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# A ReSTART for U.S.-Russian Nuclear Arms Control: Enhancing Security Through Cooperation

Pranay Vaddi and James M. Acton

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## Abbreviations

<b>ALBM</b>	air-launched ballistic missile
<b>ALCM</b>	air-launched cruise missile
<b>ALBGM</b>	air-launched boost-glide missile
<b>ICBM</b>	intercontinental ballistic missile
<b>IGLBGM</b>	intercontinental ground-launched boost-glide missile
<b>MIRV</b>	multiple independently targetable reentry vehicle
<b>New START</b>	New Strategic Arms Reduction Treaty
<b>NT</b>	nuclear-powered torpedo
<b>NTM</b>	national technical means
<b>SALT</b>	Strategic Arms Limitation Talks
<b>SLBGM</b>	sea-launched boost-glide missile
<b>SLBM</b>	sea-launched ballistic missile
<b>SLCM</b>	sea-launched cruise missile
<b>SSBN</b>	nuclear-powered ballistic missile submarine



## Summary

The last remaining limits on Russia's and the United States' nuclear forces—as codified in the 2010 New Strategic Arms Reduction Treaty (New START)—are due to expire on February 5, 2021. Moscow and Washington can and should extend this agreement in its current form for five years and begin the long and difficult negotiations toward a follow-on treaty as soon as possible. Concluding such a treaty is technically feasible and, given growing U.S.-Russian tensions, strategically critical.

Treaties to verifiably limit nuclear forces enhance Russian and U.S. security in two primary ways. First, they can help avoid expensive arms build-ups that would heighten geopolitical tensions. Second, they can lower the risk of escalation leading to nuclear use. The sharp decline in U.S.-Russian relations since New START entered into force has increased the risks of both a quantitative arms race and the kind of deep crisis or conflict that could make nuclear use imaginable. As a result, the need for strategic arms control is now greater than at any time since the end of the Cold War.

New START, which regulates Russia's and the United States' strategic nuclear forces (those capable of reaching the other's homeland), has functioned well overall. It should be—and likely would be—the starting point for negotiations toward a follow-on treaty. Negotiators should focus on managing technological advances in delivery systems and addressing the implementation challenges of New START.

This approach would not alleviate U.S. concerns about Russia's nonstrategic nuclear weapons or China's nuclear forces. And neither would it address Russian concerns about U.S. ballistic missile defenses. Instead Moscow and Washington should seek to manage these concerns through other avenues; if treaty negotiations broke down because their scope was too broad, the considerable benefits of bilateral limits on strategic offensive forces would be jeopardized.

A follow-on treaty to New START should contain the following key provisions.

**Central limits.** Intercontinental ground-launched boost-glide missiles (IGLBGMs) and nuclear-powered torpedoes (NTs)—whether nuclear or conventionally armed—represent new kinds of strategic offensive arms and should be treaty accountable.

Many of Russia's silo-based intercontinental ballistic missiles (ICBMs) are loaded with multiple warheads. In a serious conflict, the United States would have incentives to attack those weapons preemptively, which would, in turn, create pressure on Russia to use them while it still could. To

reduce the number of warheads on Russia's silo-based ICBMs and hence mitigate this danger, the ratio between strategic deployed warheads and deployed delivery systems under a follow-on treaty should be significantly smaller than New START's value of 2.2:1.

**Prohibitions and restrictions.** Nuclear-powered cruise missiles create significant costs and dangers, particularly the environmental risks of testing. Because any potential military benefits are much smaller, a follow-on treaty should prohibit each party from researching, producing, flight testing, or deploying such missiles.

The deployment of long-range air-launched ballistic and boost-glide missiles on nonaccountable bombers—specifically, Russia's Tu-22M (Backfire) medium bomber and converted U.S. B-1B and B-52H heavy bombers—could effectively circumvent New START's limits and exacerbate fears about conventional attacks on nuclear forces. The follow-on treaty, therefore, should prohibit the deployment of such weapons except on either (1) treaty-accountable heavy bombers or (2) nonaccountable short-range tactical aircraft.

Nuclear-armed long-range sea-launched boost-glide missiles (SLBGMs), if deployed, could fulfill a similar military function to sea-launched ballistic missiles (SLBMs). Russia and the United States, therefore, should agree that long-range nuclear-armed SLBGMs would constitute a new kind of treaty-accountable strategic offensive arm. To facilitate verification, they should also agree not to deploy such weapons on ships or submarines on which long-range nonnuclear sea-launched cruise missiles (SLCMs) or nonnuclear SLBGMs are deployed.

**Conversions and exemptions.** New START permits the conversion of delivery systems and launchers—that is, rendering them incapable of launching nuclear weapons—so they cease to count toward the treaty's numerical limits. Russia, however, has not accepted the validity of the procedures used by the United States to convert SLBM launchers and B-52H bombers.

The United States acted in good faith in selecting the method for converting SLBM launchers; were the situation reversed, however, Washington would probably be raising the same objections that Moscow is. To address Russian concerns, the follow-on treaty should require future conversions to adopt the alternative procedure that the United States used to convert all the SLBM launchers on four Ohio-class nuclear-powered ballistic missile submarines (SSBNs) into cruise missile launchers. Since Moscow has previously accepted this procedure, it should do so again. The follow-on treaty should also require all SLBM launchers converted under New START to be reconverted according to the new standard if they are to remain nonaccountable.

The B-52H issue is less serious in itself but relates to a broader and potentially contentious question about new bombers configured exclusively for nonnuclear operations. Both Russia and the United States intend to deploy a new heavy bomber type: PAK-DA and the B-21, respectively. They may configure only some of these aircraft for nuclear operations and argue that others should not be treaty accountable. Relevant provisions in a follow-on treaty should be built around three principles. First, to afford the parties some flexibility, conversions of certain existing types of heavy bombers should be permitted and all B-52H bombers converted pursuant to New START should be considered to have been converted. Second, PAK-DA and B-21 aircraft configured exclusively for nonnuclear operations should be exempted from accountability only if they are based at separate locations from nuclear-capable heavy bombers. Third, a follow-on treaty should provide for some additional transparency into the operations of certain nonaccountable bombers.

**New kinds of strategic offensive arms.** Article V of New START aims to manage technological change by creating a process for the parties to recognize the emergence of “a new kind of strategic offensive arm.” This provision’s effectiveness, however, is limited.

A follow-on treaty should contain a stronger provision that automatically requires new kinds to be accountable, with negotiations over implementation arrangements only. This provision should apply to both nuclear and nonnuclear weapons of strategic range. Its scope, however, should be limited to kinds that emerged after negotiations and not to existing kinds that are nonaccountable because the two sides disagreed on whether they should be. To further clarify the provision’s purpose, Russia and the United States should negotiate an agreed statement containing nonexhaustive lists of arms that they would and would not consider to be new kinds.

**Verification.** The follow-on treaty’s verification regime would be based closely on New START’s, which has functioned well. All required modifications—including inspections of IGLBGMs and NTs—would be relatively minor and should be straightforward to design and implement. The follow-on treaty would also rely slightly more heavily on national technical means (NTM) than New START does.

**Assessment and outlook.** The primary barriers facing a follow-on agreement are political. They are significant but not necessarily insurmountable. One challenge, particularly within the United States, is the domestic politics of treaty ratification. Recent congressional support for the extension of New START suggests that there is some bipartisan backing for arms control—which a well-managed ratification campaign could tap into.

Perhaps the single biggest challenge, however, is simply the perilous state of U.S.-Russian relations. These tensions would complicate negotiations and make it more difficult for each party to accept the compromises that would inevitably be required to conclude a treaty—most notably the exclusion of nonstrategic nuclear weapons and China’s nuclear forces from a U.S. perspective and the exclusion of ballistic missile defenses from Russia’s perspective. The parties, however, should resist any pressure to expand the scope of negotiations. Overambition would risk a total collapse of negotiations and, in turn, the emergence of a more unregulated deterrence relationship that is prone to dangerous arms racing and escalation.

## Introduction

Russia and the United States possess nuclear forces that could destroy both states and much of the rest of the world—many times over in a matter of minutes. For most of the last five decades, a series of treaties have regulated these arsenals. Today, just one of these treaties—New START—remains in force, and it is due to expire on February 5, 2021. The end of nuclear arms control would undermine the security of both Russia and the United States. The two states, therefore, should begin negotiations on a mutually beneficial follow-on treaty and, to buy time for this process, extend New START. This paper proposes key provisions for a follow-on treaty.

Treaties to verifiably limit nuclear forces enhance Russian and U.S. security in two primary ways. First, they can help avoid expensive arms build-ups that would heighten geopolitical tensions. For both Moscow and Washington, inferiority in strategic arms is unacceptable.<sup>1</sup> However, striving to acquire sufficient capabilities to avoid inferiority (let alone those needed to achieve superiority) risks sparking an arms race. Arms control agreements prevent this outcome by verifiably facilitating parity at a lower level than would otherwise have been the case. And the resource savings extend beyond the weapons that are not built. The additional intelligence collection efforts needed to monitor a potential adversary's nuclear forces with a high degree of confidence without cooperative verification arrangements would be much more costly than data exchanges and inspections.

Second, and perhaps even more importantly, arms control treaties can reduce the risk of escalation leading to nuclear use. In a conflict or deep crisis, a state that was concerned that its nuclear forces were vulnerable and that an attack on them was imminent could try to scare its adversary into backing off by issuing nuclear threats or even engaging in limited nuclear use. In extremis, the state might even launch a large-scale preemptive attack on its adversary's nuclear forces in the hope of limiting the damage those weapons could do. Arms control can help to manage such crisis instability. Exaggerated fears can be dispelled by each state's being transparent about the number, operational status, and deployment locations of its nuclear weapons. Well-grounded fears can be managed through limits on offensive capabilities, requirements or incentives to field forces that are more survivable or less useful for conducting a surprise attack, and even prohibitions on destabilizing technologies, particularly those that could be employed to attack an adversary's nuclear forces.

Strategic arms control, exemplified by New START, plays a particularly important role in risk reduction. (In unhelpful jargon inherited from the Cold War, the term “strategic” is used to describe weapons with sufficient range to attack the other state's homeland from their deployment locations.) Because Russian and U.S. strategic weapons—ICBMs, SLBMs, and heavy bombers—directly pose an existential threat to the other nation, imbalances are particularly likely to catalyze arms racing.

Moreover, because a relatively large fraction of each state's strategic forces and their supporting infrastructure are located in their homelands, the perceived threat of being attacked with strategic weapons is especially liable to spark escalation as the result of crisis instability.

The sharp decline in U.S.-Russian relations since New START entered into force has increased the risks of both a quantitative arms race and the kind of deep crisis or conflict that could make nuclear use imaginable. As a result, the need for strategic arms control is now greater than at any time since the end of the Cold War. Indeed, the U.S. National Defense Authorization Act for Fiscal Year 2020, which was passed with overwhelming bipartisan support, emphasizes that “legally binding, verifiable limits on Russian strategic nuclear forces are in the national security interest of the United States.”<sup>2</sup>

To preserve the benefits of strategic arms control, Russia and the United States should extend New START in its current form for five years, as permitted by the treaty. Russia has indicated its support for an unconditional extension.<sup>3</sup> And the administration of President Donald Trump has not completely ruled one out—although it has expressed skepticism and suggested various conditions for an extension. Most recently, it has conditioned the extension of New START on Russia and the United States’ negotiating a nonbinding “framework” for future arms control, which “China will be expected to join.”<sup>4</sup> Washington insists that, under this framework, Russia must commit to negotiating limits on all warheads, including those that are not accountable under New START.

Even if Russia and the United States can eventually manage to agree on an extension, it would serve only as a stopgap. Moscow and Washington, therefore, should also begin negotiations toward a follow-on treaty. Because such negotiations are likely to be drawn out, they should commence as soon as possible. (Obviously, if New START is not extended, negotiations on a new treaty would become all the more urgent.)

### Overview of the Issues

The starting point for negotiations toward a follow-on treaty should be—and likely would be—the text of New START. Overall, this agreement has functioned well. The Trump administration has repeatedly certified Russian compliance at a time when it has not been shy about accusing Russia of violating other agreements.<sup>5</sup> Current and former military leaders espouse the value of the treaty's verification provisions for military planning.<sup>6</sup> That said, Trump administration officials, lawmakers, and analysts have criticized New START for what it does not constrain.<sup>7</sup> Russia's so-called exotic strategic weapons—that is, new strategic weapons of kinds other than ICBMs, SLBMs, or heavy bombers—have sparked considerable concern. One such system, the IGLBGM Avangard, has already been deployed. Because its booster is a treaty accountable ICBM, Russia has acknowledged that it is

accountable under New START and is applying the treaty's provisions accordingly. But developmental systems, including a nuclear-powered cruise missile and a long-range nuclear-powered torpedo—both of which are intended to be nuclear-armed—may not be captured by New START's definitions (though neither is likely to be deployed during that treaty's lifetime, even if it is extended). A follow-on treaty should address this lacuna.

U.S. concerns about New START also extend to China's noninvolvement and to Russia's large force of nonstrategic nuclear weapons, which are not accountable. These concerns are valid and important, but negotiations over a strategic arms limitation agreement are not the right forum to address them. China has made it clear that it will not engage in negotiations toward a trilateral limitation treaty, and Washington cannot force it to do so. Beijing has emphasized the existence of a "huge gap" between the U.S. and Chinese nuclear arsenals and has insisted that further U.S. reductions are needed to "create conditions" for multilateral disarmament negotiations.<sup>8</sup>

Meanwhile, expanding the scope of bilateral negotiations to include nonstrategic nuclear weapons would introduce daunting challenges. Verifying limits on such weapons would require highly intrusive inspections that would impact operations on nuclear bases not only in Russia but also in the United States and some of its NATO allies. Designing an acceptable verification regime would require years of effort, including prolonged negotiations, exercises, and intermediate steps. Rather than losing the considerable benefits of bilateral strategic arms control—at least for a prolonged period—the United States should seek to manage its concerns through other more promising approaches (the authors of this paper will publish concepts for doing so soon). A useful first step, for example, could be inspections to verify the absence of nuclear warheads at storage sites that are not currently being used to host such weapons.

Although Russia has offered to extend New START unconditionally, it has been unwilling to state that the United States is in full compliance. Moscow's primary concern, which will need to be addressed in negotiating a follow-on, is that the procedures the United States used to convert some B-52H bombers and SLBM launchers (that is, render them incapable of launching nuclear weapons) were ineffective.<sup>9</sup> The United States relied on these procedures to remove a certain number of systems from accountability and hence meet New START's numerical limits.

Additionally, Moscow has long feared that the United States seeks to coerce it by acquiring the capabilities to undermine Russia's nuclear deterrent. It worries that, in a deep crisis or conflict, the United States might launch preemptive nuclear or nonnuclear attacks on Russia's nuclear forces and then use missile defenses to defeat whatever surviving weapons Russia launched in retaliation. However, negotiations toward a treaty on strategic offensive arms are not the right forum for managing

Russian concerns about ballistic missile defenses. Washington has made clear that it will not accept binding limits on missile defenses, and Moscow cannot force it to do so. Instead, Russia should seek to manage its concerns through politically binding transparency and confidence-building measures that could, for example, demonstrate that missile defense interceptors located in Europe lack the speed to threaten Russian ICBMs (and, once again, these authors will soon be publishing proposals to this end). But a follow-on treaty can and should seek to manage the perceived threat of the United States' conducting counterforce strikes with conventionally armed strategic weapons—boost-glide missiles and nonaccountable heavy bombers, in particular.

The following proposed elements of a follow-on treaty aim to address both Russian and U.S. concerns. Each state would have to make concessions, but both would gain significantly more than they lose. In practice, negotiators do not settle on all aspects of an agreement at once; they trade concessions with each other laboriously. This paper leaves questions of negotiating tactics—of precisely which concession should be traded for which—to the diplomats. It focuses instead on the key elements of a final agreement in the belief that, taken as whole, these elements represent a fair and attainable compromise.

## Solution Concept

Given that a follow-on treaty should be based on New START, this discussion focuses exclusively on how New START should be adapted to reflect a decade's worth of technological advances in nuclear delivery systems and treaty implementation lessons. Specific numerical limits for a follow-on treaty are not proposed. Such limits are invariably the result of internal military assessments as well as domestic and international bargaining; suggestions from analysts would likely carry little weight. Instead, it is more productive to focus on the major qualitative features of a follow-on treaty without getting bogged down in debates about precisely how many warheads, delivery systems, and launchers the parties should be permitted. That said, further reductions in numbers seem possible without compromising national security, and a follow-on treaty should facilitate them. Indeed, an analysis by the U.S. Department of Defense enabled president Barack Obama to conclude in 2013 that it was possible to “maintain a strong and credible strategic deterrent while safely pursuing up to a one-third reduction in deployed strategic nuclear weapons from the level established” by New START.<sup>10</sup>

## Central Limits

New START imposes three separate limits: 700 deployed ICBMs, SLBMs, and heavy bombers; 800 deployed and nondeployed ICBM launchers, SLBM launchers, and heavy bombers; and 1,500 deployed strategic warheads (with each deployed heavy bomber counted as one such warhead). All of the United States' strategic-range nuclear weapons and the vast majority of Russia's are captured by these limits (Russia's nuclear-armed SLCMs are the only exception). However, to account for technological developments since New START's negotiation, a follow-on treaty should, in various ways, manage a broader range of strategic offensive arms—boost-glide missiles, air-launched ballistic missiles (ALBMs), NTs, and nuclear-powered cruise missiles—while encouraging Russia to further reduce its reliance on vulnerable silo-based ICBMs loaded with large numbers of warheads.

**Intercontinental ground-launched boost-glide missiles and nuclear-powered torpedoes.** IGLBGMs and NTs represent new kinds of strategic offensive arms. For a follow-on treaty to be credible, it is just as important to limit these weapons as it is to limit ICBMs or SLBMs. If IGLBGMs and NTs were not accountable, deploying them would enable the United States or Russia to circumvent the treaty's limits.

IGLBGMs are launched by large rockets, but rather than arcing high above the Earth like ICBMs, they reenter the atmosphere quickly and then glide unpowered through it at hypersonic speeds. In 2019, Russia started to field the first IGLBGM, Avangard, which is intended to penetrate U.S. homeland missile defenses and will likely be deployed exclusively with nuclear warheads.<sup>11</sup> Because its booster is a treaty-accountable ICBM, this missile counts toward New START's limits—but future Russian IGLBGMs may not. The United States, meanwhile, is focused on the development of nonnuclear boost-glide weapons with shorter ranges, but it has conducted flight tests of intercontinental-range systems, which also may not be captured by New START's limits.<sup>12</sup> Russia is concerned that U.S. IGLBGMs, whether nuclear or conventionally armed, could threaten its nuclear forces. Managing these concerns is another reason for limiting IGLBGMs. Given the similarities between ICBMs and IGLBGMs, there should be few technical challenges to making IGLBGMs accountable under a follow-on treaty.

Concerns about U.S. ballistic missile defenses also motivated Russia to develop the Poseidon nuclear-powered torpedo, which will have an extremely long range (described by the U.S. Department of Defense as “intercontinental”) and carry a high-yield nuclear warhead.<sup>13</sup> Russia's position is that its inclusion in New START would require an amendment. For now, the issue is moot because Poseidon

will likely not be deployed within the lifetime of New START or even during a possible extension. Looking forward, because Russia's NTs will reportedly be deployed aboard a dedicated carrier submarine—in much the same way that SLBMs are deployed on SSBNs—it should be technically straightforward for a follow-on treaty to limit them.<sup>14</sup>

## Proposed Central Limits

IGLBGMs and NTs—whether nuclear or conventionally armed—should be accountable under a follow-on treaty. Thus, the treaty should impose the following three categories of limits:

- Deployed ICBMs, IGLBGMs, SLBMs, NTs, and heavy bombers
- Deployed and nondeployed launchers for ICBMs, IGLBGMs, SLBMs, and NTs, as well as deployed and nondeployed heavy bombers
- Warheads for ICBMs, IGLBGMs, SLBMs, and NTs, as well as warheads counted for heavy bombers

In implementing these provisions, the following new definitions should apply:

- “IGLBGM” means a land-based surface-to-surface weapon-delivery vehicle that sustains unpowered flight through the use of aerodynamic lift over most of its flight path and has a range in excess of 5,500 kilometers. A reaction control system designed to change a vehicle's attitude is not considered capable of powering flight.
- “NT” means an unmanned, undersea, nuclear-powered weapon-delivery vehicle.
- For a boost-glide missile, the term “range” means the maximum distance that can be flown determined by projecting its flight path onto the Earth's sphere from the point of launch to the point of impact on the assumption that its maximum speed does not exceed the maximum speed reached in any flight test of a missile of the same type.

**Multiple independently targetable reentry vehicles.** Although not a new technology, MIRVs—multiple independently targetable warheads—undermine crisis stability. In particular, many of Russia's vulnerable silo-based ICBMs are loaded with four, six, or even ten warheads.<sup>15</sup> The United States could destroy each of these weapons before they were launched, with high confidence, by targeting them with just two warheads a piece. As a result, in a major conflict, the United States would have particularly strong incentives to attack Russia's silo-based ICBMs preemptively—which would, in turn, create strong pressures on Russia to use those weapons while it still could.

Although a prohibition on MIRVed silo-based ICBMs would be desirable, Moscow would be highly unlikely to accept it today—not least because these weapons, which make up almost half of Russia’s deployed ICBM warheads, significantly reduce the costs of maintaining parity with the United States.<sup>16</sup> Nonetheless, a follow-on treaty could still discourage loading large numbers of warheads onto individual missiles. In particular, to meet the central limits of a treaty that mandated steeper reductions of warheads than of deployed delivery systems and launchers, Russia would probably need to reduce the warhead loadings on some MIRVed ICBMs. While this approach would not require Russia to abandon such weapons entirely, it might lead Moscow to reassess the utility of Sarmat—a new heavily MIRVed ICBM currently under development—and deploy it in smaller numbers or, perhaps, not at all and instead place a greater emphasis on more survivable mobile ICBMs (in particular, the mobile variant of the RS-24 ICBM, which is currently under production).

## Proposed Provisions Relating to MIRVs

Under the follow-on treaty, the ratio between strategic deployed warheads and deployed delivery systems should be significantly smaller than New START’s value of 2.2:1.

## Prohibitions and Restrictions

Other technological developments—nuclear-powered cruise missiles, ALBMs, air-launched boost-glide missiles (ALBGMs), and SLBGMs—are also relevant to a follow-on treaty. These capabilities all have or could have strategic ranges but have never been limited through an arms control agreement. Prohibitions or restrictions on deployments could be helpful in managing the risks associated with them.

**Nuclear-powered cruise missiles.** Russia is trying to develop a nuclear-powered cruise missile, Burevestnik, though its efforts appear to have encountered significant setbacks. Most significantly, an accident in August 2019 that killed five Russian scientists and released radiation was reportedly the result of a botched operation to recover a missile that had crashed during a test.<sup>17</sup> The military benefits of nuclear-powered cruise missiles—an effectively unlimited range and ability to penetrate missile defenses—are likely to be fairly modest given that Russia is developing other long-range systems that are capable of evading missile defenses. By contrast, these weapons create significant

costs and dangers, including the expense and difficulty of development and the considerable environmental risks of testing. As a result, such missiles should be prohibited. This measure would help Russia assure its European neighbors that they will not be negatively affected by further testing.

## Proposed Provisions for Nuclear-Powered Cruise Missiles

The follow-on treaty should prohibit each party from researching, producing, flight testing, or deploying nuclear-powered cruise missiles.

**Air-launched ballistic and boost-glide missiles.** In the future, long-range ALBMs and ALBGMs could spark arms racing or crisis instability. (In keeping with a long-standing precedent, “long-range” in this context means a range of at least 600 kilometers.) Starting in 2017, Russia deployed Kinzhal, a dual-use ALBM with a claimed range of up to 2,000 kilometers, on MiG-31K aircraft.<sup>18</sup> The United States, meanwhile, is developing conventional ALBGMs with ranges of up to about 1,000 kilometers.<sup>19</sup> The deployment of such weapons on nonaccountable bombers—specifically Russia’s Tu-22M (Backfire) medium bomber and converted U.S. B-1B and B-52H heavy bombers—would be problematic.

The Tu-22M does not meet New START’s definition of a heavy bomber because it is not equipped to carry long-range nuclear-armed air-launched cruise missiles (ALCMs) and its unrefueled range is less than 8,000 kilometers. (There is some concern in the United States that a modernized version of the aircraft, the Tu-22M3M, may exceed the range threshold—though Russia has stated otherwise.) By arming this aircraft with long-range ALBMs or ALBGMs, however, Russia could give it a prompt strategic-range strike capability, thus circumventing New START’s limits and inducing a U.S. response. Meanwhile, the United States has converted some aircraft—its entire B-1B fleet and, more controversially, some B-52H bombers—so they are not accountable under New START. Arming these aircraft with nonnuclear ALBMs or ALBGMs could exacerbate Russian fears about conventional attacks on its nuclear forces, thus risking crisis instability during a conflict.

The simplest way to address these concerns would be for Russia and the United States to agree, under a follow-on treaty, to deploy nuclear or nonnuclear long-range ALBMs or ALBGMs only on treaty-accountable heavy bombers or on nonaccountable tactical fighters. (In the meantime, it would be helpful for them to adopt this rule on a politically binding basis.) This approach would prohibit

Russia from deploying Kinzhal on the Backfire bomber and the United States from deploying its planned ALBGMs on converted heavy bombers. It would, however, permit the deployment of long-range ALBMs or ALBGMs on accountable heavy bombers since such deployments would be limited. This approach would also permit unlimited deployments on tactical fighters because such aircraft, even when armed with these weapons, could not threaten the interior of the other state's homeland.<sup>20</sup>

## Proposed Provisions for Air-Launched Ballistic Missiles and Air-Launched Boost-Glide Missiles

The follow-on treaty should prohibit the deployment of long-range ALBMs and long-range ALBGMs except on either (1) treaty-accountable heavy bombers or (2) nonaccountable short-range tactical aircraft.

In implementing this provision, the following new or revised definitions should apply:

- “Heavy bomber” means a bomber of a type, any one of which satisfies either of the following criteria: (1) its unrefueled range is greater than 8,000 kilometers, or (2) it is equipped for long-range nuclear ALCMs, long-range ALBMs, or long-range ALBGMs.
- “Nonaccountable tactical aircraft” means an aircraft with an unrefueled flight range of less than 2,000 kilometers.
- “Long-range ALBM” means an air-to-surface weapon-delivery vehicle that has a ballistic trajectory over most of its flight path and a range in excess of 600 kilometers.
- “Long-range ALBGM” means an air-to-surface weapon-delivery vehicle that sustains unpowered flight through the use of aerodynamic lift over most of its flight path and has a range in excess of 600 kilometers.

**Sea-launched boost-glide missiles.** The United States is currently developing SLBGMs; whether Russia has an interest in this technology is unclear.<sup>21</sup> There is a strong theoretical argument for nonnuclear SLBGMs' being accountable under a follow-on treaty—just as nonnuclear SLBMs, if deployed, would be accountable under New START. However, nonnuclear SLBGMs would almost certainly be deployed on nuclear-powered attack submarines or surface ships, which would likely preclude their limitation in a new treaty. These platforms have never been subject to inspections, and verifying limits on missiles deployed on them would be impractical. Nonnuclear SLBGMs, as well as SLCMs, should instead be managed through a politically binding transparency arrangement.<sup>22</sup>

Long-range nuclear-armed SLBGMs, by contrast, should not be exempted from accountability. There is no publicly available evidence that either Russia or the United States is developing such weapons. However, because these missiles might be more effective than SLBMs at penetrating defenses, one or both parties may seek them to augment—or perhaps even replace—their SLBM forces. For this reason, the two parties should agree, in advance, that long-range nuclear-armed SLBGMs would be accountable pursuant to the follow-on treaty’s “new kinds” provision (which, as discussed below, should be a stronger version of the equivalent provision in New START).<sup>23</sup> Because inspections would be seriously hindered if the ships that carried these missiles were also configured for conventional operations, Russia and the United States should also adopt a rule against commingling long-range nuclear-armed SLBGMs with specified kinds of nonnuclear weapons on a single ship.

## Proposed Provisions for Long-Range Nuclear-Armed Sea-Launched Boost-Glide Missiles

In an agreed statement, included as an annex to the follow-on treaty, Russia and the United States should agree that long-range nuclear-armed SLBGMs, if deployed, will constitute a new kind of strategic offensive arm.

They should also state that they will not deploy such weapons on ships or submarines on which long-range nonnuclear SLCMs or nonnuclear SLBGMs are deployed.

In implementing this provision, the following new definition should apply:

- “Long-range SLBGM” means a weapon-delivery vehicle that sustains unpowered flight through the use of aerodynamic lift over most of its flight path; has a range in excess of 600 kilometers; and is of a type, any one of which has been contained in, or launched from, a submarine or surface ship.

## Conversions and Exemptions

New START permits the conversion of delivery systems and launchers so they cease to count toward the treaty's numerical limits. The United States has used these provisions to meet those limits. Russia, however, has argued that the procedures the United States used to convert SLBM launchers and B-52H bombers are not irreversible and that Russian acceptance of those procedures is required before converted systems become nonaccountable.<sup>24</sup> A follow-on treaty should seek to address Russia's concerns and prevent a recurrence of a similar disagreement in the future. To this end, two principles should be adopted. First, where possible, conversions should use procedures and practices that both parties have previously accepted. Second, additional transparency measures should be implemented to build confidence in the effectiveness of conversion procedures.

**SLBM launcher conversions.** The nub of Russia's concerns is that a steel closure affixed to the top of converted SLBM launch tubes—which the United States claims renders the launchers inoperable—could be removed easily. Russia also argues that this closure prevents inspectors from verifying that the tube is incapable of containing or launching an SLBM. (The United States removed components to disable the launchers but has been unwilling to allow Russian inspectors to verify their absence.) While the United States acted in good faith in selecting the conversion method, were the situation reversed, Washington would probably be raising the same objections that Moscow is.

Russia and the United States are looking to try to resolve this issue through New START's Bilateral Consultative Commission. However, even if they succeed in finding a mutually acceptable fix for the remainder of New START's lifetime, the issue is likely to resurface in negotiations over a follow-on treaty (especially if either party needs to use conversion procedures to reduce SLBM launchers to meet treaty-mandated reductions). This controversy could likely have been avoided if the United States had adopted the same approach it took when it converted all the SLBM launchers on four Ohio-class SSBNs into cruise missile launchers. The United States reduced both the length and diameter of those tubes—a procedure that Russia acknowledged left the tubes verifiably incapable of launching SLBMs. This procedure, along with enhanced transparency, should become the standard for SLBM launcher conversions under a follow-on treaty.

## Proposed Provisions for Conversions of Sea-Launched Ballistic Missile Launchers

The follow-on treaty should permit SLBM launcher conversions provided that (1) the length or diameter of the launch tube is reduced to render it physically incapable of accommodating an SLBM, and (2) following conversion, inspectors are able to view the interior of the launch tube from topside to confirm any reductions.

All SLBM launchers converted under New START must be reconverted according to the new standard if they are to remain nonaccountable.

The inspecting party should be permitted to inspect all converted SLBM launchers on the SSBN containing the deployed SLBM that is designated for inspection.<sup>25</sup>

**Heavy bomber conversions and exemptions.** In converting B-52H bombers, the United States severed their nuclear arming circuits and removed their nuclear pre-arming switches. However, the United States is unwilling to remove the attachment points for nuclear weapons because this equipment is also used for nonnuclear munitions. Russia has stated that it cannot verify that these converted aircraft are incapable of launching long-range nuclear-armed ALCMs. Instead, it argues that converted bombers should be based at air bases with no nuclear infrastructure. This proposal, which the United States has rejected, goes beyond New START's requirements and is a tacit acknowledgement by Moscow that there is no technical solution to its concerns.

Relatedly, a follow-on treaty will also have to manage the new bomber types that both Russia and the United States intend to deploy: PAK-DA and the B-21, respectively. Moscow and Washington may want some of these aircraft to be configured exclusively for conventional operations and hence exempted from accountability. However, it could be challenging to credibly distinguish between bombers of these types that are configured for nuclear operations and those that are not.

An approach to managing this set of issues should be built around three principles. First, to afford the parties some flexibility in meeting a follow-on treaty's central limits, conversions of certain existing types of heavy bombers should be permitted. Second, PAK-DA and B-21 aircraft configured exclusively for nonnuclear operations should be exempted from accountability only if they are based at separate locations from nuclear-capable heavy bombers. There is clear precedent for this approach. During New START negotiations, for example, Russia accepted that converted B-1Bs were nonnuclear—and hence nonaccountable—in part because they are based separately from treaty-accountable

heavy bombers. Finally, a follow-on treaty should provide more transparency on the operations of certain nonaccountable bombers—converted heavy bombers as well as nonnuclear PAK-DA and B-21 aircraft—to build confidence that they are not available for nuclear operations and that the two countries are not practicing or preparing for conventional counterforce strikes.

## Proposed Provisions for Aircraft Conversions and Exemptions

The follow-on treaty should permit the United States to convert additional B-52H bombers using the procedures adopted under New START. All B-52H bombers converted pursuant to New START should be considered to have been converted.

Russia should be permitted to convert heavy bombers of any one type that was deployed prior to New START's entry into force.

Conversions of heavy bombers of any other type should not be permitted.

Converted bombers should not be treaty-accountable, and it should be permissible to base them at either nuclear or nonnuclear air bases.

U.S. B-1B bombers should continue to be subject to the limited inspection rights established by New START's First Agreed Statement. Provided that these aircraft continue to be based exclusively at nonnuclear air bases, they should not be considered to be treaty-accountable heavy bombers and should not be subject to the enhanced transparency requirements for converted and new nonnuclear heavy bombers, as described below.

The parties should be required to designate all new heavy bombers—that is, heavy bombers of a type not deployed when New START entered into force—as either nonnuclear or nuclear-capable prior to their first deployment.

- New nonnuclear heavy bombers must be based at nonnuclear air bases and should be exempted from accountability.
- New nuclear-capable heavy bombers must be based at nuclear air bases and should be accountable.

A party may change the designation of a new heavy bomber from nonnuclear to nuclear-capable, provided that the party rebases the aircraft to a nuclear air base (at which point it becomes treaty-accountable). A party may not change the designation of a new heavy bomber from nuclear-capable to nonnuclear.

All new nonnuclear heavy bombers and all heavy bombers converted under either New START or the follow-on treaty should be subject to enhanced transparency requirements. Specifically, each party should be required to assign all such bombers a unique identifier and provide specified notifications about their operations—in particular, their movements outside national territory and their participation in major exercises.<sup>26</sup>

In implementing these provisions, the following new definitions would apply:

- “New heavy bomber” means a heavy bomber of a type not yet deployed when New START entered into force.
- “New nonnuclear heavy bomber” means a new heavy bomber that is not equipped for long-range nuclear-armed ALCMs, nuclear air-to-surface missiles, nuclear bombs, long-range ALBMs, or long-range ALBGMs.
- “New nuclear-capable heavy bomber” means a new heavy bomber that is equipped for long-range nuclear-armed ALCMs, nuclear air-to-surface missiles, nuclear bombs, long-range ALBMs, or long-range ALBGMs.
- “Nonnuclear air base” means an air base without any infrastructure for storing or handling nuclear weapons, including an air base from which such infrastructure has been removed.
- “Nuclear air base” means an air base with infrastructure for storing or handling nuclear weapons.

## New Kinds of Strategic Offensive Arms

Article V of New START gives each party the right, if it “believes that a new kind of strategic offensive arm is emerging, . . . to raise the question of such a strategic offensive arm for consideration in the Bilateral Consultative Commission.” This provision is intended to provide the parties with a means to manage technological change that occurs over the course of the treaty’s lifetime. Its effectiveness, however, is limited. If this provision were invoked, Russia and the United States would need

to agree on whether the arm in question was treaty-accountable and, if so, how to apply the treaty's provisions. The result would almost certainly be an irresolvable disagreement. In the interim, the party developing the weapon would not be restricted from deploying it.

Since the New START negotiations, the United States has become concerned that Russia is developing various new kinds of strategic offensive arms that may not be accountable under the treaty. Meanwhile, Russia has long been concerned about strategic conventional weapons (or conventionally armed weapons with strategic range) and has sought to engage the United States in discussions about subjecting them to arms control. Indeed, Moscow's position appears to be that, under New START, a new kind of strategic offensive arm could be nuclear or nonnuclear. As a result, both states should now have an interest in a follow-on agreement with a stronger provision that automatically requires new kinds of strategic offensive arms to be accountable—with the scope of any negotiations restricted to implementation arrangements only.

If history is any guide, the negotiations over such a provision would play out in a predictable way. Given Russia's concerns about conventional counterforce attacks, it would probably argue that a new kind of strategic offensive arm could be nuclear or nonnuclear. As precedent, it could note that, if conventionally armed ICBMs and SLBMs were deployed, they would be accountable under New START. The United States would worry, however, that Russia might try to use an overly broad new kinds provision to undermine the United States' conventional military edge by arguing it applied to U.S. nonnuclear capabilities that did not threaten Russia's nuclear forces.

A compromise is possible. The new kinds provision in a follow-on treaty should apply to both nuclear and nonnuclear weapons of strategic range. Its scope, however, should be limited only to kinds of arms that emerged after negotiations and not to existing kinds that are nonaccountable because the two sides disagreed on whether they should be (otherwise a party could weaponize this provision and use it to accomplish during implementation what it failed to achieve during negotiations). To further clarify the provision's purpose and address U.S. concerns, Russia and the United States should negotiate an agreed statement that includes nonexhaustive lists of arms that they would and would not consider to be new kinds. (The lists would necessarily be nonexhaustive because it is impossible to foresee every new kind of arm that may be deployed over the treaty's lifetime. If a new kind of arm not listed in the agreed statement were deployed, greater specificity in the treaty's text should significantly reduce the potential for disagreement about whether it must be made accountable.)

## Proposed Provisions for New Kinds of Strategic Offensive Arms

A follow-on treaty should specify that a new kind of strategic offensive arm must (1) have strategic range, (2) not be accountable under the follow-on treaty, (3) not have been deployed prior to the follow-on treaty's entry into force, and (4) not have been specifically exempted in the agreed statement on new kinds.

The follow-on treaty should further require:

- New kinds of strategic offensive arms to be treaty-accountable.
- The deploying party to notify the other party when each individual delivery system of a new kind first leaves a production facility and where it is deployed.
- The two parties to negotiate all other necessary implementation details, including procedures for exhibitions and inspections, in the bilateral commission established to oversee treaty implementation. The agreement stipulating implementation arrangements should be legally binding without the need for additional domestic ratification procedures (as is the case for agreements reached in New START's Bilateral Consultative Commission).<sup>27</sup>

In an agreed statement, Russia and the United States should provide nonexhaustive lists of arms that they would and would not consider to be new kinds of strategic offensive arms.

Arms considered to be a new kind should include the following:

- Nuclear-armed ground-launched intercontinental cruise missiles
- ALBMs and ALBGMs with ranges in excess of 4,500 kilometers<sup>28</sup>
- Nuclear-armed SLBGMs

Arms *not* considered to be a new kind should include the following:

- Nonnuclear cruise missiles
- Nuclear-armed ground-launched cruise and ballistic missiles with ranges less than 5,500 kilometers
- Ground-launched boost-glide missiles with ranges less than 5,500 kilometers
- Nonnuclear SLBGMs

In the agreed statement, the parties should commit to declaring, at the time of entry into force, (1) all systems currently under development that may be deployed during the lifetime of the treaty that may constitute a new kind for purposes of the treaty, and (2) the anticipated year of deployment for each such system. Each party should update its declaration annually.

## Verification

The follow-on treaty's verification regime would be based closely on New START's, which has functioned well. All required modifications would be relatively minor and should be straightforward to design and implement—though two are significant enough to highlight here.

First, the new treaty should provide for inspections of two kinds of delivery systems that are not limited by New START: NTs and IGLBGMs (though Avangard is an exception). Inspections of IGLBGMs would mirror those for ICBMs. Indeed, because Avangard is treaty-accountable, Russia and the United States have presumably developed inspection procedures that could be applied to other IGLBGMs. Inspection procedures for NTs would be based on those for SLBMs. In fact, inspections of NTs could be somewhat simpler because it should be acceptable to assume that each NT has only one warhead, whereas the number of reentry vehicles emplaced on an SLBM must be verified.

Second, NTM would be used to verify the prohibitions and restrictions pertaining to nuclear-powered cruise missiles, ALBMs and ALBGMs, and nuclear-armed SLBGMs. The most challenging of these tasks would likely be determining whether an SLBGM is nuclear-armed. A cooperative solution to this problem would be challenging because of the difficulties associated with inspecting nonnuclear SLBGMs deployed on nuclear-powered attack submarines or surface ships to verify that they are indeed nonnuclear. That said, in implementing previous arms control agreements, Russia and the United States have been content to rely on NTM for determining whether an ALCM is nuclear-armed—a similar kind of challenge.

NTM would also be used to determine the range of boost-glide missiles (which is necessary because such missiles would be accountable only if they have a range of 600 kilometers when air- or sea-launched, or 5,500 kilometers when ground-launched). Russia and the United States already rely on NTM, in large part, to determine the ranges of ballistic missiles for the purposes of New START implementation. Essentially identical techniques can be used to determine the characteristics of the rocket booster used to launch a hypersonic glider. The glider itself can likely be tracked for almost its entire trajectory with existing early-warning satellites, thus enabling its characteristics (most importantly, the ratio between the lift and drag forces it experiences) and its maximum speed to be ascertained.<sup>29</sup> Taken together, all this information should permit each state to obtain a reasonably accurate estimate of the range of the other's boost-glide systems.

## Assessment and Outlook

From a technical perspective, the proposed treaty appears to be entirely feasible. While it would unquestionably be a long and complex agreement—requiring perhaps a year of negotiations at a minimum—it would be based on New START, which has been successfully implemented. Moreover, only a few modifications to New START’s verification regime would be required, and they seem straightforward to design and implement.

The political prospects of a follow-on agreement, however, are significantly less bright than the technical ones—though they are not entirely bleak. One challenge, particularly within the United States, is the domestic politics of treaty ratification. A Republican president would likely have little difficulty securing the two-thirds majority needed to obtain the U.S. Senate’s advice and consent. A Democratic president would face a much tougher challenge given likely Republican opposition, but recent congressional support for the extension of New START suggests that there is some continuing bipartisan backing for arms control. A well-managed ratification campaign could tap into this support, though such a campaign would undoubtedly be difficult.

But perhaps the single biggest challenge facing a follow-on treaty is simply the perilous state of U.S.-Russian relations—a “profound crisis” in the words of various Russian officials.<sup>30</sup> Even at the best of times, negotiating a strategic arms control agreement is difficult. Under the current circumstances, when the default assumption for each state is that the other is acting in bad faith, and they have to tackle emerging technologies that have never been regulated, negotiations would likely be particularly fraught.

The state of the bilateral relationship also makes it more difficult for each party to accept the compromises that would inevitably be required to conclude a treaty. The most contentious compromises would likely concern what is *not* included in the agreement’s text. The United States would not obtain limits on nonstrategic nuclear weapons and China’s nuclear forces. Russia, meanwhile, would not succeed in restricting ballistic missile defenses.

The result could be considerable pressure to expand the scope of negotiations. Yielding to this pressure would be a mistake, however. Precisely because relations between Russia and the United States are so poor, there is little prospect of their reaching a comprehensive agreement that includes capabilities as sensitive as nonstrategic nuclear warheads and ballistic missile defenses. Overambition would risk a total collapse of negotiations and, in turn, the emergence of a more unregulated deterrence relationship that is prone to dangerous arms racing and escalation.

Therefore, in the final analysis, Washington's choice is not between a bilateral treaty that limits strategic nuclear forces and a trilateral one that limits all American, Chinese, and Russian nuclear weapons; rather, it is between bilateral limits on strategic nuclear forces and no limits at all. Similarly, for Russia, the choice is not between a bilateral treaty that limits strategic offensive and defensive forces and one that limits only offensive forces, but between limits on offensive forces and no limits at all. Given this reality, both governments should focus on negotiating a new bilateral strategic offensive arms limitation treaty.

Of course, this approach would not preclude separate negotiations to address other security concerns. On the contrary, the successful conclusion and implementation of a follow-on treaty would help create a better environment for them. In some ways, the situation is analogous to the late 1960s and early 1970s when the United States and the Soviet Union engaged in the first-of-their-kind Strategic Arms Limitation Talks (SALT). The first fruits of these negotiations—the 1972 SALT I Interim Agreement and the 1972 Anti-Ballistic Missile Treaty—did not address all, or even most, of each state's security concerns. But these agreements did help curb the worst excesses of the arms race and, perhaps more importantly, paved the way for later and more ambitious agreements. A similar spirit of pragmatism would serve Russia and the United States well today.

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