreement on transparency regarding missile defenses. Under that agreement, the sides would make annual exchanges of data regarding key elements of their missile defense systems (e.g., numbers of interceptors, launchers and radars) as well as the projected numbers of such systems for each year over the subsequent 10 years. The Russians did not engage on the proposal.

At about the time that Putin prepared to return to the presidency in 2012, Russian officials began to press other concerns. One focused on U.S. plans for Conventional Prompt Global Strike (CPGS). Some Russian analysts argued that CPGS systems could threaten strategic targets in Russia and linked their concerns about such systems to further reductions of nuclear arms. (As of fall 2016, the United States has not deployed any CPGS systems.)

Moscow also returned to the question of third-country nuclear forces, which it had unsuccessfully raised in the SALT and INF negotiations. Washington took the position that, given the differences between U.S. and Russian nuclear arms levels, on the one hand, and the much smaller nuclear forces of every other nuclear power, on the other hand, there was room for at least one more bilateral U.S.-Russian nuclear arms reduction agreement. Russian officials, however, argued that the next negotiation should bring in other nuclear weapons states (all of which are closer to Russia than to the United States). Foreign Minister Sergey Lavrov stated that "we have also to bear in mind that further steps that could be proposed on reducing strategic offensive weapons will have to be considered in a multilateral format, because the further reductions would bring us to levels comparable to the nuclear arsenals possessed by countries other than Russia and the U.S."[12] How Lavrov came up with the calculation is unclear—as of 2016, the United States and Russia were estimated to have some 4,500 nuclear weapons each compared to 300 for the nearest third-country nuclear weapons state—but Russian officials continue to call for a multilateral approach.

The Russians appear to have linked further nuclear arms reductions to resolution of their stated worries about missile defense, conventional prompt global strike, and third-country nuclear forces. This could be motivated by a desire to have reasons not to engage on further nuclear arms cuts at this time. This could also reflect areas where Moscow has security concerns—real or imagined—that Washington may need to address.

Over the course of Obama's second term, the prospects for progress with Russia on nuclear arms reductions or related issues decreased. In 2014, Russia's illegal seizure of Crimea and its instigation of and support for armed separatism in eastern Ukraine brought U.S.-Russian relations to a post-Cold War low point. Moreover, another complication emerged in summer 2014, when the U.S. government concluded that Russia had violated the INF Treaty by testing a ground-launched cruise missile to intermediate range, though Washington has made no details

public. Moscow denied the charge and voiced three charges of its own regarding U.S. violations of the treaty.

While the Obama administration exempted arms control from its decision to ratchet down diplomatic exchanges with Moscow in the aftermath of Russia's actions against Ukraine, Russia showed no interest in continuing an arms control dialogue. Whether that signals a Kremlin calculation that arms control no longer serves its interests, or whether the Kremlin decided to wait for the next U.S. president, remains to be seen.

CHAPTER 3

U.S. Nuclear Forces

The United States has long maintained a triad of submarine-launched ballistic missiles, intercontinental ballistic missiles, and strategic bombers to provide a nuclear deterrent that is safe, secure, and effective. The U.S. military also maintains dual-capable aircraft and nuclear gravity bombs in Europe (and deployable elsewhere in support of U.S. alliance commitments). Key elements of the triad, however, are aging out and will require replacement in the coming decade. The Obama administration has laid out plans to develop and deploy the new Columbia-class ballistic missile submarine, a new ICBM, the B-21 bomber, and the Long-Range Standoff (LRSO) weapon, a new nuclear-armed, air-launched cruise missile. Programs to build a new dual-capable aircraft (the F-35) and modernize the B61 nuclear gravity bomb are already well along.

The modernization plans will create a "bow-wave" of Pentagon spending in the mid-2020s, raising questions about the ability of the Defense Department's budget to accommodate strategic force modernization along with other defense priorities. If only for this reason, the new administration will wish to review the modernization plans.

The U.S. Nuclear Arsenal

Even with the significant reductions that have taken place over the last 25 years, the U.S. nuclear stockpile as of September 2015 numbered 4,571 weapons.[13] Of these, an estimated 1,750 are deployed strategic warheads, although the figure under the New START Treaty's counting rules was lower. This reflects the fact that warheads that could be deployed on ballistic missile submarines in overhaul do not count under New START's limits and that the treaty attributes deployed strategic bombers with only one warhead each—even though those bombers can and would carry significantly more nuclear weapons and it is believed that more weapons are stored at bomber bases. It is believed that 180 B61 gravity bombs are deployed in Europe. In addition, the United States has an estimated 2,500 retired nuclear weapons awaiting dismantlement.[14]

The two key limits of New START constrain the United States and Russia each to no more than 1,550 deployed strategic warheads on no more than 700 deployed strategic delivery vehicles. These limits take full effect in February 2018. As of September 1, 2016, the U.S. military had 1,367 deployed strategic warheads on 681 deployed strategic delivery vehicles, using New START's counting rules.[15] When New START's limits take full effect, the Pentagon plans to field 400 deployed Minuteman III ICBMs armed with one warhead each, 240 deployed Trident II D5 SLBMs carrying multiple warheads on 14 ballistic missile submarines, and 60 deployed B-2 and B-52 bombers, armed with nuclear gravity bombs and air-launched cruise missiles.

The planned New START force structure appears relatively stabilizing in crisis stability terms. The bulk of U.S. deployed strategic nuclear warheads are and will be on ballistic missile submarines, a number of which operate at sea at any time, where they are believed to be very survivable. The decision to "download" the U.S. ICBM force so that each Min-

uteman III carries a single warhead makes them less inviting targets than when they carried three warheads. At that time, in an intense crisis, an adversary considering a first strike might have calculated that they could use one or two warheads to destroy three U.S. warheads on a Minuteman III in its silo; now, they would have to expend one or two warheads to destroy a single Minuteman III silo and warhead, an unattractive exchange ratio. The harder it is for a potential adversary to contemplate a successful first strike against U.S. nuclear forces—at present, that would only be Russia—the more stable the situation will be in a crisis.

In addition to deployed strategic systems, the U.S. Air Force is estimated to maintain 180 B61 nuclear gravity bombs at six airbases in five European countries.[16] In a conflict involving NATO, these weapons could be used by the U.S. Air Force and, under programs of cooperation, could be made available for use by the Belgian, Dutch, German, Italian, and possibly Turkish air forces. Certain U.S. F-15E and F-16 fighter-bombers are nuclear-capable, and the new F-35 will also have nuclear-capable variants.

U.S. Nuclear Force Modernization

Based on the 2010 nuclear posture review, subsequent studies and its assessment of what was needed to support its deterrence strategy, the administration of President Barack Obama has adopted a nuclear force modernization program. In accordance with that program, the Air Force intends to replace the Minuteman III ICBMs, which have been in service since 1970. The current ICBMs have received upgrades and life extension maintenance and are expected to remain deployed until 2030. The follow-on missile—the Ground-Based Strategic Deterrent—would begin deploying in 2030. Some argue that cost considerations should lead the Air Force to again extend the life of the Minuteman III, which a RAND Corporation study found to be a cheaper option, but Air Force leaders clearly prefer a new missile.

The Navy will begin retiring its current Ohio-class ballistic missile submarines (SSBNs) at the end of the 2020s and plans for the first Columbia-class submarine to enter service in 2031. The Navy wants 12 new SSBNs to replace the 14 Ohio-class boats. The number of SSBNs can be reduced by two because the Columbia SSBNs will have a reactor that does not require a lengthy refueling process, reducing time the boat must spend in the shipyard. The Navy's highly reliable Trident II D5 missile is expected to remain in the force until at least 2042.

The B-21 bomber is currently under development. Planned upgrades to the nuclear bomber force also include modernization of the B61 gravity bomb for the B-2 and B-21 aircraft, a program already well underway. The modernized B61, referred to as the B61-12, will become the sole nuclear gravity bomb in the U.S. arsenal, with strategic and non-strategic missions. The Pentagon is also developing a new nuclear-armed ALCM for the bomber force, the LRSO.

In tandem with the planned modernization of strategic delivery systems, the Department of Energy is extending the life of and modernizing nuclear warheads. The Department of Energy eventually desires to move to an arsenal comprised of three interoperable warheads that could be mounted on ICBMs or SLBMs plus warheads for the B61-12 bomb and LRSO, resulting in five warhead types in the nuclear inventory. Critics have questioned the cost of this program. They have also expressed concern that the complexity of developing three interoperable ballistic missile warheads might be such that the reliability of the weapons could not be assured by the stockpile stewardship program and might require nuclear explosive testing.

The cost projections for U.S. nuclear force modernization programs are daunting. The Congressional Budget Office put the cost of modernizing and operating U.S. nuclear forces at $355 billion for the years 2014 to 2023.[17] Another estimate placed the 30-year cost of maintaining, modernizing, and operating U.S. strategic forces at $1 trillion.[18] The costs of individual programs are rising, and Pentagon officials openly concede that they do not know how to fund the entire modernization effort. Principal Deputy

Under Secretary of Defense for Policy Brian McKeon said, "We're looking at that big bow wave and wondering how the heck we're going to pay for it, and probably thanking our stars we won't be here to have to answer the question."[19] Unless defense budgets increase significantly in coming years, the Navy may be forced to make painful trade-offs between new ballistic missile submarines or attack submarines and destroyers, and the Air Force between B-21s and ICBMs or F-35 fighters and KC-46 aerial tankers.

Reviewing U.S. Modernization Plans

The new administration should conduct a nuclear posture review. In doing so, it can reaffirm or may wish to reconsider some elements of the strategic modernization program of record that it will inherit from the Obama administration. Attempting to modify the program could be controversial. Some will cite Moscow's more aggressive posture as well as the modernization of Russian strategic nuclear forces—including new ICBMs, SLBMs, and SSBNs—and non-strategic nuclear arms. They will argue that, under these conditions, to say nothing of China's growing military power and rogue threats such as North Korea, scaling back U.S. modernization plans would be unwise, could signal a lack of resolve, and could be misinterpreted by potential adversaries.

The Kremlin's aggression against Ukraine has had an impact on nuclear arms questions. It has largely stifled a discussion in Europe about the necessity of maintaining U.S. nuclear weapons on the continent and, if so, how many. Moreover, in 2013, the Obama administration concluded that the United States could reduce by up to one-third the number of U.S. deployed strategic warheads. Senior military officials made clear their preference to do this on a reciprocal basis with Russia, but other officials suggested the United States might safely make such a reduction even if Russian strategic forces remained at New START levels. The Russia-Ukraine conflict, however, killed the small possibility that Obama might in his last year in office implement a reduction on a unilateral basis.

At the same time, the United States should not pursue a nuclear modernization program that ultimately proves unaffordable. In the ideal world, requirements, policy and strategy will drive decisions regarding U.S. force structure. It would be unwise, however, not to factor the budget situation into the decision process, bearing in mind that decisions to embark on new weapons programs entail modest costs early on but potentially tens of billions of dollars in the out years.

One should anticipate that the cost of sophisticated new weapons systems will increase. For example, in contrast to an earlier estimate of $62.3 billion for research and development, infrastructure, and production of 642 missiles, the Pentagon's Office of Cost Assessment and Program Evaluation in September 2016 put the cost of the new ICBM program at $85 to 100 billion.[20] These estimates are for development and production and do not include operating costs. The U.S. Air Force recently said that the estimated production cost of the B-21 will be less than the earlier estimated cost of $550 million per aircraft. That would be good news, but it goes against the history of cost growth in the F-35, F-22, and B-2 programs. Given the overall fiscal situation and the probable domestic political climate, it would seem unrealistic to expect major increases in defense spending that would allow the Pentagon to avoid tough choices between nuclear arms, which provide the bedrock for U.S. and allied security, and conventional weapons systems, which the military operates around the world on a daily basis.

One question raised by some non-governmental experts concerns the need for continuing to maintain a strategic triad. Of the three legs, SLBMs on ballistic missile submarines comprise the element most likely to be preserved. SSBNs at sea and underwater are very survivable. Given current Pentagon plans, almost 1,100 strategic warheads would be carried on the 240 deployed SLBMs that the Navy plans to maintain under New START. The bomber leg also likely is safe, as bombers perform conventional as well as nuclear missions (B-52s, B-1s, and B-2s have all taken part in conflicts in places such as Serbia, Afghanistan, and Iraq.) Moreover, bombers can be

used for political signaling purposes in ways that ICBMs and SLBMs cannot.

Were the U.S. government to seriously consider abandoning the triad, the ICBM leg appears most vulnerable. Former Secretary of Defense Bill Perry and others have recommended doing away with this element. ICBMs in fixed silos can be targeted and raise the issue of "use or lose." The Air Force thus maintains a capability to launch ICBMs under attack. (The prospect that ICBMs must be launched quickly or face the possibility of being destroyed in their silos is one reason why some argue for eliminating the ICBM leg.) Cancellation of the Minuteman III follow-on and elimination of current missiles would yield major savings for Defense Department budgets.

On the other hand, there are reasons to keep ICBMs. While nothing thus far suggests that there has been an anti-submarine warfare breakthrough that would put SSBNs at sea at risk, whether that will remain true in a world of small unmanned naval drones is a question worthy of study. ICBMs could provide a hedge against a compromise of SSBN survivability. Moreover, in a crisis, an adversary with the ability to locate U.S. SSBNs at sea might contemplate attacking them, believing such action would not cross the threshold that would draw a nuclear response. However, attacking the U.S. ICBM force would require pouring hundreds of nuclear warheads into the center of America, which inevitably would trigger nuclear retaliation.

One element of the planned modernization program that many have questioned is the LRSO, a new nuclear-armed, air-launched cruise missile. The United States first developed ALCMs in the 1970s in response to growing concern that the B-52 would not be able to penetrate increasingly sophisticated Soviet air defenses. The ALCM gave the B-52 the ability to launch weapons from distances well beyond the reach of Soviet fighters and anti-aircraft missiles.

The LRSO would replace current ALCMs, but the Air Force also intends to procure 80-100 B-21 bombers. The B-21s will incorporate the newest stealth features and will have advanced electronic warfare capabilities. As noted, the B61 nuclear gravity bomb is being modernized for both strategic and non-strategic delivery platforms. The Air Force believes the B-21 will be able to penetrate and operate in contested air defense environments, something the B-52 and B-1 cannot do. If that is true, the LRSO offers a redundant capability. The Pentagon could save an estimated $20 to 30 billion by scrapping the program and its associated nuclear warhead. Alternatively, if the B-21 will not be able to penetrate sophisticated air defenses, the next administration might consider scrapping the bomber, buying the LRSO, and developing a less expensive and less stealthy delivery platform to carry the LRSO and perform conventional missions. (One question the Air Force hopefully is considering now is the vulnerability of bombers on the ground at known bases to small drones that could carry small explosives that could destroy or disable bombers outside of hangars.)

Another modernization question for the next administration as part of its nuclear posture review and determination of its strategic force requirements will be whether to procure the same numbers that the Obama administration has proposed. The cost of developing and building twelve Columbia-class ballistic missile submarines is estimated at $140 billion. Reducing the planned buy of new ballistic missile submarines could save $5 to 7 billion per SSBN in construction costs and almost $20 billion per SSBN in operating expenses over the boat's lifetime.[21] Procuring only 10 Columbia-class SSBNs instead of 12 thus could save as much as $50 billion (though most of the savings would be realized many years in the future).

The need for 12 new submarines appears driven by the requirement to have a certain number on station so that they could launch promptly if necessary. If that prompt launch requirement were relaxed (discussed below), the U.S. Navy could get by with fewer submarines. Going from 12 submarines to 10 would reduce the number of SLBM tubes from 192 to 160. As a result, deployed Trident II D5 SLBMs would have to carry more warheads on average than

under current plans if the Navy sought to maintain 1,000 to 1,100 deployed warheads on its SLBM force. Ten SSBNs—a level which the Navy will in any event operate for most of the 2030s (a mix of Columbia and Ohio boats)—would still make for a sizable nuclear force at sea.

Another possibility would be a reduction in the planned number of ICBMs. The Pentagon would like to buy 642 ICBMs in order to support 400 deployed missiles until 2070 (the other missiles would serve for test shots and as spares). At the mid-point in the Obama administration's tenure, the Air Force reportedly was prepared to accept a force of 300 deployed ICBMs. The next administration could consider reducing the ICBM force to that level or to an even lower figure.

Another question the next administration might want to review is the number of reserve nuclear weapons maintained by the U.S. military. The United States has a total nuclear stockpile of around 4,500 nuclear weapons. If one removes an estimated 1,750 deployed strategic warheads—not using New START rules but counting warheads on strategic ballistic missiles and bombs and ALCMs located at airbases for nuclear-capable bombers—and 180 nuclear bombs in Europe, that leaves almost 2,600 reserve weapons. The reserve weapons are justified as a hedge against a geopolitical surprise, an unexpected technical problem with deployed warheads, or a breakdown of the New START Treaty. The U.S. military should maintain some spare and reserve warheads, but the next administration should ask whether it needs so many (a reduction may be envisaged; the Department of Energy reportedly has considered sizing the nuclear enterprise to support 3,000 total warheads in the future).

When considering the size of U.S. strategic forces—and any changes to the Obama administration's plan—and the unilateral policy questions raised below, the impact on Russia policy and force structure should be weighed. Modernization of U.S. forces can enable arms control if it gives Moscow a greater incentive to negotiate an agreement, as was the case with the deployment of U.S. INF missiles in Europe in the 1980s. That said, the risk in proceeding to build a bargaining chip is that, if no deal is ultimately struck, one may end up holding an expensive, and perhaps less than necessary, chip.

Possible Unilateral Policy Changes

In addition to examining and perhaps reconsidering the size of the planned strategic force modernization, the next administration could consider unilateral policy changes. These could reduce nuclear tensions at a time when more formal engagement with Russia is difficult. For example, the administration could choose to implement, on a unilateral basis, the one-third reduction in deployed strategic warheads that Obama proposed in Berlin in June 2013. It could adopt the lower number of warheads either in the context of the current planned modernization program or in the context of a revised modernization program. That would cut the number of deployed U.S. strategic warheads under New START counting rules from 1,550 to 1,000 to 1,100. The next administration could choose, in consultation with NATO, to revisit the question of the number of U.S. nuclear bombs in Europe. It would be difficult, however, to adopt such changes absent some modification of Russian behavior, as doing so could unnerve allies in the current political environment. Moreover, a unilateral reduction of deployed U.S. strategic warheads would mean abandoning the "second to none" criterion; Defense Department (and other) officials attach political significance to this, though the Pentagon has indicated in the past that the United States could maintain a secure second-strike capability even if Russia had more deployed warheads. (A decision to reduce the number of reserve nuclear warheads might not carry the same political consequences.)

Other unilateral policy changes that the next administration might consider relate to how it operates U.S. nuclear forces. One change that received attention in summer 2016 but seems unlikely to be adopted by the Obama administration is a "no first use" policy for nuclear weapons. Under no first

use, the United States would declare that it would use nuclear weapons only after they had been used against the United States or an American ally. (A somewhat more ambiguous variant of this is the "sole purpose" approach considered, but not adopted, by the Obama administration's nuclear policy review in 2010. Under this approach, the United States would declare that the sole purpose of its nuclear weapons is to deter *nuclear* attack on the United States, U.S. allies, or U.S. military forces.)

Proponents of a no first use or sole purpose policy note that, with the most powerful conventional forces in the world, the U.S. military can give the president a robust range of punishing conventional options for responding to a non-nuclear attack. Given the risk that, if the United States initiated use of nuclear weapons, it could trigger nuclear retaliation, it is difficult to see an American president ordering use of nuclear weapons in a situation in which they had not been already used against the United States or an ally. He or she would look to the military for other response options.

Opponents of no first use argue that, by reducing the potential risks and costs to an adversary of any non-nuclear attack, the policy would reduce the overall deterrent effect of U.S. military forces. They fear that this could make conventional conflict more likely or lead an adversary to conclude that it would be possible to employ chemical or biological weapons without fear of a U.S. nuclear response. They worry that no first use could leave some allies feeling more exposed. Another concern is that, as countries such as Russia and China expand their conventional force capabilities, they may have regional superiority and could achieve a rapid *fait accompli* before the arrival of reinforcing U.S. forces.

This issue may in any case receive greater attention in the near future. As commander in chief, the president has virtually unlimited authority to order the use of nuclear weapons. In September, Senator Ed Markey and Representative Ted Lieu introduced the First Use of Nuclear Weapons Act. If enacted, that would require that the president obtain a congressional declaration of war before using nuclear weapons, unless nuclear weapons had already been used against the United States or an American ally.

Another possible policy change would affect U.S. ICBMs. The Minuteman force presently can be launched in a matter of minutes, providing the option to "launch under attack." Launch under attack carries a risk that a launch decision could be made on the basis of incomplete or faulty information. The president could decide not to exercise that option and so inform the Pentagon and Strategic Command. Many believe the option is not usable because the president would have to make a decision in a matter of minutes, which realistically no president would do. The launch under attack option was adopted at a time when a massive disarming first strike was seen as a real possibility, which is not now the case. Single-warhead ICBMs do not provide a lucrative target, and a high percentage of U.S. warheads are based on SSBNs.

In addition to abandoning the launch under attack option, the administration could also consider de-alerting the ICBM force. De-alerting would abandon that option and would be consistent with a desire to reduce the role of nuclear weapons in U.S. security policy. The White House could simply tell the Air Force to no longer plan or train to launch under attack. Other proposals go further, suggesting steps that would impede a launch, such as removing warheads from the ICBMs. De-alerting might signal to Russia that the United States does not seek a first-strike capability, though many in Moscow might doubt it. Opponents of de-alerting ICBMs argue that the president might want to have the option of launching under attack or of launching promptly even if there was no attack on the United States. They also fear that, in a crisis, a move to re-alert the ICBM force could be destabilizing, i.e., the sides could find themselves in a race to put warheads back on their ICBMs. The launch under attack option could only be implemented, however, if the president was prepared to make the most monumental decision of his or her presidency, or of any presidency ever, in six to 10 minutes.

CHAPTER 4

Nuclear Arms Control Options

U.S.-Russia relations are at a post-Cold War low point, but this does not mean that U.S.-Russian arms control will remain permanently frozen. As noted in Chapter 1, matters can change in the arms control dialogue between Washington and Moscow, and other factors could spark a renewed interest in arms control. Still, it would be realistic to keep expectations for near-term arms control progress modest.

This chapter explores the kinds of choices that the next administration could face if the arms control dialogue began to show life. If that were to happen, Washington should have ideas ready for a new negotiation. It would also be important to find a way to resolve compliance questions regarding the Intermediate-range Nuclear Forces Treaty, without which it is difficult to see the Senate consenting to ratification of any new arms control agreement with Russia (this is addressed in greater detail in Chapter 8). Even if Moscow remains unready to move, there may be advantages in having a nuclear arms reduction proposal, in the same way that President Ronald Reagan's initial proposal for a zero level for intermediate-range nuclear forces was made as much with the goal of winning the public relations battle with the Kremlin as actually achieving a negotiated result.

Alternatively, the next administration could choose not to pursue further nuclear arms cuts. That could, however, have negative foreign policy consequences and might undermine Democratic support in Congress for funding U.S. nuclear modernization.

Resuming a process aimed at securing further reductions in U.S. and Russian strategic forces (beyond those mandated in the New START Treaty) and at bringing under control non-strategic nuclear weapons would almost certainly require addressing related questions raised by Moscow. These include missile defense, advanced conventional strike weapons, and third-country nuclear forces, which will be explored in subsequent chapters.

New START Extension

The New START limits take full effect in February 2018, and the treaty by its terms expires in February 2021. The treaty contains a provision allowing the sides to extend it by up to five years. While Moscow shows little interest in new nuclear arms reduction measures, it may well be interested in extending New START. Historically, Moscow has preferred to be in a legally-binding (treaty) relationship with the United States when it comes to strategic nuclear weapons. The tense political relations between the United States and Russia make it more desirable for the sides to have a cap on the other's strategic offensive nuclear capabilities and make the treaty's transparency measures more valuable.

Some believe that the next administration should seek to extend New START early in its term, out of concern that it may not be possible later if bilateral relations continue to deteriorate. That is a question worth close consideration. If New START were extended and the Kremlin willing to discuss further reductions, the administration could seek a new negotiation knowing that New START would be in force until possibly February 2026. Alternative-

ly, the administration might hold off on extending New START and explore whether possible Russian interest in extension could be leveraged to launch a negotiation on further nuclear cuts. The leverage would likely prove limited, and the U.S. government presumably would not want to jeopardize gaining at least an extension of New START's limits. But it is at least worth pondering whether something more might be achievable.

Further Strategic Nuclear Arms Reductions

Some comments by Russian officials reportedly have suggested that Moscow might be prepared to consider further nuclear arms control measures once New START's limits take full effect in February 2018. Other Russian comments offer less ground for optimism. If the next administration wants to pursue strategic nuclear reductions that go beyond New START and Russia is prepared to engage, a number of questions would arise.

First, is the New START framework the right one for a new negotiation on strategic nuclear weapons? The treaty has the advantage of being familiar to both sides, which have now been implementing it for more than five years. Familiarity is important. New START was negotiated in less than one year—a very rapid negotiation compared to previous arms control treaties (with the exception of the Strategic Offensive Reductions Treaty, which lacked many of the critical elements of other arms control agreements, such as verification provisions). Moreover, New START provides for limits on strategic delivery vehicles as well as deployed strategic warheads, a key point for Moscow. The existing framework could also accommodate adjustments, such as lowering the numerical limits or reducing the undercounting of bomber weapons. It is not clear that another framework would prove more suitable for strategic arms reductions.

If the United States and Russia agreed to continue the New START framework, the next issue would be whether the New START limits could be lowered. In June 2013, President Barack Obama proposed to reduce the 1,550 deployed strategic warhead limit by up to one-third, which would have brought that limit down to 1,000 to 1,100. U.S. officials indicated that Washington would be prepared for commensurate reductions in the limits of 700 deployed strategic delivery vehicles and 800 deployed and non-deployed ICBM and SLBM launchers and nuclear-capable bombers.

In considering how low to go beyond New START, Obama administration officials reportedly considered and discarded limits of 300 to 400 and 700 to 800 deployed strategic warheads.[22] It felt those levels went too far, too quickly. They would mean dramatically lower numbers of strategic delivery vehicles. Those levels likely would be too low for Moscow. Reducing deployed strategic warheads to such lower levels could prove controversial in the Senate if non-strategic nuclear weapons remained unconstrained.

Whether during a new U.S. presidency Moscow would accept a limit of 1,000 deployed strategic warheads (if other issues of interest to Russia were addressed) remains to be seen. A limit of 500 deployed strategic delivery vehicles should be of interest to the Kremlin. The U.S. military plans to maintain 700 deployed strategic delivery vehicles under New START. While the Russian military is building new ICBMs and SLBMs to modernize its strategic forces, it is also retiring a number of older Soviet-era missiles, and many analysts anticipate that Russia will maintain about 500 deployed strategic delivery vehicles—roughly the current number. That number should allow the Russian military to maintain the New START limit of 1,550 deployed strategic warheads. (The combination of the absence of economic reform, the soft price of oil, and Western economic sanctions stemming from Russian aggression against Ukraine mean that the Kremlin also faces budget problems.)

A limit of 500 deployed strategic delivery vehicles would require that the United States eliminate 200 deployed missiles and bombers compared to its force under New START. Since most U.S. missiles are

downloaded and carry fewer warheads than they are capable of carrying, a limit of 500 would also cut into the U.S. "upload" potential, i.e., the ability to add deployed warheads to the force in a crisis or if the treaty broke down. That should provide an inducement for Russia to consider reductions, though Moscow may be building a missile force that can accommodate an upload capability of its own.

One issue that the next administration might revisit would be counting rules. The actual warhead count rule for ICBMs and SLBMs is workable, with inspection measures in place that create a risk of discovery during an inspection were a side to cheat by having placed more warheads on a deployed missile than the number that it declared; that risk deters cheating. Likewise, the rules for counting deployed strategic delivery vehicles (e.g., ICBMs in silos or on mobile launchers and SLBMs in submarine launch tubes) have proven workable and make sense.

The rule to reconsider is that for counting bomber weapons. Under New START, each deployed bomber is attributed as one deployed strategic warhead. Bombers, however, can carry many more than one (B-52s equipped to carry ALCMs could carry as many as 20). This discount rule for bombers in part reflects an arms control tradition of discounting bomber weapons as compared to ballistic missile warheads. Bombers have flight-times measured in hours rather than minutes, can be recalled, and could face sophisticated air defenses. Aircraft have been seen as a less critical question than ballistic missiles for strategic stability. An actual load counting rule for bombers as used for ICBMs and SLBMs, moreover, would be meaningless, because in practice neither the U.S. nor Russian militaries maintain nuclear weapons on board aircraft.

In a future negotiation, the sides might consider adjusting the counting rule, for example, to attribute each deployed bomber with two or three deployed strategic warheads instead of one. That would still be less than a bomber's maximum capacity and less than what bombers might actually carry in a conflict, but it would move toward a more accurate count of bomber weapons. U.S. Air Force officials might have some concern about this; their readiness to support Obama's one-third cut in New START's deployed strategic warhead limit reportedly was conditioned on maintaining a counting rule attributing only one weapon per deployed bomber.

An alternative approach, reportedly proposed by U.S. negotiators in New START but rejected by the Russian side, would establish a regime that would count nuclear gravity bombs and ALCMs located at airbases with deployed bombers as deployed strategic warheads. Such an approach would effectively end the tradition of discounting bomber weapons; it would treat bombs, ALCMs, ICBM warheads, and SLBM warheads equally in the deployed strategic warhead count. Such a counting rule would require working out a verification regime that would allow the sides to inspect bomber weapon storage areas to monitor the number of weapons located at airbases for deployed strategic bombers. It is not clear if the Russian side would now be interested in such an approach, which would reduce the number of uncounted strategic warheads for bombers.

It may also be necessary to consider whether other types of weapons should be constrained. Russian television in 2015 broadcast a viewgraph of a large nuclear-armed torpedo. Many question whether that was a genuine weapon plan or merely an attempt to spoof the West. It would still make sense to examine whether and how new systems should be counted and limited.

Non-Strategic Nuclear Weapons

When the Senate gave its consent to New START, it called for the next negotiation to address non-strategic nuclear weapons. (For purposes of this paper, "non-strategic" nuclear weapons include everything not constrained by New START, that is all nuclear weapons except for ICBM warheads, SLBM warheads, and nuclear bombs and ALCMs for strategic bombers.) It becomes increasingly difficult to see how the United States and Russia can keep reducing only one category of their nuclear arms—deployed strategic—while leaving the rest of the weapons in

their nuclear arsenals unconstrained. The next administration should consider how it could bring non-strategic nuclear weapons into a negotiation.

The United States has long deployed non-strategic nuclear weapons in Europe. They provide a military capability, though their primary importance is political: signaling the U.S. commitment, including of U.S. strategic forces, to the defense of NATO and the assurance of allies. The Russians thus far have refused to discuss non-strategic nuclear weapons, asserting that U.S. nuclear gravity bombs in Europe must first be withdrawn.

Negotiating a separate limitation regime covering U.S. and Russian non-strategic nuclear weapons would in any case prove difficult, given the significant disparities in the two sides' numbers. It was estimated that in 2016 the United States had 500 non-strategic nuclear weapons—all B61 nuclear gravity bombs, of which 180 were located at bases in Europe. By contrast, it was estimated that Russia had some 2,000 non-strategic nuclear weapons, with a much wider variety, including bombs, cruise missiles, anti-submarine weapons, surface-to-air and anti-missile interceptors, and short-range surface-to-surface missiles.[23] Any equal limit on non-strategic nuclear weapons would require that Russia reduce many more weapons than the United States would have to cut.

As a way to address this problem, the next administration might consider seeking to negotiate a single aggregate limit covering all U.S. and Russian nuclear weapons—strategic and non-strategic, deployed and non-deployed. In this case, putting non-deployed (or reserve) strategic weapons on the negotiating table, which Obama was prepared to do, would bring in a category in which the United States is believed to have a numerical advantage: around 2,000 weapons, compared to about 700 for Russia. In the context of a single aggregate limit, the higher Russian number of non-strategic nuclear weapons would be offset by the higher U.S. number of non-deployed strategic warheads.

Addressing limits on non-strategic and non-deployed strategic nuclear weapons would require new verification provisions. The challenges would be similar for the two categories, as in both cases the question would largely be one of monitoring limits on nuclear weapons in storage sites. No U.S. non-strategic nuclear weapons are deployed on delivery systems, and reserve strategic weapons are non-deployed by definition. It is believed that most Russian non-strategic nuclear weapons also are not deployed but maintained in storage facilities. Crafting monitoring provisions for non-strategic and non-deployed strategic weapons at treaty-declared storage facilities would present new but not necessarily insurmountable challenges. The tougher question would be what the sides might do about the possibility of undeclared nuclear weapons stored at undeclared sites. (The lower the limits on U.S. and Russian nuclear forces, the more problematic the problem of undeclared weapons becomes. If the United States and Russia were each limited to 2,500 total nuclear warheads, a couple of hundred undeclared nuclear warheads likely would have little effect on the strategic balance. The sides could bound this problem by requiring that all nuclear weapons be deployed or stored at declared sites and that any movement of a nuclear weapon between such sites be notified in advance. In that case, any nuclear weapon detected outside of a declared site and not in a notified transit would constitute a treaty violation.)

If the United States and Russia were to agree to a single limit on all nuclear weapons (with the exception of those retired and awaiting dismantlement, which could be limited separately), they might also agree to a sublimit on the number of deployed strategic warheads. Essentially, this would make the New START limit on deployed strategic warheads a sublimit within the new treaty's overall aggregate limit on all nuclear warheads. The sublimit would cap the systems of greatest concern: warheads deployed on ICBMs and SLBMs.

As for numbers, an ambitious goal for a U.S.-Russian agreement would aim for a roughly 50 percent cut in total nuclear weapons numbers and constrain each side to no more than 2,000 to 2,500 total nuclear warheads, with a sublimit of no more than 1,000 deployed strategic warheads. ("Deployed" could be

limited to only warheads on deployed ICBMs and SLBMs, or it might also include some attributed number of bomber weapons.) This structure for an agreement would allow the sides freedom to choose what kinds of weapons they maintained over the 1,000 deployed strategic warhead sublimit. Russia might well opt to keep more non-strategic nuclear weapons, while the United States might maintain more non-deployed strategic warheads. That would reflect what appear to be the sides' current preferences.

This kind of a treaty presumably would include limits on deployed strategic delivery vehicles and on deployed and non-deployed ICBM and SLBM launchers and nuclear-capable bombers, carrying over those two limits from New START. The Russians likely would insist on it, and it would be in the U.S. interest to constrain Russian strategic delivery vehicles and launchers. Cutting the number of deployed strategic warheads from the New START limit of 1,550 to a sublimit of 1,000 deployed strategic warheads would suggest cutting the New START limits of 700 deployed strategic delivery vehicles and 800 deployed and non-deployed launchers to 500 and 575, respectively.

Working out limits on delivery platforms for non-strategic nuclear weapons would prove far more difficult. All U.S. and Russian aircraft that can deliver non-strategic nuclear weapons are dual-capable, that is, they can carry out conventional as well as nuclear missions, and their primary missions are conventional. Most, if not all, other Russian delivery systems for non-strategic nuclear weapons can be armed with conventional warheads. Both sides would be reluctant to limit tactical conventional capabilities as the result of a nuclear arms agreement. Moreover, as with the weapons themselves, there is a disparity in delivery platforms. U.S. dual-capable aircraft for non-strategic weapons consist of some F-15Es and F-16s and in the future will include some F-35 variants. By contrast, Russian delivery platforms include dual-capable aircraft, submarines, surface ships, anti-aircraft missiles, anti-missile interceptors, and short-range surface-to-surface missiles. Negotiating a constraint regime for non-strategic delivery platforms acceptable to both sides would be very difficult. It would be simpler to have constraints on strategic delivery vehicles and launchers but not seek to limit delivery vehicles or platforms for non-strategic nuclear weapons.

Of course, in a negotiation, the next administration could choose to pursue different numbers. However, persuading Moscow to accept a limit of 2,000 to 2,500 total nuclear weapons, with a sublimit of 1,000 deployed strategic warheads, would constitute a very significant arms control achievement.

If it is not possible to launch a negotiation that limits non-strategic nuclear weapons, at least not initially, the next administration could consider a variety of confidence- and security-building measures (CSBMs) that would cover non-strategic nuclear weapons and lay a basis for later limitations and reductions.

Transparency measures. These could include data exchanges on the numbers, types, and perhaps locations of non-strategic nuclear weapons (they might also be made to apply to non-deployed strategic warheads). Such a data exchange could help the sides assess implementation of other possible CSBMs regarding these weapons and provide a basis for considering subsequent limits on them and means to monitor such limits. The sides might exchange data on implementation of the unilateral reductions of non-strategic nuclear weapons that they announced in 1991 and 1992, as it could be easier to share detailed information regarding past reductions than detailed data on current numbers.

Demating. The United States and Russia could each agree to state that, as a matter of policy, it would not maintain non-strategic nuclear weapons on (or "mate" those weapons with) delivery systems. This measure reflects operational practice for U.S. non-strategic nuclear weapons and for most—some analysts believe all—non-strategic weapons on the Russian side. That would make it easier for the sides to consider this step. This could be a useful political measure, though its practical significance could be limited by how close the weapons are stored to their

delivery systems. In the case of U.S. B61 bombs in Europe, they may be located in underground storage vaults in close proximity to their delivery aircraft.

No increase commitment. The United States and Russia could each declare that, as a matter of policy, neither would increase the total number of its non-strategic nuclear weapons. Again, this may already be in the cards as a practical matter. The U.S. military is modernizing the B61 but does not plan an increase in numbers. Russian analysts expect the number of non-strategic nuclear weapons in the Russian stockpile to decrease as those weapons are modernized.

Consolidation/relocation. The United States and Russia might agree to consolidate non-strategic nuclear weapons at fewer storage sites. In the past, some NATO countries have expressed interest in getting Russia to relocate its non-strategic nuclear weapons to storage sites further removed from NATO territory. (Countries in Asia understandably would not want to see Russian non-strategic nuclear weapons relocated from Europe to east of the Ural Mountains.) Such a measure would have to be carefully considered, as consolidation and relocation concepts could prove difficult if applied on the American side, given the small number of storage sites and the alliance sensitivities inherent to the issue.

Monitoring these CSBMs could prove difficult, even with some transparency measures. While the 1991-1992 U.S. and Soviet/Russian unilateral reductions that resulted from the "presidential nuclear initiatives" were widely welcomed and eliminated thousands of nuclear weapons on both sides, there were no provisions to verify their implementation. U.S. officials later expressed concern that Russia did not fully implement its declared unilateral steps.

The U.S. government should anticipate that, in any discussion of CSBMs along the above lines, Moscow would propose a measure restricting all non-strategic nuclear weapons, or all nuclear weapons not on board ballistic missile submarines, to national territory. That would have the effect of forcing the withdrawal of U.S. nuclear gravity bombs from Europe and would foreclose the possible option—which the Obama administration explicitly kept open—of redeploying non-strategic nuclear weapons to the Western Pacific in support of Japan or South Korea.

Bringing all U.S. and Russian nuclear weapons into a limitation regime appears to be a logical step and would better position Washington and Moscow to urge third-country nuclear powers to constrain their nuclear arms. While some Russian non-governmental analysts appear interested in an arrangement that would limit all U.S. and Russian nuclear weapons, the Russian government has yet to indicate such interest. The next administration should understand that getting the Kremlin to agree to such a regime, or even to just a further reduction in deployed strategic weapons, would not be an easy proposition. It would very likely require that Washington address other issues raised by Russian officials, issues that the next chapters will address.

CHAPTER 5

Missile Defense

Moscow's concerns about U.S. missile defense capabilities and intentions date back to the early 1980s and the Reagan administration's Strategic Defense Initiative. While Washington has continued to pursue missile defense, intercepting strategic ballistic missile warheads has proven more difficult and expensive than anticipated. U.S. ambitions have been downsized over the past 30 years from the goal of defending America against a massive Soviet ballistic missile attack. Current policy seeks to defend the homeland against a limited ballistic missile attack such as North Korea might be able to mount, though Russian commentary suggests that some in Moscow fear a broader objective for U.S. missile defenses—to degrade a Russian retaliatory strike.

Missile defenses affect the U.S.-Russian strategic balance but should be kept in perspective. Under New START, each side will likely maintain about 1,500 deployed ICBM and SLBM warheads. They could easily overwhelm the missile defenses deployed by the other. At present, offense wins the offense-defense competition, and that looks likely to remain the case for the foreseeable future. The attacker has the option of adding decoys, balloons, and other countermeasures to ballistic missiles, and discriminating between real warheads and decoys outside the atmosphere poses a major challenge for the defender. The planned addition by the end of 2017 of 14 ground-based midcourse interceptors to U.S. capabilities is expected to cost about $1 billion. The Russians likely could add 14 nuclear warheads, to say nothing of cheaper decoys, to their strategic ballistic missile force at significantly less cost.

This does not mean that offense will always dominate. Some future technology could emerge that changes the equation. That would have major implications for the strategic balance and strategic stability as well as for future arms control efforts. But such a technological breakthrough does not appear likely in the near to medium term.

In late 2010, NATO and Russian leaders agreed to try to develop a cooperative missile defense for Europe. U.S. and Russian officials conducted intense exchanges, but they failed to close a deal. Since then, differences over missile defense have deepened, and Moscow has cited this as one reason for its reluctance to pursue further nuclear arms reductions.

Factors on both sides complicate the missile defense dialogue. On the American side, many Republicans on Capitol Hill are strong advocates of strategic missile defense and appear unprepared to accept any limitation in that area, even if an agreement were of limited duration and would have no meaningful impact on U.S. missile defense plans. The Russian government meanwhile attributes to U.S. missile defenses capabilities they do not have, and Moscow ignores the large gap between the number of strategic offensive warheads and the number of interceptors capable of engaging ICBM and SLBM warheads. Neither the Republicans' faith in missile defense nor the Russians' professed concern about it appear to bear much relation to current U.S. missile defense capabilities.

The Current Missile Defense Standoff

U.S. missile defenses currently consist of a number of systems. Ground-based midcourse interceptors deployed in Alaska and California are intended to defend against a limited ballistic missile attack against the U.S. homeland. The interceptors currently number 30 and will increase to 44 by the end of 2017, though questions remain about their effectiveness, particularly of the interceptors' kill vehicles. (The recent test history is not encouraging. The George W. Bush administration rushed to deploy the ground-based interceptors before completing their development and test program.) U.S. military forces also deploy theater missile defense systems such as the Terminal High Altitude Area Defense (THAAD), the Aegis ballistic missile defense system, and the Patriot PAC-3, which are intended to counter short to intermediate-range ballistic missiles.[24] They have a much better test record.

The Aegis system uses SM-3 interceptor missiles. U.S. Navy ships with SM-3 IA interceptors have been deployed in European waters since 2011 as the first phase of the "European phased adaptive approach" for missile defense. Those were augmented in a second phase by 24 SM-3 IB interceptors deployed in Romania in 2015 ("Aegis Ashore"). In the planned third phase, 24 SM-3 IIA interceptors are to be placed in Poland in 2018. NATO has stated that the SM-3 interceptors are not oriented against Moscow but instead look to defend against threats from NATO's southeast. U.S. officials have been more explicit in stating that the interceptors are oriented against Iran's ballistic missiles, particularly if Tehran develops longer-range capabilities in the future.

Interestingly, publicly-expressed Russian concerns over U.S. missile defenses focus far more on the SM-3s in Europe than on the ground-based midcourse interceptors in Alaska and California that are designed to engage strategic ballistic missile warheads. This likely reflects strong Russian antipathy toward U.S. military deployments on the territory of countries that joined NATO in the past 20 years as well as fears about future capabilities. SM-3s based in Europe pose no threat to Russian ICBMs, though some analysts believe that ships armed with more advanced SM-3 models might be able to defend the U.S. homeland against a strategic ballistic missile attack if the ships were deployed close to the east and west coasts. (That, of course, would require diverting those warships from a multitude of other missions.)

While Russia expresses concern about U.S. missile defense developments and intentions, it has long maintained an active missile defense program of its own. This includes a defense around Moscow, though the current effectiveness of that system is uncertain. It would undoubtedly be overwhelmed by a concerted attack. The Russian military advertises its new S-400 and S-500 air defense missiles as having capabilities against intermediate-range ballistic missiles similar to the capabilities of SM-3 interceptors. Thus far, the U.S. military does not appear to be alarmed by the capabilities that Russian interceptors might have against U.S. strategic ballistic missiles.

Following the failure of the sides in 2011 to agree on a cooperative missile defense, Russian officials began increasingly to insist on a legally-binding guarantee—that is, a treaty—that U.S. missile defenses would not be oriented against Russian strategic missiles. They elaborated that such a guarantee should be accompanied by limits on the numbers, velocities, and locations of missile interceptors.

In 2010, it might have been possible to negotiate a treaty of 10 years' duration on missile defenses, paralleling the 10-year duration of the New START Treaty, that would have offered a reasonable assurance to Russia on missile defenses but not constrained planned U.S. missile defense programs in any significant way. U.S. negotiators, however, did not attempt such a negotiation. If they had, Republican senators would have blocked any effort to gain Senate consent to ratification.

U.S. and NATO officials in 2011 offered to provide Russia a politically-binding assurance that U.S. missile defenses in Europe would not be directed against Russian strategic forces, a position that NATO leaders reiterated at their May 2012 summit meeting

when they stated that "NATO missile defense is not directed against Russia and will not undermine Russia's strategic deterrence capabilities."[25] Such assurances did not, however, suffice for Moscow. The Russians accused Washington of being duplicitous about its deployments, asserting that U.S. missile defense plans should have been adjusted following the 2015 Iran nuclear deal.

In spring 2013, the United States proposed an executive agreement, which would not require Senate consent to ratification, regarding missile defense transparency. Under the agreement, for key missile defense elements such as interceptors and radars, the two countries would exchange annual declarations providing their current numbers of key elements and projected numbers for each year looking out over the subsequent 10 years. The data exchange's goal was to provide sufficient information so that each side could see that the other's missile defenses did not threaten its strategic offensive forces or, at a minimum, would have a number of years of warning in which it could act if it saw a threat emerging.

The Russians did not pick up on these U.S. proposals. If anything, Moscow's rhetoric against U.S./NATO missile defenses in Europe has escalated.

Options on Missile Defense

It would be useful to find a way to get back to the idea of a cooperative NATO-Russia missile defense for Europe, though that idea's time may have passed. Still, at a minimum, finding a way to defuse the dispute over missile defense would be mutually beneficial. That would not only remove a problem issue from the U.S.-Russian agenda, but it well may be a requirement if the next U.S. administration wishes to pursue further nuclear arms reductions with Moscow.

At a future point, if/when there is greater equivalence between strategic offense and missile defense, the Russian view that a legally-binding treaty governing missile defenses should apply in parallel with a treaty mandating strategic nuclear arms reductions would have merit. A future U.S. administration interested in a treaty providing for further cuts in strategic nuclear forces may find that it can go no further if it is not prepared to negotiate a treaty on missile defense. But the current gap between offense and defense is huge. In 2017, the U.S. military will deploy 44 interceptors capable of engaging ICBM or SLBM warheads. When the New START limits take full effect in February 2018, the Russian military will be able to deploy some 1,500 ICBM and SLBM warheads. For the foreseeable future, neither side's missile defenses will pose a serious threat to the strategic ballistic missile forces of the other. A treaty is not needed in the near term to ensure strategic stability.

In order to defuse the missile defense question, the next administration might nevertheless reiterate the 2013 offer of an executive agreement on missile defense transparency and consider some additional steps. The 2015 Joint Comprehensive Plan of Action (JCPOA) regarding Iran's nuclear program may create an opportunity. While the JCPOA does not constrain Iran's ballistic missiles, it does block for at least 10 to 15 years the prospect of Iran producing nuclear weapons to place on a ballistic missile. A ballistic missile carrying a conventional warhead poses a threat orders of magnitude less than a ballistic missile armed with a nuclear warhead.

One option the next administration might consider would be for the United States, after consultation with NATO, to offer as a matter of policy a cap on the number of SM-3s deployed in Romania and Poland. Currently, the planned number is 48, but "adaptive" in the European phased adaptive approach implies the possibility of an increase (and, in theory, the possibility of a decrease). A cap could remove the possibility of an increase and/or provide Russia a greater degree of predictability regarding U.S. missile defenses. This might be accompanied by an offer to allow Russians to visit the missile defense sites to confirm the number of interceptors.

A variant of this proposal would entail a U.S. offer of a cap on the number of SM-3s in Romania and Poland and on board U.S. Navy ships in European

waters, at a higher number than the option addressing just SM-3s ashore in Romania and Poland. Defining a number could prove difficult, however, given changes in the number of U.S. ships in European waters over time. Moreover, the Russians would find it difficult to confirm U.S. adherence to such a cap. The vertical box launchers now standard on board most U.S. surface combatants can carry anti-aircraft missiles, sea-launched cruise missiles, and other weapons as well as the SM-3. The Pentagon does not disclose the weapons loadings on U.S. warships and would be reluctant to do so. Absent such information, the Russians would have less confidence in the U.S. cap on SM-3 numbers.

A more dramatic option would be for the United States, again after consultation with NATO and in particular with Poland, to offer to halt construction of the SM-3 site in Poland or to complete the site but not deploy SM-3 interceptors there. (SM-3s in Poland would supplement the SM-3s already based in Romania.) Any such offer likely would have to be conditioned on two points. First, there could be no question about Iran's adherence to the JCPOA.

Second, in order to avoid damage to the U.S.-Polish relationship, it would have to be understood that the United States would deploy in Poland a different military capability involving at least as many U.S. troops as the SM-3 deployment. Few if any senior officials in Warsaw worry about an Iranian ballistic missile attack. They might be just as content with U.S. soldiers providing some other capability. There likely would be little interest in the United States, Poland, and NATO in taking such a step unless Russia offered something of interest, such as moving to constrain non-strategic nuclear weapons.

A different approach would count strategic missile interceptors under the limit on deployed strategic warheads at some discounted rate. For example, the sides might agree that three interceptors would be treated as the equivalent of one strategic warhead, leaving each free to choose its offense-defense mix. While an intriguing concept, neither side's military would likely embrace it in the near term.

Much Russian concern about U.S. missile defenses appears to focus on the longer term, i.e., what will come after the current U.S. plans. As Russian Deputy Prime Minister Dmitry Rogozin put it in early 2012, it was less phases one, two, three, or (the since cancelled) four of the European phased adaptive approach that bothered the Kremlin: "There are no guarantees that after the first, second and third phases are completed, there will be no fourth, fifth and sixth. Do you really think they [the United States] will halt all their technologies after 2020? That's nonsense! They will go ahead with developing and boosting the technical parameters of their interceptor missiles and performance characteristics of their warning systems."[26]

It is difficult to see any U.S. administration able to offer stringent limits that foreclose future missile defense options on a permanent basis. While it looks like U.S. and Russian strategic offensive ballistic missiles will be able to overwhelm the missile defenses of the other side for the foreseeable future, that does not preclude a future technology breakthrough that might change the equation. Still, if it could advance the process of reducing nuclear weapons, the next administration might consider reiterating the Obama offer of an executive agreement on missile defense transparency and offering certain measures of self-restraint—well short of a legally-binding treaty that, for the foreseeable future, appears politically unacceptable in Washington.

CHAPTER 6

Advanced Conventional Strike Weapons

Over the past two decades, weapons systems have become increasingly more accurate, raising the prospect that precision-guided conventional weapons could be used to strike and disable or destroy targets that previously would have required a nuclear warhead. The Conventional Prompt Global Strike (CPGS) concept was first developed by the George W. Bush administration, which expressed interest in placing conventional warheads on a small number of Trident II D5 submarine-launched ballistic missiles.

President Barack Obama's administration ruled out putting conventional warheads on SLBMs or ICBMs but expressed interest in the capability of delivering a conventional warhead to intercontinental distances within sixty minutes. The Pentagon is exploring several possibilities for the CPGS role, with most attention to date on hypersonic glide vehicles. This is still a research and development program; no acquisition decision has been made. A hypersonic glide vehicle would be launched by a ballistic missile but then "glide" along the upper reaches of the atmosphere to its target. While a hypersonic glide vehicle might come close to replicating the capability of an ICBM, it does not follow a ballistic path, and the Obama administration maintains that it would not be captured by the New START limits, provided that more than half of its flight were non-ballistic. Russia is also pursuing hypersonic glide vehicles, as is China.

The Pentagon is considering a variety of boosters for hypersonic glide vehicles, including intermediate-range ballistic missiles that would be based on land and on submarines (though their less than intercontinental range and the fact that submarines might be out of range of potential targets could limit their utility). The Pentagon is also exploring hypersonic cruise missiles.

Russian analysts have expressed concern that the United States might attack Russian strategic targets, including command nodes and ICBM silos, with precision-guided conventional warheads. That said, the Obama administration attempted to engage Russian officials on conventional strike systems in the context of broader discussions of strategic stability; those efforts did not produce any headway. If Moscow changes course and indicates a readiness to discuss further reductions of nuclear weapons, there likely will need to be discussion of conventional systems, particularly CPGS.

CPGS Systems Constrainable?

Were the United States to reconsider placing conventional warheads on ICBMs or SLBMs, or were the Russians to consider such an option, those warheads would be constrained under New START's deployed strategic warhead limit. That limit does not distinguish between nuclear and conventional warheads. Each side is free to deploy conventional warheads on ICBMs or SLBMs, though each deployed conventional warhead would come at the cost of a deployed nuclear warhead. Likewise, were either side to deploy a hypersonic cruise missile on a strategic bomber, that would be captured under New START, albeit with a discounted attribution rule of one deployed warhead per deployed strategic bomber.

There are important reasons why the sides might not want to pursue the option of placing conventional warheads on their strategic ballistic missiles. If one side saw the other launch an ICBM or SLBM, it could not know that the missile carried a conventional warhead. It could just as probably assume that the warhead was nuclear and, if it was launched in its direction, respond with nuclear weapons of its own.

This "warhead ambiguity" is one reason why the United States decided to look at hypersonic glide vehicles, which could be based on land launchers at facilities separate from ICBM fields. Another advantage of hypersonic glide vehicles is that they can maneuver and change direction. A U.S. ICBM launching a conventional warhead at a target in the Middle East would have to overfly Russia, which could be misinterpreted in Moscow. A hypersonic glide vehicle, on the other hand, could have the ability to fly around Russia. This raises another issue in addition to warhead ambiguity (which would still apply with a hypersonic glide vehicle): While an ICBM (or SLBM) warhead, once separated from the booster, flies a predictable ballistic course to its target, a hypersonic glide vehicle would be able to change course, raising the questions of "destination ambiguity" and "target ambiguity"—where is the vehicle ultimately headed? Yet another issue with hypersonic glide vehicles is that, after they reach the glide portion of their flight, they may be less visible to radars than ballistic missile warheads.[27]

The Obama administration has described the CPGS requirement as a niche capability. Defense Department officials believe such systems might be useful, for example, to strike high-value terrorist targets out of prompt reach of other weapons systems and suggest a limited need. Given the likely cost of such systems, the number will almost certainly be low. If the military has a requirement to put large numbers of conventional weapons on a target, it has other, cheaper ways, such as B-52s or B-1s carrying conventional bombs or Joint Air-to-Surface Standoff Missiles (JASSMs) or conventionally-armed sea-launched cruise missiles launched from submarines or surface ships.

If the next administration views only a limited requirement for intercontinental-range hypersonic glide vehicles—and if they can in fact be made to work—those vehicles should be amenable to an arms control solution. The United States might propose to Russia a side agreement to New START limiting each to no more than, for example, 30 intercontinental-range hypersonic glide vehicles. Certain provisions from New START on data exchanges and notifications could be readily modified for the side agreement, which might even include an inspection provision to confirm that hypersonic glide vehicles were conventionally armed.

An alternative approach would amend New START to include hypersonic glide vehicles, counting each as a deployed strategic warhead and their deployed boosters as deployed strategic delivery vehicles. Thirty would not take much space under limits of 1,550 and 700, though some might be concerned about the principle of constraining a specifically conventional weapons system under New START and the precedent it could set for a future treaty, especially if that agreement contained limits dramatically lower than those in New START.

If the United States decided to pursue options other than hypersonic glide vehicles of intercontinental range, they might not relate well to New START provisions. They might be of lesser concern to Russia, though that would depend on the specifics of the system.

While earlier bilateral discussions appear to have achieved little, neither the United States nor Russia now seems to have a workable hypersonic glide vehicle. They thus still have the opportunity to discuss such systems, their possible impact on the strategic balance, and limitation regimes before they are deployed. Since hypersonic glide vehicles have not yet been deployed, it might be possible to consider a ban, though that likely would have to involve China.

The Harder Problem of Cruise Missiles

While not prompt, conventionally-armed cruise missiles are increasingly accurate. They are also deployed in large numbers. The Pentagon's goal is to have 4,000 conventionally-armed sea-launched cruise missiles in addition to conventionally-armed air-launched cruise missiles such as the JASSM and its extended range variant.

The U.S. military has deployed conventionally-armed cruise missiles for more than 30 years and, in past arms control negotiations, generally tried to shield them from limitation. These missiles have become a key element of U.S. conventional power projection. The Russians may be starting to catch up, having demonstrated their conventionally-armed SLCMs and ALCMs in operations in Syria.

Neither military is likely to be ready to reduce or even seriously limit the number of its conventionally-armed cruise missiles, even though some Russian analysts express concern about the use of such missiles in a "conventional strategic attack." Other analysts note that, in order for the United States to carry out a mass conventional cruise missile attack on Russia, a significant portion of the U.S. Navy would have to head toward Russia's coasts, something the Russian military would almost certainly detect. It is not clear, moreover, how effective conventionally-armed cruise missiles might be against certain target classes, such as hardened ICBM silos.

Still, if the U.S. and Russian governments are not ready to limit conventionally-armed SLCMs and ALCMs, they might consider a military-to-military dialogue on the capabilities of such weapons, e.g., what target sets they pose a realistic threat to, and their implications for the strategic nuclear balance. Such a dialogue could ease concerns about cruise missile capabilities, or it might point up issues that the sides need to consider more closely.

World Nuclear Warhead Numbers, 2016

COUNTRY	MILITARY STOCKPILE[28]
United States	4,670
of which deployed strategic	(1,750)
Russia	4,490
of which deployed strategic	(1,790)
France	300
of which deployed strategic	(280)
China	260
of which deployed strategic	(0)
Britain	215
of which deployed strategic	(120)
Pakistan	110-130
India	100-120
Israel	80
North Korea	?

Note: the above U.S. and Russian figures are based on estimates of total deployed ballistic missile warheads and actual weapons designated for bomber use, not on New START counting rules, which attribute only one weapon per each deployed bomber.

CHAPTER 7

Third-Country Nuclear Forces

Negotiated nuclear arms control agreements to date have largely been a matter conducted solely between Washington and Moscow (the one exception being the negotiation of the Lisbon Protocol in 1992, under which Russia, Belarus, Kazakhstan, and Ukraine agreed to undertake the Soviet Union's START I obligations). The focus on the United States and Soviet Union/Russia made sense, given the size of the nuclear superpowers' arsenals compared to the other nuclear-armed states.

The process cannot remain bilateral forever, particularly if Russia holds to its current insistence that the next round of nuclear arms reductions bring in third countries. The United States and Russia have already conducted discussions on strategic stability and disarmament with Britain, France, and China in a P5 venue (the five permanent members of the U.N. Security Council are also the five nuclear weapons states recognized by the Non-Proliferation Treaty). The results to date have been modest. The next administration will need to consider how, if at all, it wants to deal with the question of third-country nuclear forces.

A Multilateral Negotiation on Limits?

Britain, France, and China are the most logical candidates for inclusion in a multilateral process. They are the three largest nuclear weapons states after the United States and Russia, though their individual arsenals are each only about one-fifteen the size of either of the two nuclear superpower arsenals. India and Pakistan are the next logical candidates. In the near term, however, it may make more sense for those two countries to explore confidence-building and other measures regarding their nuclear forces on a bilateral basis. (That said, it should be recognized that Indian nuclear forces are a factor in Beijing's thinking on nuclear weapons and vice-versa.) Addressing Israel's nuclear arsenal might logically best take place in the context of an overall settlement providing for peace in the Middle East. The international community seeks to end North Korea's nuclear weapons program, thus far, with no success. Still, bringing that country into a multilateral process would be premature and risk legitimizing its nuclear arsenal.

A five-power negotiation would be easier to conduct than one involving all nine states that are known or presumed to have nuclear arms, but it would by no means prove simple. Of the three, only Britain has expressed anything that appears to be a readiness to take part. Chinese officials typically preclude their country's participation until such time as the United States and Russia reduce down to levels closer to China's. The vastly different sizes of the nuclear arsenals would complicate any negotiation. While the United States and Russia each maintain about 4,500 nuclear weapons in their military stockpiles, as of early 2016, it was estimated that France had 300, China 260, and Britain 215.

The five maintain very different nuclear force structures. For example, Britain maintains only nuclear-armed SLBMs and no longer has non-strategic nuclear weapons, while the other four do. (The

French have a nuclear-armed air-launched cruise missile in their inventory for use by a fighter-bomber that would not be covered by New START.)

In the near term, it is impossible to see a five-power negotiation producing a multilateral treaty on nuclear arms reductions. The question of *de jure* equality could quickly stall the negotiation. Neither Russia nor the United States would agree to accept equal limits with the other three, while Britain, France, and China would not accept a treaty that provided for unequal limits. The latter three seem to accept the reality of significant nuclear inferiority relative to the United States and Russia, or at least are not taking steps to change it. But they most likely would not be amenable to codifying unequal limits in a treaty. That would rule out an approach along the lines of the 1922 Washington Naval Treaty, which constrained the capital ships of the navies of the United States, Britain, Japan, Italy, and France in accordance with a 5-5-3-1.75-1.75 ratio, at least until it broke down in the 1930s.

If the P5 were committed to a world without nuclear arms, an agreement might be negotiated with unequal interim constraints but a final limit for all five of zero. None of the five, however, is committed to achieving that goal in the near term. All five have boycotted the U.N.-based open-ended working group on nuclear weapons, where interest was expressed in negotiating a global convention banning all nuclear weapons.

If the five countries could not reach an agreement covering all of their nuclear weapons, could they negotiate an agreement covering some portion? Such a negotiation would still have to cope with the problem of equal vs. unequal limits. In 2007, Russia and the United States issued a joint statement at the United Nations reaffirming their commitment to the INF Treaty and calling on other countries to follow suit and eliminate their land-based ballistic and cruise missiles of intermediate range. No other country picked up on the idea. While Britain and France do not maintain land-based intermediate-range missiles, China has hundreds, most of which are believed intended to carry conventional warheads. Washington and Moscow are unlikely to persuade Beijing to eliminate those.

If seems unrealistic to expect Britain, France, and China to take part in a negotiation aimed at legally-binding limits on nuclear forces. While Russian officials have called for a multilateral negotiation, they have put forward no specific proposals for multilateral limits, suggesting that they understand the difficulty of coming up with a negotiable position.

If a negotiation on legally-binding limits is not possible in the near term, the next administration might consider another possible course: in the context of a U.S.-Russian agreement on a new treaty providing for nuclear arms reductions that go beyond those in New START, London, Paris, and Beijing would agree to undertake unilateral, politically-binding commitments not to increase the overall numbers of their nuclear weapons so long as the two nuclear superpowers were reducing theirs. An alternative approach would be for each of the three to state that it would not build up beyond a certain specified level X (with X being different for each country). That could allow for some modest growth, possibly of interest to China. That, however, would make the approach less attractive to Washington and Moscow.

Transparency and Confidence-Building Measures

The next administration might consider transparency and confidence-building measures, starting with the P5 states, which could help to reduce uncertainties about other states' nuclear forces. Such measures could also provide information and build confidence that might facilitate launch of a negotiation on more direct limits at a later point. Among the possibilities for transparency and confidence-building measures:

Data exchange. The five could agree to exchange data on their nuclear forces in a multilateral format. This could be a very basic exchange, covering total numbers and types of nuclear weapons. (Were Britain, France, and China to agree to no increase commitments, providing data on their total number

of nuclear weapons would be important to establish a baseline for the commitments.) A data exchange could be more detailed. For example, a multilateral exchange could be based on the requirements of New START, which would include exchanging information on specific locations for deployed strategic delivery systems. More detailed exchanges might be possible for Britain and France to accept, but China would be reluctant to provide too much detail, fearing that information provided for transparency or confidence-building purposes could also be used by Russia or the United States to target its relatively small number of nuclear weapons systems.

Demonstrations. U.S. and Russian officials regularly conduct inspections of the other side's strategic nuclear forces under New START. The two countries might consider allowing British, French, and Chinese officials to join some of the inspections as observers. That could serve as a confidence-building measure as well as begin to expose the three countries to the kinds of verification measures that might need to be incorporated in a future multilateral accord. Washington and Moscow could offer this on a unilateral basis or, of greater interest to the United States and Russia, in return for the other three countries offering some demonstrations regarding their nuclear systems.

Notifications. Beyond semi-annual data exchanges, the United States and Russia exchange numerous notifications under New START's terms. Some, such as movements of specific strategic delivery vehicles, likely would be unacceptable to China. But it might be more possible to secure agreement from the Britain, France, and China to join the United States and Russia in providing notifications of launches of ICBMs and SLBMs—some of which they already notify in the form of notices to airmen and mariners. The five might also consider multilateral notifications of major strategic exercises. New START requires the United States and Russia to notify one another of major exercises involving heavy bombers. The other three countries do not have heavy bombers, but they might consider some definition of exercise that would capture for notification other major activities involving nuclear forces.

Open Skies. The United States, Russia, Britain, and France already participate in the Open Skies Treaty, which allows overflights of treaty parties by unarmed aircraft equipped with photographic equipment. The four might consider with China whether a parallel Open Skies arrangement among the five could contribute to transparency and confidence-building.

Demating. The United States, Russia, Britain, and France maintain deployed strategic warheads on their ICBMs and SLBMs. It is believed, however, that most if not all U.S., Russian, and French non-strategic warheads are not mated to their delivery systems. It is also believed that China keeps its nuclear warheads separate from delivery systems, though that may change as the Chinese Navy begins regular patrols by submarines carrying SLBMs. There may be space for the sides to agree to keep their non-strategic warheads demated from their delivery systems, as that appears to be the current practice for most if not all (the exception may be some Russian non-strategic warheads).

Strategic Dialogue. The five states could agree to expand the previous P5 agenda and hold regular exchanges on questions such as strategic stability, missile defense and the offense-defense relationship, the effect of potential new weapons technologies, and the doctrines governing their nuclear forces. U.S. and Russian officials have long conducted such discussions, which have given them a commonly understood strategic vocabulary. (U.S. and Russian officials should continue to hold regular bilateral consultations on strategic stability.)

CHAPTER 8

Other Nuclear Issues

Previous chapters have examined options for further reductions in U.S. and Russian nuclear arms as well as for addressing Russian concerns on missile defense, advanced conventional strike weapons, and third-country nuclear forces. This chapter looks at three other questions. First, it considers how the next administration might talk about the elimination of nuclear arms. Second, it addresses how, if the sides were willing, they might address compliance concerns regarding the INF Treaty. Third, this chapter examines the question of U.S. ratification of the 1996 Comprehensive Nuclear Test Ban Treaty (CTBT).

A World Without Nuclear Weapons?

Virtually every presidential administration since 1945 has endorsed the goal of eliminating all nuclear weapons, which the United States pledged to do—as did Russia, Britain, France, and China—under the Non-Proliferation Treaty. Presidents Ronald Reagan and Barack Obama gave particular attention to the goal. Reagan came close to agreeing with Soviet leader Mikhail Gorbachev at their summit in Reykjavik in October 1986 on the elimination of all nuclear weapons within 10 years. In his April 2009 speech in Prague, Obama called for reducing the number and role of nuclear weapons in U.S. security policy and endorsed the goal of creating a world without nuclear arms. He also stated that it would take time and that, as long as nuclear weapons existed, the United States would maintain an effective nuclear deterrent. That was an important qualifier; even if all nuclear-armed states agreed on the goal, finding a path to a world without nuclear weapons would be extremely difficult.

The next administration should consider what aspiration, if any, it wishes to express regarding the goal of eliminating nuclear weapons. It will face contradictory pressures. On the one hand, there is growing international interest in getting rid of nuclear arms. In December 2015, in part owing to frustration with the slow pace of nuclear disarmament, the United Nations General Assembly established an open-ended working group on the question, charged with formulating "legal measures, legal provisions and norms" aimed at promoting global nuclear disarmament. The United States, Russia, Britain, France, and China opposed the initiative and have not participated in the open-ended working group process. More than 100 countries nevertheless have taken part. The process will likely continue and could soon have a U.N. General Assembly-approved mandate to begin negotiating a convention banning nuclear arms.

At the same time, while Britain has its nuclear weapons numbers on a downward path, none of the other nuclear weapons states embraced Obama's call in 2009. Moreover, given Russia's more belligerent attitude, China's growing military power, and North Korea's push for more sophisticated nuclear weapons and missiles, some argue that the United States must rely more on nuclear deterrence than Obama had hoped. A number of analysts who argue for greater reliance on nuclear deterrence contend that it kept the Cold War between the United States and the Soviet Union from going hot.

At several points during the Cold War, however, due either to human or mechanical error, the world came perilously close to a breakdown in deterrence that would have produced a nuclear conflagration and catastrophic consequences. Continuing to rely on nuclear deterrence means continuing to live with this risk, which may well have grown since the Cold War as a result of the increase in the number of nuclear weapons states. (In a world without nuclear weapons, the United States would seem to be in a strong security position given its geographic location, a robust network of alliances, and powerful conventional forces. While such a world would have risks, those risks should be weighed against the risks of continued reliance on nuclear deterrence and of its possible failure.) Even if the next administration concluded that a declaration of its support for a world without nuclear arms would not serve as a guide for its near-term decisions regarding nuclear forces and policy, it might still see that such a declaration could have political value.

Dealing With the INF Treaty

It is virtually impossible to see a new treaty reducing U.S. and Russian nuclear arms unless there is some resolution of compliance concerns regarding the INF Treaty. On the American side, the next administration would have a very difficult time securing Senate consent to ratification of a new treaty if concerns persisted about Russian INF Treaty compliance.

In July 2014, the U.S. government made public its charge that Russia had violated the INF Treaty by testing a ground-launched cruise missile to intermediate-range (500 to 5,500 kilometers). Washington has released few details about the missile publicly, making it difficult for non-governmental analysts to assess the specifics of the charge. The Obama administration has pressed Moscow to return to full compliance and has said that it is pursuing measures in response to the Russian violation.

While many in Congress have expressed concern about the Russian violation, there thus far has been no significant push for U.S. withdrawal from the INF Treaty. That reflects the fact that U.S. allies in both Europe and Asia take a strong interest in the treaty's continued functioning, since it bars Russia from deploying missiles that could reach them but not the U.S. homeland. Depending on what happens in U.S.-Chinese relations, some analysts foresee a possible future requirement for placing intermediate-range ballistic missiles on Guam. At this point, however, the Pentagon lacks a specific military requirement for intermediate-range missiles. Even if the United States built such missiles, few allies would be prepared to host them where they could hold at risk targets in Russia. All that said, if Russia were to move from testing to actual deployment of an intermediate-range ground-launched cruise missile, that would change things dramatically.

The Russian government has denied that it violated the INF Treaty. It instead charges that the United States has violated the agreement in three ways: using prohibited intermediate-range ballistic missiles as targets for missile defense tests; arming unmanned aerial vehicles (drones) and thereby making them the equivalent of ground-launched cruise missiles; and placing vertical box launchers for SM-3 missile interceptors in Romania, when those launchers on board U.S. Navy ships can carry and fire sea-launched cruise missiles that are almost identical to the banned U.S. ground-launched cruise missile.

Thus far, U.S. and Russian officials have made no apparent progress in resolving these charges, and the Pentagon has begun taking some measures that it describes as responding to the Russian violation. The next administration should consider how it might move to resolve both sides' complaints, if the opportunity with Moscow arose. One could see a path forward to address the concerns raised by Russia, if Moscow were prepared to return to full compliance with the INF Treaty and perhaps provide some transparency to demonstrate that.

There appear to be ways to address the Russian concerns. The INF Treaty has a provision that makes allowance for use of what otherwise might be considered intermediate-range ballistic missiles for pur-

poses such as missile defense targets. The Russian military advertises its S-400 and S-500 air defense missiles as having capabilities against intermediate-range ballistic missiles and presumably has an interest in testing against such missiles. The sides could agree on language to make clear the distinction between prohibited intermediate-range ballistic missiles and missiles used in missile defense tests. Alternatively, or in addition, the sides could agree that each could have no more than a certain number of ballistic missiles for use as targets in missile defense tests and that those missiles would be restricted to declared sites associated with missile defense tests.

The Russian claim regarding drones does not pass the common sense test. A ground-launched cruise missile flies from point A to—and attacks—point B, destroying itself in the process. A drone, on the other hand, flies from point A to point B, launches a weapon at a target at point B, and then returns to point A (or to some other point C). Moreover, the Russian military is developing long-range armed drones of its own. Again, the sides could work out language to make clear the difference between prohibited ground-launched cruise missiles and permitted armed drones.

The most substantive Russian charge concerns the vertical box launcher for SM-3s in Romania, which can hold 24 SM-3s (with another box launcher to be deployed in Poland in 2018). While the Pentagon intends to deploy only SM-3 missile interceptors in those launch spaces, it is not clear that there is any easily observable reason why a cruise missile could not be placed in one or more of the launch spaces. (Some Russian analysts claim that the U.S. military could also place an intermediate-range ballistic missile in the launcher.) Were Russia to have deployed such a launcher system and the United States had not, Washington might well have expressed concern to Moscow.

In order to resolve this issue, the United States, after consultation with Romania (and Poland), might offer Russia the opportunity to visit the SM-3 site(s) once or twice a year and ask that two or three of the launch spaces—at the choice of the visiting Russians—be opened to confirm that they contained SM-3 interceptors and not something else. U.S. officials have privately indicated that they would be prepared to consider such a step if Russia, for its part, were to come back into full compliance with the INF Treaty and offer transparency measures to help confirm that fact. As an alternative, the Pentagon could consider whether there was some observable difference that could be applied to the shore-based vertical box launchers that would indicate the launchers do not contain or are incapable of containing cruise missiles, in the same way that observable differences were applied to U.S. B-1 bombers to indicate that they would perform only conventional missions and thus would not be countable under New START's limits.

These measures could address Russian-stated concerns if there was a serious dialogue in which Moscow addressed the concern about Russian compliance. Russian officials likely would not acknowledge a treaty violation, and the U.S. government should not press for such an acknowledgment, provided that the problem was resolved. A model could be a consent decree used to resolve domestic legal disputes: the side does not admit that it did anything wrong but agrees not to do it in the future.

Comprehensive Nuclear Test Ban Treaty

The United States signed the Comprehensive Test Ban Treaty in 1996. By preventing other countries from nuclear explosive testing, the CTBT would impose an important hindrance to countries seeking to gain a nuclear weapons capability or to nuclear-armed states seeking to develop more sophisticated weapons. One hundred and eighty-three countries have signed the CTBT, and 166 have ratified it.

The Senate, however, did not give consent to ratification of the treaty when it considered it in 1999. Opposition to ratification largely stemmed from two questions. First, how could the U.S. government maintain confidence in its nuclear arsenal without

explosive testing? Second, how could the U.S. government be certain that others were not cheating on the treaty and testing illegally?

In order to enter into force, Annex 2 of the CTBT requires that 44 named countries, the nuclear weapons states and states that had nuclear power or nuclear research reactors as of 1996, ratify the treaty. Of the 44 Annex 2 countries, 36 have ratified, including Russia, Britain, and France. Eight—including the United States and China—have signed but not ratified or not signed at all.[29]

The Obama administration came to office hoping to secure ratification of the CTBT. After a more bruising than expected fight to get ratification of New START, the administration did not press forward with the CTBT, instead seeking to educate senators on the rationale for the treaty. In September 2016, the P5 countries issued a joint statement supporting the CTBT and its ultimate entry into force, and the U.N. Security Council passed a resolution also supporting the CTBT and its International Monitoring System and calling on states to continue to observe the *de facto* moratorium (with the exception of North Korea) on nuclear weapons testing.

The administration has sensibly argued that there are much better answers to the two questions cited by treaty opponents in 1999. First, the stockpile stewardship program, begun in the 1990s as a means to ensure the reliability of nuclear weapons without nuclear explosive testing, has been a success. The national lab directors and commander of Strategic Command have certified to the president that the arsenal is reliable, and the lab directors believe that they can continue to do so without nuclear explosive testing in the future. They have noted that, with the stockpile stewardship program, the labs have come to understand things about how nuclear weapons work that were not learned during nearly 50 years of testing.

Second, the means for detecting nuclear tests have improved significantly over the past 20 years. In addition to U.S. national technical means, which have improved over the past 16 years, the CTBT Organization's International Monitoring System deploys nearly 300 stations around the world that operate on a continuous basis with instruments to detect tests underground, underwater, and in the atmosphere. With these systems, it is believed that tests down to one kiloton can be detected (the weapon that destroyed Hiroshima was fourteen kilotons). In some geological formations, tests down to 0.1 or 0.2 kilotons can be detected.

The next administration will want to consider whether or not to press for CTBT ratification. Part of that decision could depend on the make-up of the Senate after the November elections.

In making its decision, the next administration might consider two additional points. First, what is the likelihood that Nevada—home of the Nevada National Security Site, formerly known as the Nevada Test Site—would consent to a resumption of U.S. testing? Nevada fought long, hard, and successfully against the storage of nuclear waste at the site. Would it agree to resumed tests, particularly as Las Vegas, located about 60 miles away, has seen its population nearly triple since the last nuclear test was conducted in 1992?

Second, the United States conducted as many nuclear tests as the rest of the world combined and had more sophisticated instruments for collecting data from those tests. By preventing others from testing, a global nuclear test ban would appear to freeze and lock in an important U.S. knowledge advantage.

CHAPTER 9

Conclusions and Recommendations

The preceding pages have outlined the kinds of questions that the next administration might consider regarding U.S. nuclear forces and nuclear arms control with Russia. These questions likely will not top the foreign and security policy agenda of the next president, given a chaotic world, but they nevertheless will require the administration's attention for a variety of reasons.

Recommendations Regarding U.S. Nuclear Forces

The next president should carry out a nuclear posture review early in her or his term. The goal should be to determine the requirements for U.S. nuclear forces and policy and whether current and planned nuclear forces meet those requirements. A major part of the review should focus on what the United States seeks to deter potential adversaries from doing and what is required to deter them from those actions, including what sorts of things they value that the United States should seek to hold at risk, both with nuclear and other military forces.

In this regard, special attention should go to Russia, given the size and variety of its nuclear forces and the more belligerent stance it has adopted toward the West in recent years. Russia's stated policy is that it would use nuclear weapons only in response to an attack on Russia or a Russian ally with weapons of mass destruction or an attack on Russia with conventional forces in which the existence of the state is at stake. However, Moscow's loose talk about nuclear use and nuclear "de-escalation" (early use of nuclear weapons to end a conflict on favorable terms) has raised questions about whether its action doctrine might be different from stated policy. A nuclear posture that can deter Russia—America's only peer competitor in the nuclear weapons area—should suffice to deter other potential adversaries. The large-scale nuclear exchange that drove force planning for much of the Cold War is less likely today. The most worrisome path to U.S.-Russia nuclear use appears to be escalation of a conventional conflict, and that should receive particular attention.

Not all fixes to the force posture need to be additional hardware, i.e., more bombs, planes, and/or missiles. The Obama administration did not challenge the Kremlin's loose talk regarding nuclear weapons, which was a mistake. It would have been better to privately and publicly remind Moscow that any use of a nuclear weapon—no matter how small or how "discrete"—would cross a threshold that has not been breached for more than 70 years and open a Pandora's box full of unpredictable, nasty, and potentially catastrophic consequences. U.S. officials should seek to devalue the nuclear "de-escalation" doctrine by pointing out to the Kremlin its flawed premises and the disconnect between that doctrine and Russia's stated policy, and the instability that it creates.

The nuclear posture review should examine the U.S. force structure that the new administration inherits and ask if that is the right structure and whether it is affordable. As noted earlier, ideally, requirements, policy, and strategy rather than budgets will dictate U.S. force structure. But it would be unwise not to factor the budget situation into the decision process.

The Obama administration essentially punted the question to its successor; no one in the Pentagon has suggested a prioritization process or the conventional capabilities that the U.S. military would forgo in order to fund the currently-planned strategic modernization program. The next administration will not have that luxury.

Regarding U.S. strategic nuclear forces, the next administration's nuclear posture review should reaffirm that the triad will be maintained. ICBMs, the leg most commonly mentioned for elimination, provide a hedge against an anti-submarine warfare breakthrough that may be unlikely but cannot be dismissed entirely. They also force a potential adversary to contemplate the likely U.S. response to a major nuclear attack on the American homeland.

The next administration should, however, suspend the LRSO program and take a hard look at why a nuclear-armed air-launched cruise missile is necessary if the B-21 bomber, with its stealth and advanced electronic warfare capabilities, will indeed be capable of defeating and penetrating sophisticated air defenses. In particular, what additional target set will the LRSO be able to cover that cannot be held at risk by other U.S. strategic forces?

Given the likely budget situation, the nuclear posture review should consider whether, while maintaining the triad, it is necessary to keep the current planned force of 700 deployed strategic delivery vehicles, the number permitted by the New START Treaty. A force structure of 500 deployed strategic delivery vehicles could, if necessary, carry close to New START's permitted 1,550 deployed strategic warheads, albeit with a loss of flexibility. Such a triad could comprise 10 Columbia-class SSBNs with launch tubes for 160 SLBMs (on average, one presumably would be in the shipyard at any time, resulting in 144 deployed SLBMs), 250 deployed ICBMs, and a force of 100 deployed B-2 and B-21 bombers. The savings in both construction and life-cycle costs of such a triad, including cancellation of the LRSO, would be in the range of $100 to 200 billion. Much of those savings would come in later years, but a long-term perspective would avoid saddling a future administration with unaffordable programs.

Such a force could also, of course, readily accommodate a smaller number of deployed strategic warheads, were there to be a new negotiated arms reduction agreement with Russia or a decision to make a unilateral reduction in deployed strategic warheads.

Another issue that the review should consider, this time in consultation with NATO allies, is the number of U.S. B61 nuclear bombs in Europe. The coming deployment of the F-35, which will be more capable of penetrating air defenses than current U.S. and NATO dual-capable aircraft, as well as the parallel deployment of the B61-12 bomb, which will be more flexible and accurate than existing B61 bombs, could allow the alliance to consider whether a reduction in the number of bombs would be possible.

The nuclear posture review should consider ways to give the president more time to make a decision regarding use of nuclear weapons. Launch under attack scenarios envisage only eight to 10 minutes. The review should look for ways to allow the president hours, even days, to give such a consequential order.

The next administration thus should consider whether it wants to maintain the ability to launch ICBMs under attack. The June 2013 "Report on Nuclear Employment Strategy of the United States" provided by the Department of Defense noted that the Department had been directed "to examine further options to reduce the role of launch under attack in U.S. planning, while retaining the ability to launch under attack if directed."[30] Does maintaining the option make sense, when it is almost impossible to conceive of an American president making such a fateful decision in just minutes? The administration should also weigh whether or not to de-alert the ICBM force. Nothing need be done physically to the ICBMs; the White House could simply indicate that Strategic Command no longer has to plan, train or exercise for prompt launch.

An easing of the requirement for prompt launch could have implications for the U.S. force structure. For example, if the United States were to move to a day-to-day posture in which it was assumed that

the president would take a significant amount of time to make a nuclear use decision, the relevant number of ballistic missile submarines would be the number of SSBNs at sea, not the number of SSBNs at sea and within range of targets. That could lower the total number of SSBNs that the United States requires. (In a crisis, Washington would have the option of putting additional SSBNs to sea, though that generated posture could not be sustained indefinitely.)

The next administration should commission a study on moving to a policy in which the United States would state that the sole purpose of its nuclear weapons is to deter a nuclear attack on the United States, U.S. allies, or U.S. forces. The United States already has adopted, in the form of its negative security assurance, a no use of nuclear weapons policy toward non-nuclear weapons states that are party to the NPT and in full compliance with their non-proliferation obligations, which amounts to most countries in the world. Washington would have to consult closely with allies on this question. A sole purpose policy might sacrifice the ability of nuclear weapons to deter non-nuclear attack, but the United States today has a wide variety of highly capable conventional forces that it could use in response to a non-nuclear attack. Moreover, how likely is it that the president would resort to first use of nuclear weapons against a nuclear-armed state, faced with the prospect of nuclear retaliation? The U.S. government strived mightily during the Cold War to sustain the perception that it was prepared to use nuclear weapons first when the Soviet Union and Warsaw Pact had significant conventional force advantages, but the conventional military balance today is radically different. (The one concern would be biological warfare; if it moved to a sole purpose policy, the administration could attach a qualifier similar to one the Obama administration applied to its negative security assurance in 2010, i.e., that it might revisit the policy in the event of new developments in biological weapons.)

If the next administration adopted some or all of the above recommendations, it would need to decide when and how to roll them out. A major consideration would be the state of the U.S.-Russia relationship. On the one hand, the administration would not want to adopt actions that looked like they ignored or rewarded Russia's recent bad behavior. On the other hand, it would not want to wait and lock itself into a modernization program that it or its successor could not afford. This will be a tough dilemma, especially if Moscow remains recalcitrant on arms control.

Parity with Russia matters less today in strategic terms. In 2013, the U.S. government determined that it could safely reduce U.S. deployed strategic warheads by up to one-third below the New START level of 1,550, even if Russia remained at 1,550. (Senior military officers did not challenge this but made clear their preference to effect the reduction in parallel with Russia.) In 2012, a Department of Defense report, coordinated with the Director of National Intelligence, examined Russian nuclear forces and stated that additional Russian strategic warheads, even significantly exceeding the New START limit, "would have little to no effect on the U.S. assured second-strike capabilities that underwrite our strategic deterrence posture." The report added that Russia "would not be able to achieve a militarily significant advantage by any plausible expansion of its strategic nuclear forces, even in a cheating or breakout scenario under the New START Treaty, primarily because of the inherent survivability of the planned U.S. strategic force structure, particularly the Ohio-class ballistic missile submarines, a number of which are at sea at any given time."[31]

While parity may be less necessary for strategic stability, it can matter for negotiations and politically. Allies may become concerned if Washington moves away from the "second to none" criterion for its nuclear forces and the numbers gap between the United States and Russia appears too large, even if the gap may not have much strategic meaning. While not foreclosing unilateral decisions regarding U.S. strategic forces, and in any event at least suspending the decision to proceed with the LRSO, it would be wise for the next administration first to seek to engage Russia in a negotiation that would result in a treaty mandating mutual reductions.

Arm Control and Related Issues

The next administration should explore Moscow's readiness to reinvigorate the arms control dialogue, indicating that, in the context of an agreement that further reduced U.S. and Russian nuclear weapons, it would be prepared to consider measures in the areas of missile defense, advanced conventional strike weapons and third-country nuclear forces that would address stated Russian concerns. It should make clear that the process also must resolve concerns regarding compliance with the INF Treaty.

The next administration should seek a negotiation that covers all U.S. and Russian nuclear weapons—strategic and non-strategic, deployed and non-deployed. The U.S. position should seek to limit each country to no more than 2,200 total nuclear weapons (not including those weapons retired and in the dismantlement queue, which would be constrained under a separate regime). The U.S. position should include a sublimit of no more than 1,000 deployed strategic warheads, using the New START definition that attributes one warhead to every deployed bomber. Alternatively, it could include a sublimit of no more than 900 deployed strategic warheads, if deployed strategic warheads were defined only as warheads on deployed ICBMs and SLBMs. The alternative, while a deviation from New START counting rules, would have the sublimit constrain those systems that could be launched and strike their targets in a very short time period, in contrast to the remaining weapons, most of which (if not all) would be in storage. It would also obviate the one deployed strategic warhead for each deployed bomber attribution rule.

The U.S. position should seek to limit each side to no more than 500 deployed strategic delivery vehicles and no more than 575 deployed and non-deployed ICBM and SLBM launchers and bombers. Within such a limit, the United States could deploy a triad comprising 144 deployed SLBMs on nine SSBNs (assuming a 10th SSBN in the shipyard with no deployed missiles on board), 250 deployed ICBMs, and 100 B-2 and B-21 bombers. The bulk of the U.S. deployed warhead force would be carried on MIRVed SLBMs as at present; the ICBMs would each carry only a single warhead as at present.

This kind of follow-on treaty to New START would require the negotiation of new verification measures to monitor nuclear weapons that were not mounted on ICBMs or SLBMs but were kept in treaty-declared storage sites. This would be a challenging but manageable element of a new treaty. The harder challenge would be what to do about the possible storage of nuclear weapons outside of treaty-declared locations. The verification provisions could include certain requirements—e.g., no nuclear warhead could be outside of a treaty-declared location except during a pre-notified transfer between treaty-declared locations—that would bound the problem.

As the negotiation began, the U.S. position might suggest transparency measures regarding non-strategic nuclear weapons and an agreement on demating. The demating provision could possibly be incorporated in a treaty and applied to all nuclear warheads other than warheads on ICBMs and SLBMs.

The administration would have to work out the tactics of negotiations. For example, if it were prepared to accept a limit of 500 deployed strategic delivery vehicles and understood Moscow to be interested in such a limit, it might want to start with some other level for bargaining purposes.

The above approach would have some elements that should appeal to Moscow, in particular the reduction in the number of U.S. deployed strategic delivery vehicles to a level commensurate with the apparent planned Russian strategic force and the reduction in U.S. upload capability. But those points may not suffice; the next administration would likely have to address Russian concerns on other issues in order to secure Moscow's agreement to this kind of nuclear arms reduction agreement. The administration thus should indicate that, in return for serious Russian engagement on further nuclear reductions—including of non-strategic nuclear weapons as well as a return to full compliance with the INF Treaty—it is prepared to consider steps regarding missile defense, advanced conventional strike weapons, and

third-country nuclear forces, issues where Moscow would be able to declare a "win."

On missile defense, the next administration should reiterate the spring 2013 U.S. proposal for an executive agreement on missile defense transparency. In addition, U.S. officials should consult with NATO, and in particular with Polish and Romanian officials, on indicating that the United States and NATO would be prepared to consider steps to cap the number of SM-3 interceptor missiles in Europe, possibly including non-deployment of interceptor missiles in Poland. Agreement on these points would depend on how far Moscow was prepared to go in negotiating nuclear reductions. There would need to be an understanding that the missile defense cap was conditioned on Iran fully observing the Joint Comprehensive Plan of Action and thereafter not pursuing a nuclear weapons capability. It would also have to be understood that, if the arrangement precluded the deployment of SM-3 interceptors in Poland, the U.S. military would likely deploy there some capability of equivalent manpower strength.

As for conventional strike weapons, conventional warheads on ICBMs and SLBMs would already be captured by the deployed strategic warhead limit of New START (and presumably by any follow-on treaty). Given the potential for misinterpretation of any ICBM or SLBM launch, and if it were of interest to the Russian side, U.S. officials might consider a ban on conventional warheads on strategic ballistic missiles.

As for intercontinental-range hypersonic glide vehicles, the next administration—if it decides that it wants to field such a capability—should offer to negotiate with Moscow a separate agreement limiting such systems. The agreement could constrain each side to no more than 20 or 30 deployed hypersonic glide vehicles on no more than 20 or 30 deployed launchers (ballistic missiles). To avoid confusion with ICBMs, the sides should agree that hypersonic glide vehicles would be deployed at sites separate from ICBM bases. The agreement could also contain verification provisions, including inspections that would allow each side the opportunity to confirm that hypersonic glide vehicles did not carry nuclear warheads.

Conventionally-armed air-launched and sea-launched cruise missiles do not readily lend themselves to limitation. (If, however, the next administration decides to cancel the LRSO, it might seek to propose a ban on nuclear-armed cruise missiles.) Conventionally-armed cruise missiles are central to U.S. power projection and appear increasingly important to Russian power projection as well. An effort to negotiate limits on these systems at this point likely would prove fruitless. What the next administration could offer is a dialogue, involving U.S. and Russian military experts, on cruise missile capabilities and their impact on the U.S.-Russian strategic balance. This would give Russian officials, if they wished, an opportunity to voice any concerns that they have about the employment of cruise missiles in a conventional strategic attack; U.S. officials would have a chance to respond and perhaps alleviate the worst Russian concerns.

As for third-country nuclear forces, the next administration could inform Moscow that, in the context of a negotiation of a new nuclear arms reduction agreement that covers all U.S. and Russian nuclear warheads, Washington would be prepared to work with Russia to elicit from Britain, France, and China politically-binding unilateral commitments not to increase the total number of their nuclear weapons and transparency commitments to provide basic information on their nuclear arsenals, specifically, the total numbers and types of nuclear weapons. The next administration might go even further and advise that it would be prepared to examine any Russian proposal for a five-power negotiation but make clear that it would not be prepared to support an unrealistic proposal—e.g., one that would set unequal limits for the United States and Russia, on the one hand, and Britain, France, and China, on the other hand—that would have no chance of being negotiated.

These ideas might make it possible to bridge the gap that has emerged between the United States and Russia on arms control and related issues in recent years. Whether a U.S. approach that incorporated

these elements would succeed, particularly in a time of tense bilateral relations, is a proposition to test with Moscow. Even if the Russian government was not, at least not immediately, prepared to engage, a stated U.S. readiness to pursue a negotiation aimed at a 50 percent reduction in total U.S. and Russian nuclear weapons could serve as a powerful sign of American commitment to reduce the nuclear danger. That may prove useful if, or as, international pressure for more progress on nuclear disarmament builds.

A negotiated outcome along the above lines, particularly a 50 percent cut in U.S. and Russian nuclear arsenals, would advance U.S. security interests in several ways. It would reduce the number of nuclear warheads capable of striking the American homeland, U.S. allies, or U.S. forces; enhance strategic stability and began to move from the bilateral Cold War stability model to one taking account of the more complex stability interactions of the present day; increase transparency and predictability, particularly regarding missile defenses and those kinds of nuclear weapons—reserve strategic and all non-strategic—that thus far have not been subject to arms control constraints; lower the cost of nuclear weapons in the U.S. defense budget; bolster U.S. non-proliferation credentials by demonstrating commitment to meet its NPT obligation to nuclear disarmament; and begin the process of bringing third countries into the nuclear arms control process. Such an approach might also contribute to a betterment of the broader U.S.-Russian relationship.

This outcome should offer similar benefits to Russia. The big question for the next administration will be whether Moscow sees things the same way. If so, there may be prospects for nuclear arms control. If, on the other hand, the Kremlin sees things differently and does not regard arms control as meeting its security goals, the administration will face more difficult choices. In such a situation, it would be harder to adopt on a unilateral basis some of the changes described above, but they should not be excluded, depending upon the administration's calculation of what it needs to support its deterrence, assurance, and stability requirements.

Acronyms

ABM Treaty	Anti-Ballistic Missile Treaty
ALCM	Air-Launched Cruise Missile
CPGS	Conventional Prompt Global Strike
CSBM	Confidence- and Security-Building Measure
CTBT	Comprehensive Test Ban Treaty
ICBM	Intercontinental Ballistic Missile
INF Treaty	Intermediate-range Nuclear Forces Treaty
JASSM	Joint Air-to-Surface Standoff Missile
JCPOA	Joint Comprehensive Plan of Action
LRSO	Long-Range Standoff (Missile)
MIRV	Multiple Independently-targetable Reentry Vehicle
NATO	North Atlantic Treaty Organization
NPT	Non-Proliferation Treaty
P5	UN Security Council Permanent Five members (Britain, China, France, Russia, and the United States)
SALT	Strategic Arms Limitation Talks
SLBM	Submarine-Launched Ballistic Missile
SLCM	Sea-Launched Cruise Missile
SSBN	Ballistic Missile Submarine (nuclear)
START	Strategic Arms Reduction Treaty
THAAD	Terminal High Altitude Area Defense

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