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Third-Country Nuclear Forces and Possible Measures for Multilateral Arms Control

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INTRODUCTION AND EXECUTIVE SUMMARY

To date, negotiated nuclear arms control and reduction agreements have been an exercise conducted almost solely between the United States and the Soviet Union, and, following the latter's collapse in 1991, the United States and Russia. That was logical, given the size of the nuclear superpowers' arsenals compared to those of other nuclear weapons states.

However, U.S.-Russia bilateral nuclear arms control discussions are currently at a stalemate. Differences in approach emerged after the conclusion of the 2010 New Strategic Arms Reduction Treaty (New START). Washington sought further reductions in nuclear weapons, while Moscow focused on related issues, such as missile defense and advanced conventional strike systems. Russia's seizure of Crimea and intervention in eastern Ukraine in 2014 brought the overall political relationship to a post-Cold War low, and counter-charges of violations of the 1987 Intermediate-Range Nuclear Forces Treaty are a further complicating factor.

In earlier negotiations, Moscow advocated for inclusion of British and French strategic nuclear forces, or tried to extract compensating concessions for them, but Washington resisted. In 2013, the Russians began to insist that the next round of nuclear arms reductions be multilateral, but the United States continues to prefer the option of another bilateral round. Whether Moscow will stick to its demand remains to be seen. Washington may find that, if it wishes to pursue further U.S.-Russian nuclear reductions, it must respond in some way to the Russian demand. This paper assumes that the Russians will at the least insist that some third-country nu-

clear weapons states begin to engage in the nuclear arms control process.

Chapter 1 provides an overview of U.S. and Russian nuclear forces, and arms control negotiations between Washington and Moscow. Chapter 2 examines multilateral agreements regarding nuclear weapons, including the Non-Proliferation Treaty (NPT), test ban treaties and nuclear-weapon-free zones.

Chapter 3-5 focus on the three next largest nuclear weapons states: Britain, France, and China. They describe the nuclear forces of each, their nuclear modernization plans, the doctrine governing those nuclear forces and the countries' participation in arms control efforts. They look at the three countries in detail, with the assumption that a multilateral discussion might first take place among them and the United States and Russia—the five permanent members of the U.N. Security Council and the five nuclear weapons states recognized by the NPT. Chapter 6 briefly describes the nuclear forces of the four other countries that possess, or are believed to possess, nuclear weapons: India, Pakistan, Israel and North Korea. It also briefly assesses the feasibility of multilateral arms control efforts that would include those nuclear weapons states.

Chapter 7 looks at a variety of approaches for addressing U.S., Russian, British, French and Chinese nuclear forces in a multilateral arrangement. At one end of the spectrum, the five could consider negotiated numerical limits. That prospect raises two questions: what nuclear weapons would be limited, and would a negotiation aim for equal limits—which

could be difficult given the number of weapons held by the United States and Russia, compared to the arsenals of Britain, France and China.

Other possibilities include transparency and confidence-building measures, such as data exchanges, notifications and demonstrations. One possible agreement could stipulate that the countries keep non-strategic nuclear weapons de-mated, or separated, from their delivery systems—a common practice with such weapons. Other approaches include unilateral measures without a treaty.

While a multilateral arms control effort is unlikely in the near term—and it is not clear when even the U.S.-Russia dialogue will resume in earnest—Chapter 8 provides recommendations for initial steps that might be taken by the five U.N. Security Council permanent members, and preliminary measures to foster stability among all nuclear weapons states. It presupposes that Washington and Moscow are prepared to take serious steps to reduce their nuclear arsenals. Absent resumption of serious dialogue between the United States and Russia on significant nuclear arms reductions—including non-strategic nuclear weapons—other nuclear weapons states will feel no pressure and have little incentive to impose limits on their own nuclear forces.

Multilateral arms control would likely have to begin with small, manageable steps:

- Negotiating a legally-binding treaty stipulating numerical limits on all five countries' arsenals would raise difficult questions. Washington and Moscow are not prepared to accept numerical parity with Britain, France and China, and it is very difficult to see the latter three countries accepting unequal limits in a treaty. Instead, as a first step, the United States and Russia should negotiate a new nuclear arms reduction treaty with limits well below those of New START. They should engage Britain, France and China on the possibility of those countries making unilateral political commitments in which they would state their intention not to increase their nuclear arsenals as long as the United States and

Russia were implementing the new nuclear arms accord. Such a no-increase commitment could allow for modernization or replacement of older nuclear warheads with new weapons, so long as the net number did not increase.

- Unilateral, no-increase commitments could be accompanied by transparency measures. A detailed data exchange would likely not prove achievable, but it would not be unreasonable to ask that Britain, France and China declare their total warhead numbers. Although Britain and France might be willing to provide a total warhead number, China might balk at such a measure. If achieved, however, a data exchange on warheads might break down the numbers by type of warhead or delivery system.
- An additional confidence-building measure might involve a commitment by the states to refrain from deploying non-strategic nuclear warheads mated to their delivery systems, and instead to store them separately from their delivery systems. Most of the five states are believed to keep their nuclear warheads de-mated from delivery systems, with the exception of strategic warheads on their submarine-launched ballistic missiles (SLBMs) and intercontinental ballistic missiles (ICBMs).
- As another confidence-building measure, the United States and Russia might invite the other three states to join some of their New START-mandated inspections. The three could, in turn, offer demonstrations regarding some of their nuclear systems.
- Finally, the five states could build on the P5 discussions to date with more structured and detailed exchanges on questions related to strategic stability, the interrelationship between strategic ballistic missiles and missile defense, and the impact of advanced conventional strike systems on the nuclear relationships between the United States and Russia, the United States and China, and Russia and China.

The recommended agenda thus includes unilateral no-increase commitments, basic data exchanges, commitments to de-mate and store non-strategic

nuclear warheads separately from delivery systems, group inspections or demonstrations of nuclear weapons-related systems, and a multilateral dialogue on strategic stability. Such measures may seem modest to many, including officials of non-nuclear weapons states. But reaching consensus with Britain, France and China on even this limited agenda would be a major step forward in arms control. In parallel with further negotiated U.S.-Russian arms reductions, such measures would set the stage for more ambitious multilateral proposals in the future.

CHAPTER 1

THE NUCLEAR ARMS CONTROL CONTEXT

To date, negotiated nuclear arms control and reduction agreements have been conducted almost solely between the United States and Soviet Union, and, following the latter's collapse in 1991, the United States and Russia. That was logical. The United States and Soviet Union were the first countries to develop nuclear weapons, and each built a large and varied force that dwarfed the nuclear arsenal of any third country. Even after significant reductions, particularly following the end of the Cold War, the U.S. and Russian nuclear arsenals are each estimated to be some fifteen times larger than that of any third country.

The most recent U.S.-Russian arms reduction agreement—the 2010 New Strategic Arms Reduction Treaty or New START—entered into force in February 2011. The U.S. government sought to engage Moscow on further nuclear reductions, but Russian officials put forward proposals in other areas, such as missile defense. Beginning in 2013, they began to insist that the next round of nuclear arms reductions be a multilateral negotiation.

This chapter provides context for an exploration of multilateral negotiations and third-country nuclear forces by describing U.S. and Russian nuclear forces and summarizing the nuclear arms control efforts between Washington and Moscow.

THE U.S. NUCLEAR ARSENAL

As of September 2015, the U.S. nuclear stockpile numbered 4,571 weapons.¹ Of these, an estimated 1,750 are deployed strategic warheads, though the

figure was lower under New START because deployed strategic bombers are attributed as only one warhead. The remaining weapons are reserve strategic warheads and non-strategic nuclear weapons. In addition, the United States has an estimated 2,500 retired nuclear weapons awaiting dismantlement.²

In 2016, the U.S. triad of strategic delivery systems includes Minuteman III ICBMs, Trident II submarine-launched ballistic missiles (SLBMs) housed on Ohio-class ballistic missile submarines (SSBNs), and nuclear gravity bombs and air-launched cruise missiles (ALCMs) carried by B-2 and B-52 nuclear-capable heavy bombers. When New START limits take full effect in February 2018, the U.S. military plans to field 400 deployed ICBMs, 240 deployed SLBMs on 14 SSBNs, and 60 deployed B-2 and B-52 bombers. In addition to the deployed strategic systems, the U.S. Air Force is estimated to maintain 180 non-strategic B61 gravity bombs at six installations in five European countries.³

The Pentagon plans to modernize its nuclear forces in the 2020s, as many of the current nuclear systems are aging and in need of replacement. The Air Force seeks to replace the Minuteman III ICBMs, which have been in service since 1970. The follow-on missile would begin deploying in 2030 and remain in the force through 2070—though there is a possibility that cost considerations will lead the Air Force to again extend the life of the Minuteman III.

The U.S. Navy will begin retiring its Ohio-class ballistic missile submarines at the end of the 2020s. Twelve new SSBNs will replace the 14 current

Ohio-class SSBNs. The Navy will be able to reduce its submarine force by two because the new SSBNs will have a reactor that does not require a lengthy refueling process in the shipyard. The Navy's highly reliable Trident II D5 missile, which can carry up to eight multiple independently targetable reentry vehicles (MIRVs), is expected to remain in the force until at least 2042.

The new B-21 bomber, currently under development, will replace the B-1 and B-52 bombers. Planned upgrades to the strategic bomber force will also include modernization of the B61 gravity bomb for the B-2 and B-21 aircraft, a program that is already well underway. (The modernized B61, referred to as the B61-12, will become the sole strategic and non-strategic nuclear gravity bomb in the U.S. arsenal.) The Pentagon is also developing a new nuclear-armed ALCM for the bomber force, called the Long-Range Stand-Off missile or LRSO.

These plans are ambitious and appear to exceed what the United States requires in order to maintain a safe, robust and reliable nuclear deterrent. For example, the Pentagon reportedly was prepared to get by with a force of just 300 deployed ICBMs. The Air Force plans to incorporate advanced stealth features and electronic warfare capabilities in the B-21 to enable it to penetrate sophisticated air defenses, which would appear to make the LRSO redundant. Pentagon officials concede that they do not know how to fund all of the planned programs.

In addition to its nuclear forces, the United States also maintains several missile defense systems. The first is a ground-based midcourse defense element that will deploy 44 interceptors in Alaska and California by the end of 2017. These interceptors are intended to defend against a limited ballistic missile attack against the U.S. homeland that might be mounted by a country such as North Korea. U.S. military forces also deploy theater missile defense systems such as the Terminal High Altitude Area Defense (THAAD), the Aegis sea- and land-based ballistic missile defense system, and the Patriot PAC-3, which are intended to counter short to intermediate-range ballistic missiles.

The U.S. military is developing options for long-range, precision-guided strikes with conventional weapons. These include systems that can rapidly strike targets at intercontinental ranges, referred to as Conventional Prompt Global Strike (CPGS). The current U.S. focus is a hypersonic glide vehicle which would be launched by a ballistic missile but, instead of following a ballistic course, would dive down and "glide" along the upper reaches of the atmosphere to its target. The Navy and Air Force also have a stockpile of thousands of highly accurate conventionally-armed cruise missiles, though those would take two to three hours to reach targets.

THE RUSSIAN NUCLEAR ARSENAL

There is less information available regarding the Russian nuclear arsenal. In 2016, the Russian nuclear stockpile was estimated to number some 4,500 weapons. An estimated 1,790 of those are deployed strategic warheads, though under New START counting rules the figure was lower. The remainder consists of reserve strategic warheads and non-strategic nuclear weapons. According to 2016 estimates, Russia possesses an additional 2,800 retired nuclear weapons awaiting dismantlement.⁴ Like the United States, Russia maintains a triad of strategic delivery systems. It is already well into a program of modernizing its strategic forces, retiring Soviet-era systems that it might have replaced earlier had economic conditions been more favorable.

Russia's ICBM force consists of approximately 310 missiles. Deployed missiles include a number of Soviet-era ICBMs, including the SS-18, SS-19 and SS-25. Russia's ICBM modernization program aims to gradually replace the Soviet-era missiles. The new ICBMs include mobile and silo-based variations of the SS-27—called the SS-27 Mod 1 (Topol-M) and SS-27 Mod 2—some of which can carry multiple warheads, as well as the RS-28 heavy ICBM. Despite its modernization program, Russia's deployed ICBM force is expected to contract to less than 300 missiles by the early 2020s. To compensate for this decrease, Russia plans to equip more of its mobile and silo-based ICBMs with MIRVs.⁵

Russia's sea-based deterrent consists of 12 SSBNs: six Delta IV submarines, three Delta III submarines and three Borei-class submarines. Each is equipped to carry 16 SLBMs. The Delta IV submarines will remain the backbone of the Russia's sea-based nuclear forces until they are supplanted by the Borei-class.⁶

Russian SLBMs are also slated for replacement. Currently, the Delta IV submarines carry the SS-N-23 (Sineva) SLBM, the Delta IIIs carry the SS-N-18 SLBM, and the Borei-class submarines carry the SS-N-32 (Bulava) SLBM. The Sineva and SS-N-18 missiles can carry a maximum of four and three warheads, respectively, while the Bulava can carry up to six. As the Borei-class submarines take on a greater role in the undersea nuclear force, the total warhead capacity of the force will rise due to the enhanced carrying capacity of the Bulava.⁷

Russia has begun modernizing its 70-80 Soviet-era Tu-160 Blackjack and Tu-95 Bear strategic bombers, of which approximately 60 are counted as deployed under New START rules. Russia has announced plans to re-open production of the Tu-160, perhaps to replace the older Tu-95Ms. This suggests that its next-generation bomber, the PAK-DA, is unlikely to meet its delivery date, originally slated for 2023.⁸

Russia is estimated to possess approximately 2,000 non-strategic nuclear warheads and air, sea, and land-based delivery systems for those warheads. The Russian Navy holds approximately 760 tactical nuclear warheads for use in cruise missiles, antisubmarine rockets and antiaircraft missiles, torpedoes, and depth charges deployed on airplanes, as well as surface and undersea craft. In addition, the Russian Air Force fields Tu-22M3 (Backfire) bombers, and Su-24M (Fencer-D) and Su-34 (Fullback) fighter-bombers, which are equipped to carry the service's approximately 570 air-deliverable non-strategic nuclear weapons. All three aircraft can carry nuclear gravity bombs, and the Su-34 can also carry the AS-4 (Kitchen) nuclear-armed ALCM. The Russian Army possesses approximately 140 nuclear warheads for its short-range ballistic missile force, which it is currently upgrading to include the SS-26

(Iskander-M), which has a range of approximately 300 kilometers (180 miles).⁹

Unlike the U.S. military, which has phased out such systems, Russia continues to deploy large numbers of nuclear-armed air and missile defense platforms. Approximately 480 warheads are believed to be deployed with air, missile and coastal defense units.¹⁰

Like the United States, Russia is developing and deploying long-range precision-guided conventional weapons. In 2015, the Russian military used long-range sea- and air-launched cruise missiles to strike anti-Assad groups in Syria. Russia is also working to develop its own hypersonic glide vehicle.

NUCLEAR ARMS CONTROL DURING THE COLD WAR

The first negotiation to limit the numbers of strategic nuclear weapons, the Strategic Arms Limitation Talks (SALT), began in 1969. In 1972, the negotiation 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 national capital and one at an ICBM field, each with no more than 100 launchers for ABM interceptors. By imposing limits on interceptor missiles, the ABM Treaty made it easier for the U.S. and Soviet militaries to constrain the numbers of their strategic offensive systems.
- The second agreement concluded in 1972 was the Interim Offensive Arms Agreement. It limited the number of U.S. and Soviet ICBM and SLBM launchers to those already deployed or under construction. Though the agreement allowed the Soviet Union more launchers (2,358 to 1,710), that advantage was offset by the fact that the United States maintained a much larger strategic bomber force, which was not constrained by the agreement. In addition, the United States had begun the process of placing MIRVs on its ICBMs and SLBMs, which meant

that the smaller number of U.S. launchers could carry more warheads than the Soviet ballistic missile force.

During the SALT negotiations, the Soviets proposed to limit U.S. forward-based systems—dual-capable fighter aircraft deployed at NATO European bases and on board U.S. aircraft carriers—which Soviet negotiators argued could strike Soviet territory with nuclear bombs. They also sought to limit British and French nuclear forces as part of an agreement. U.S. negotiators adamantly refused on both counts, maintaining on the latter request that the United States had no authority to agree to limits on the nuclear forces of third countries.

The Soviet delegation made the following unilateral statement when the Interim Offensive Arms Agreement was signed:

“Taking into account that modern ballistic missile submarines are presently in the possession of not only the United States, but also of its NATO allies, the Soviet Union agrees that for the period of effectiveness of the Interim Freeze Agreement the United States and its NATO allies have up to 50 such submarines with a total of up to 800 ballistic missile launchers thereon (including 41 U.S. submarines with 656 ballistic missile launchers). However, if during the period of effectiveness of the Agreement U.S. allies in NATO should increase the number of their modern submarines to exceed the numbers of submarines they would have operational or under construction on the date of signature of the Agreement, the Soviet Union will have the right to a corresponding increase in the number of its submarines. In the opinion of the Soviet side, the solution of the question of modern ballistic missile submarines provided for in the Interim Agreement only partially compensates for the strategic imbalance in the deployment of the nuclear-powered missile submarines of the USSR and the United States. Therefore, the Soviet side be-

lieves that this whole question, and above all the question of liquidating the American missile submarine bases outside the United States, will be appropriately resolved in the course of follow-on negotiations.”¹¹

The American side responded with a unilateral statement of its own:

“The United States side has studied the ‘statement made by the Soviet side’ of May 17 concerning compensation for submarine basing and SLBM submarines belonging to third countries. The United States does not accept the validity of the considerations in that statement.”¹²

Negotiations continued after 1972. The 1974 protocol to the ABM Treaty constrained each side to a single ABM site with no more than 100 interceptor launchers. SALT II, signed in 1979, limited the United States and Soviet Union to no more than 2,250 strategic nuclear delivery vehicles each. However, it did not cap the total number of weapons that could be deployed. By that time, both sides were developing and deploying MIRVs on their ICBMs and SLBMs, and long-range ALCMs on their strategic bombers. At the end of the 1980s, it was estimated that each side had over 10,000 strategic nuclear warheads.

During the SALT II negotiations, the Soviet side again sought to limit, or obtain compensation for, U.S. forward-based systems and British and French nuclear forces. U.S. negotiators again rebuffed that attempt, and the Soviet side dropped the issue relatively early in the negotiating process.

In light of geopolitical developments such as the 1979 Soviet invasion of Afghanistan, the Senate did not consent to ratification of SALT II. Still, the United States observed a policy of not undercutting the SALT II limits until 1986. By that time, the United States and Soviet Union had begun negotiations on the Strategic Arms Reduction Treaty (START), which covered warheads as well as delivery vehicles and would provide for reductions, not just limitations.

START was signed in 1991, just months before the dissolution of the Soviet Union. It limited each side to no more than 1,600 strategic nuclear delivery vehicles and no more than 6,000 warheads attributed to those delivery vehicles. While the numbers were high, they represented the first negotiated reductions in strategic offensive forces and reversed the trend of sustained growth through the 1960s, 1970s and early 1980s.

However, START was not the first U.S.-Soviet agreement to provide for nuclear force reductions. In 1987, the two countries signed the Intermediate-Range Nuclear Forces (INF) Treaty, which provided for the elimination of *all* U.S. and Soviet ground-launched ballistic and cruise missiles with ranges between 500 and 5,500 kilometers (300 and 3,300 miles; any ground-launched ballistic missile with a range in excess of 5,500 kilometers was considered an ICBM subject to the START limits). By the end of the INF Treaty's elimination period in mid-1991, the United States and the Soviet Union had destroyed some 2,700 intermediate-range missiles, along with launchers and other associated equipment.

Early in the INF negotiations, the Soviets again sought to include British and French nuclear forces as well as U.S. forward-based aircraft. U.S. negotiators again resisted, and the INF Treaty addressed only U.S. and Soviet land-based missile systems.

U.S.-RUSSIAN NUCLEAR ARMS CONTROL

Following the collapse of the Soviet Union, the United States, Russia, Belarus, Kazakhstan and Ukraine negotiated the Lisbon Protocol in May 1992. Under that agreement, the latter four countries agreed to take on the Soviet Union's START obligations, and Belarus, Kazakhstan and Ukraine agreed to eliminate all strategic nuclear weapons on their territory and accede to the NPT as non-nuclear weapons states. (This was the sole instance of a multilateral agreement to reduce nuclear arms.)

The United States and Russia quickly negotiated a START II Treaty, which was signed in January 1993.

START II would have limited each side to no more than 3,000-3,500 strategic warheads but, due to a downturn in broader U.S.-Russian relations, it never entered into force. Negotiations on START III, launched in 1997, did not yield an agreement.

After becoming president in 2001, George W. Bush's first major move on arms control was to withdraw from the ABM Treaty. The Russians were not pleased, but they did not raise a major protest. In May 2002, Bush and Russian President Vladimir 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 1,700-2,200 operationally deployed strategic warheads. It 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. The Russian side made no effort to capture British or French strategic nuclear forces during the quick negotiation that produced SORT.

President Barack Obama favored a return to a more traditional approach, one that would limit both warheads and strategic delivery vehicles and would also include definitions, agreed counting rules and verification measures. In April 2010, he and Russian President Dmitry Medvedev signed the New START Treaty, which entered into force in February 2011. The treaty 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 counts the actual number of warheads on deployed ICBMs and SLBMs and attributes one warhead to each deployed nuclear-capable bomber. It will remain in force until February 2021, and it can be extended for up to five years beyond that date.

When signing New START, Obama made clear his desire for further U.S. and Russian nuclear arms reductions. He called for inclusion of reserve (non-deployed) strategic weapons and non-strategic weapons, which would have put all U.S. and Russian nuclear arms on the negotiating table. In 2013,

Obama proposed reducing the deployed strategic warhead limit in New START by up to one-third, which would have cut the number of deployed strategic warheads to 1,000-1,100, and called for “bold” but unspecified reductions in non-strategic nuclear weapons.

Moscow, however, showed little interest in further cuts to strategic nuclear forces beyond those required by New START. The Russians conditioned any discussion of limits on non-strategic nuclear arms on the prior withdrawal of all American nuclear weapons from Europe and the elimination of their support infrastructure at NATO bases.

Moreover, the Russians began to express concern about other questions which they tied to further nuclear talks. Although NATO and Russia resolved in late 2010 to explore a cooperative approach to missile defense in Europe, the sides did not reach agreement. The Russian government called for a binding agreement that U.S. missile defenses would not be directed against Russian strategic missiles, an agreement that would place limits on the number, location and velocity of missile interceptors. The United States declined to negotiate such a treaty, but in 2013 Washington offered to discuss an executive agreement on transparency regarding missile defenses. The Russians did not elect to pursue such an agreement.

As the Russians appeared to dig in on the missile defense question, particularly with Putin’s return to the presidency in 2012, they began to raise other concerns. One focused on U.S. plans for Conventional Prompt Global Strike. Some Russian analysts argued that CPGS systems raised the potential for a “conventional strategic” attack against Russia. As of 2016, the United States has not deployed any CPGS systems, though it does have a large number of slower conventionally-armed cruise missiles. In addition to its questions regarding CPGS, Moscow has expressed concern about the lack of arms control measures covering outer space and the potential for militarization of space, as well as the failure of NATO to ratify the adapted Conventional Armed Forces in Europe Treaty.

Finally, Russia has returned to the question of third-country nuclear forces. Washington argued that, given the disparity between the numbers of nuclear weapons held by the United States and Russia and the arsenals of every other nuclear power, there was room for at least one more bilateral U.S.-Russian nuclear arms reduction agreement. Moscow, however, took the position that the next negotiation had to include other nuclear weapons states. In June 2013, Russian 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.”¹³

In May 2016, TASS reported that the Russian foreign ministry spokeswoman said “we believe that the implementation of the [New] START Treaty will exhaust our capabilities regarding mutual arms cuts with the United States. It is necessary to look for ways to involve in the nuclear disarmament process all other states possessing military nuclear potential, first of all Washington’s allies in NATO.”¹⁴

Many analysts expect that, in 2019 or 2020, Russia will be prepared to negotiate an extension or follow-on to New START. The mathematical basis for Lavrov’s assertion that further reductions would render U.S. and Russian arsenals comparable to those of Britain, France and China remains unclear. If the United States and Russia were to agree in a bilateral negotiation to reduce their nuclear stockpiles by 50 percent, each country would still have seven times as many nuclear weapons as any third-country nuclear weapons state. If, however, Moscow holds to the position articulated by Lavrov and the foreign ministry spokeswoman, third-country nuclear forces would have to be addressed in some way in order to ensure that the next round of U.S. and Russian nuclear reductions goes beyond the New START limits.

WORLD NUCLEAR WARHEAD NUMBERS, 2016⁹⁴

COUNTRY	MILITARY STOCKPILE
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	?

CHAPTER 2

MULTILATERAL EFFORTS TO DATE

Although formal treaties to limit and reduce the number of nuclear weapons have only been agreed upon as part of bilateral negotiations between the United States and Soviet Union/Russia (the Lisbon Protocol excepted), a number of multilateral treaties and agreements have been concluded that limit opportunities for states to develop or improve nuclear weapons capabilities. These include the 1968 Non-Proliferation Treaty (NPT), as well as the 1963 Limited Nuclear Test Ban Treaty and 1996 Comprehensive Nuclear Test Ban Treaty. In addition, some states have agreed to establish nuclear-weapon-free zones.

In late 2007 and 2008, there was a brief push to multilateralize the 1987 U.S.-Soviet Intermediate-Range Nuclear Forces (INF) Treaty.¹⁵ Since 2010, the five permanent members of the U.N. Security Council—the United States, Russia, Britain, France and China—have conducted a dialogue on nuclear weapons questions. And in 2015, the U.N. General Assembly (UNGA) mandated an open-ended working group to examine the question of eliminating nuclear weapons.

NON-PROLIFERATION TREATY

Signed in 1968, with entry into force in 1970, the NPT sought to arrest the growth of the number of nuclear weapons states. Most nations have signed and ratified the NPT, which consists of three principal agreements: nuclear weapons states agree to reduce and pursue the eventual elimination of their nuclear weapons; non-nuclear weapons states commit to refrain from acquiring nuclear weapons; and

non-nuclear weapons states have a right to access civil nuclear technology.

The NPT recognized five nuclear weapons states: the United States, Soviet Union (Russia), Britain, France and China. India, Pakistan and Israel did not sign the NPT. North Korea signed but subsequently withdrew from the treaty.

Though the treaty had an initial duration of 25 years, at the 1995 review conference consensus was reached to make the NPT a treaty of indefinite duration. The NPT provides for review conferences every five years, and at those meetings non-nuclear weapons states have become increasingly strident in their criticism of the slow pace of nuclear disarmament by the five NPT-recognized nuclear weapons states.

TEST BAN TREATIES

In 1963, representatives of the United States, Soviet Union and Britain signed the Limited Nuclear Test Ban Treaty (LTBT), which prohibited nuclear tests in the atmosphere, underwater or in outer space. The treaty was open to signature by other countries, and most countries signed and ratified it—with the notable exception of China and France. The treaty was driven by concerns about the fall-out produced by atmospheric testing. For example, above ground tests conducted at the Nevada nuclear test site sent fall-out “downwind,” often into Utah. Once the LTBT came into force, the United States, Soviet Union and Britain shifted their test programs underground. France and China moved most, but not all, of their tests underground. Nuclear tests conducted

by India, Pakistan and North Korea have all been underground. It is not definitively known whether Israel has carried out a nuclear test.

In 1996, the Comprehensive Nuclear Test Ban Treaty (CTBT) was concluded and opened for signature. That treaty bans all nuclear tests that result in a nuclear yield. Over the past 20 years, more than 180 countries have signed the treaty, and more than 160 have ratified it. In order for the CTBT to enter into force, 44 states that are listed in the treaty's Annex 2 must sign and ratify. Of the Annex 2 states, India, Pakistan and North Korea have not signed, while the United States, China, Egypt, Iran and Israel have signed but not ratified. The U.S. Senate refused to consent to ratification in 1999. The Obama administration strongly favors ratification, but it has not pressed for a new vote, fearing that it would not be able to muster the necessary support in the Senate. Beijing has suggested that, once the United States ratifies the CTBT, China would follow suit.

NUCLEAR-WEAPON-FREE ZONES

The Nuclear-Weapon-Free Zone (NWFZ) designation is part of a U.N.-sponsored effort dating to the 1950s, which aims to promote regional progress in non-proliferation and disarmament by banning the development, deployment or use of nuclear weapons in a given region. Per a 1999 UN Disarmament Commission report, a NWFZ is established via free agreements among states in the concerned region. The report further advises that the NPT nuclear weapons states be consulted during discussions of a treaty to establish an NWFZ, so that they are able to support the prospective treaty, legally commit to preserving the nuclear-free zone, and renounce use of nuclear weapons or nuclear blackmail against parties to the treaty. Finally, a NWFZ specifically maintains the option for state parties to use nuclear science and technology for peaceful purposes, such as nuclear power generation.¹⁶ In establishing a NWFZ, each state agrees to eschew development of nuclear weapons indefinitely, over its entire territory, and accepts comprehensive International Atomic Energy Agency (IAEA) safeguards to verify compliance.

Existing NWFZ treaties prohibit development, deployment or use of nuclear weapons in Africa, Central Asia, Latin America and the Caribbean, the South Pacific and Southeast Asia.¹⁷ Other similar treaties have committed states to the denuclearization of Antarctica, the moon, outer space and the seabed. One region which has yet to adopt a treaty banning the possession of nuclear weapons is the Middle East. Iran and Egypt proposed the creation of such a regional agreement in 1974, but progress towards a Middle East Nuclear-Weapon-Free Zone (MENWFZ) has been repeatedly derailed by disputes between factions led by Egypt and Israel. Egypt has prioritized negotiation of a nuclear agreement, while Israel has been reluctant to participate in talks on a NWFZ agreement without a comprehensive Middle East peace settlement. Efforts to convene a conference on a Middle East Weapons of Mass Destruction Free Zone, launched after the 2010 NPT Review Conference, did not succeed.

INF MULTILATERALIZATION

In 2005, Russian officials began to express concern that the INF Treaty prohibited only the United States and Russia from possessing ground-launched ballistic and cruise missiles with ranges between 500 and 5,500 kilometers (300-3,300 miles), while other countries were free to develop and deploy such missiles—and were doing so. Those third countries, including China, India, Iran, Israel, North Korea, Pakistan, Saudi Arabia and South Korea, are geographically closer to Russia than they are to the United States.

Russian President Vladimir Putin publicly expressed concern regarding intermediate-range capabilities in February 2007, and other senior Russia leaders suggested that Moscow was considering withdrawal from the treaty. In October 2007, Putin proposed that the treaty be made “global in scope,” which would ban all countries from having ground-launched intermediate-range missiles. That same month, the United States and Russia issued a joint statement at the UNGA in which they affirmed their adherence to the treaty and called on other countries

to eliminate their intermediate-range missiles. That call found little resonance, in part because, for several countries, intermediate-range systems were their only long-range systems and their primary deterrent. The following February, Foreign Minister Sergey Lavrov proposed a multilateral treaty banning INF missiles, though American officials rejected the notion of a “one-size-fits-all” agreement in light of regional differences.

By all appearances, Russia has not pursued multilateralization of the treaty. In 2014, the United States charged Russia with violating the treaty by testing a prohibited ground-launched cruise missile of intermediate range. The Russian government denied that charge and leveled counter-accusations that the United States had violated the agreement.

FISSILE MATERIAL CUT-OFF TREATY

Efforts to limit the production of fissile material for nuclear weapons via a Fissile Material Cut-off Treaty (FMCT) have gained support in recent years. However, talks in the U.N. Conference on Disarmament have not resulted in an agreed mandate for negotiations. Britain, France, Russia and the United States have publicly declared that they will no longer produce fissile material for nuclear weapons. China is believed to have halted production of such material as well, but it remains reluctant to join a moratorium in case it decides it needs to produce additional fissile material for nuclear weapons in the future. Pakistan, which objects to any limitation on fissile material production that does not include existing stockpiles, has not been prepared to allow progress towards an FMCT. In early 2016, the United States put forward a proposal for dialogue on a treaty which would verifiably halt production of fissile material for nuclear weapons and also take into account existing stockpiles.¹⁸ It remains unclear whether, or when, negotiations on such a treaty might be launched.¹⁹

P5 DELIBERATIONS

The P5 deliberations, or “P5 process,” is an effort by the five U.N. Security Council permanent members

and NPT-recognized nuclear weapons states—the United States, Russia, Britain, France and China—to identify broadly acceptable, concrete transparency and confidence-building measures which could promote strategic stability and disarmament. British Foreign Secretary Margaret Beckett called for such an initiative in early 2007, and Defense Minister Des Browne formally declared Britain’s willingness to participate in a multilateral dialogue in February 2008. The countries have met at six high-level conferences since 2009, with the latest occurring in 2015.

Despite hopes that the meetings would reinvigorate arms control and disarmament efforts, results from the talks have been limited. Proposals from the group, based on the Action Plan of the 2010 NPT Review Conference, have called for pursuit of, among other steps, collaboration on disarmament and verification including the CTBT, a glossary of arms control and disarmament terms, progress towards a Fissile Material Cut-Off Treaty and transparency measures such as a common reporting framework on each nation’s progress towards meeting disarmament goals.

At the 2014 meeting, each state presented a report on its arsenal, but the reports were severely limited in quantitative and qualitative specificity and lacked timely information.²⁰ An effort to create a glossary of nuclear-related terms, spearheaded by China, produced a final document in April 2015.²¹ The official statement from the meeting in spring 2015 reiterated the group’s commitment to identifying means of collaborating to achieve the goals set out in the NPT.

OPEN-ENDED WORKING GROUP TO ELIMINATE NUCLEAR ARMS

The Open-Ended Working Group was established by UNGA vote in December 2015, with the aim of formulating “legal measures, legal provisions and norms” to promote global disarmament.²² The initiative, proposed by Mexico, was meant to spur progress towards eliminating nuclear weapons by allowing the United Nations to bypass obstacles in

existing forums, such as the Conference on Disarmament. However, the five NPT nuclear weapons states strongly opposed the resolution, as did much of NATO and other close U.S. allies, ostensibly because the working group is not bound by strict consensus rules.²³ The P5 did not attend the working group's first and second meetings, held in February and May 2016. Consensus documents from the meetings emphasized a number of wide-ranging, collaborative initiatives pertaining to transparency measures, de-alerting procedures, prohibition of nuclear weapons and related activities and technologies, verification of existing disarmament and non-proliferation obligations, and education regarding the humanitarian consequences of nuclear weapons.²⁴

CHAPTER 3

BRITISH NUCLEAR FORCES

As established nuclear weapons states with stable arsenals and advanced strategic delivery platforms, Britain, France and China are the primary candidates for inclusion in future multilateral nuclear arms control and disarmament efforts. The following sections describe the status of the three countries' nuclear forces, their nuclear doctrines and their readiness to engage in multilateral arms control.

Britain has the smallest nuclear arsenal of the five nuclear weapons states recognized under the Non-Proliferation Treaty (NPT) at approximately 120 operationally available strategic warheads. Its total stockpile, which peaked at around 490 warheads in the late 1970s, now numbers less than 215 warheads.²⁵ Britain has committed as recently as 2015 to reduce its stockpile to 180 warheads by the mid-2020s.²⁶ It is the only one of the five states that relies on a single strategic delivery system.

NUCLEAR FORCES

Britain's nuclear forces consist of four indigenously-produced Vanguard-class ballistic missile submarines (SSBNs), each armed with up to eight operational Trident II D5 submarine-launched ballistic missiles (SLBMs) and up to 40 warheads.²⁷ The missiles, leased from the United States as part of a long-standing program of cooperation, have a range of over 4,600 miles. They are reportedly equipped with the U.S.-designed and built W76-1/Mk4A warhead package, or a near-facsimile.²⁸ Like U.S. SLBM warheads, the British warheads are multiple independently targetable reentry vehicles (MIRVs).

Britain's strategic deterrent is based at Clyde in Scotland. The submarines are stationed at the Faslane portion of the base. Britain's nuclear warheads are maintained by the Atomic Weapons Establishment (AWE) at Aldermaston.

MODERNIZATION

Britain has initiated several programs intended to revitalize its deterrent. The Ministry of Defense plans to extend the lifespan of its Vanguard-class SSBNs, which were commissioned in the 1990s. According to the British government's 2015 National Security Strategy and Strategic Defense and Security Review (SDSR), the SSBNs will remain in service until the early 2030s, when a new Successor-class of submarines will begin to enter service. In the SDSR, the Ministry of Defense reiterates its judgment that Britain must have four such submarines in order to maintain continuous-at-sea deterrence. Critics of the program have expressed concern about its cost. The British government has estimated that the new submarines would cost up to 31 billion pounds to produce.²⁹ The government has deferred an investment decision on the acquisition of Successor submarines to the end of 2016.³⁰

Britain is a partner with the United States in the Trident II D5 modernization program, which will extend the service life of that delivery system into at least the 2040s. Its Mk4A warheads are expected to remain effective through the 2030s. AWE has reportedly spent 85 million pounds on design studies for upgrades to the warheads and has planned to conduct the upgrade program in tandem with the U.S. efforts

to upgrade its W76 warheads.³¹ A decision on a replacement warhead has been postponed to 2019.³²

DOCTRINE

The British government holds that its nuclear weapons are intended to deter an attack on Britain and its vital interests, including its NATO allies (NATO's Nuclear Planning Group discusses plans for use of both U.S. and British nuclear forces in defense of the alliance). Though its weapons support the NATO deterrent, they are operationally independent—only the prime minister can authorize their launch.

Furthermore, Britain provides negative security assurances in its employment guidelines for nuclear weapons. It has said that it will “not use, or threaten to use, nuclear weapons against any non-nuclear weapons state party to the [NPT],” if those states are in compliance with their nonproliferation obligations. However, it has reserved the right to review that assurance in the case of developments in chemical or biological weapons that pose a threat to its security.³³

Britain's four SSBNs maintain a four-step cycle of patrol, reserve, training and repair. This operational schedule provides for continuous at-sea deterrence, which means that at any given moment one submarine is on patrol, while the others are on reserve or preparing for sea duty.

Britain's deterrent is based on the concept of minimum deterrence—that is, to maintain an arsenal capable of inflicting unacceptable damage on an adversary without achieving nuclear parity. A straightforward example of minimum deterrence is the British so-called “Moscow criterion” of the early 1960s. The criterion focused on maintaining the ability to use nuclear weapons to destroy the Soviet Union's political leadership and its war-making ability by striking a number of crucial cities, including Moscow.³⁴ In London's view, that sufficed for a credible and effective nuclear deterrent.

As the likelihood of a “bolt from the blue” nuclear attack has decreased in the post-Soviet era, the

British government has moved to re-evaluate its requirements for minimum deterrence. Some officials have proposed calibrating Britain's nuclear posture by ending continuous SSBN patrols or replacing the four Vanguard-class submarines with a smaller fleet of just three.

PARTICIPATION IN ARMS CONTROL EFFORTS

Over the last several decades, British leaders have repeatedly expressed commitment to arms control, including incremental and multilateral disarmament efforts. Britain ratified the NPT long ago, and the British government maintains that the best way of pursuing the goal of a world without nuclear weapons is to achieve further gains in multilateral disarmament and non-proliferation via the NPT.³⁵

Britain is currently reducing its stockpile of nuclear warheads. In 2011, Defense Secretary Liam Fox said that ongoing reductions would bring its total number of warheads to no more than 180 by the mid-2020s.³⁶ That will make the British nuclear stockpile the smallest of the five held by the NPT-recognized nuclear weapons states.

British officials have rejected unilateral disarmament as unproductive, citing the large arsenals possessed by other countries and a lack of evidence that such actions would cause other nuclear weapons states to follow suit.³⁷ That said, British policy choices, budget constraints and domestic anti-nuclear pressures have contributed to a significant reduction in Britain's stockpile.

Britain is committed to the Comprehensive Nuclear Test-Ban Treaty. In 2010, Britain signed a cooperation agreement with France to create a simulation facility that will allow the two nations to ensure the safety and reliability of their warheads without conducting further nuclear tests.

The Conservative-led British government has made clear its support for remaining a nuclear power and its commitment to the Trident program, including

the building of four new SSBNs. In recent years, British advocates for arms control, including some members of the Labour, Liberal Democrat and Conservative parties, have called for reevaluation of the Trident program. Though many of his fellow members of Parliament support continuation of the program, Labour Party leader Jeremy Corbyn is a critic of Trident. Parliament voted overwhelmingly on July 19, 2016, to renew the Trident system by proceeding with the purchase of four new SSBNs.

The Scottish secession movement and the commitment of secessionists to nuclear disarmament have major potential implications for Britain's nuclear deterrent, as British SSBNs and nuclear weapons are based and stockpiled in Scotland. A draft constitution, released in mid-2014 by the Scottish National Party (SNP), called for unilateral disarmament and removal of nuclear weapons from Scottish territory. Although the September 2014 referendum for independence failed to pass, SNP has become the third-largest political party in Britain. Its leader, Nicola Sturgeon, has continued to emphasize that the party will not enter into a coalition with another party unless that party also withdraws its support for the Trident program. On July 19, all 52 SNP members of Parliament voted against Trident renewal.

It is unclear what impact the June 2016 British referendum to exit the European Union will have on Britain's nuclear arsenal. Scottish support for EU membership may provide impetus for a new referendum on Scotland's independence from the United Kingdom, which would call into question Britain's continued stationing of its SSBNs in Scotland.

CHAPTER 4

FRENCH NUCLEAR FORCES

The French nuclear arsenal peaked at about 540 warheads in the early 1990s.³⁸ It currently stands at approximately 280 operationally deployed warheads, with a total stockpile of 300 warheads.³⁹ France has officially capped its arsenal at a maximum of 300 warheads, a limit announced by President Nicholas Sarkozy in 2008.⁴⁰ That commitment was reaffirmed by President Francois Hollande in February 2015.

NUCLEAR FORCES

French nuclear forces consist of four indigenously-produced Le Triomphant-class ballistic missile submarines (SSBNs), each of which can carry up to 16 French-built M45 or M51 SLBMs. In his 2015 speech, Hollande confirmed that France possesses a total of 48 operational submarine-launched ballistic missiles (SLBMs), each of which can carry up to six domestically-produced TN75 warheads.⁴¹ The submarines are based at Île Longue, on the western tip of the Breton peninsula. Missiles for non-deployed submarines are stored at Île Longue, while warheads for those submarines are stored near Île Longue in Saint Jean.⁴²

In addition to its undersea arsenal, France possesses approximately 50 nuclear-capable fighter-bombers. While these would be considered non-strategic nuclear systems in the United States, France considers them to be strategic. Each is capable of carrying one nuclear-armed ASMP-A air-launched cruise missile (ALCM). The Mirage 2000N K3 and Rafale F3 land-based aircraft are divided into two squadrons, based at Istres and Saint-Dizier airfields. The third

squadron, which flies the Rafale MF3, deploys on France's aircraft carrier, the Charles de Gaulle. Although the carrier is equipped to carry the ASMP-A, it does not do so under normal circumstances. When the MF3 aircraft are not deployed, they are based at Landivisau, and their complement of missiles is likely stored at Istres airfield.⁴³ In his 2015 speech, Hollande revealed that France possesses a total of 54 ASMP-A ALCMs.

France's nuclear weapons are managed by the Direction des Applications Militaires (DAM), a department within the country's Nuclear Energy Commission. DAM oversees research, design, manufacture, operational maintenance and dismantlement of nuclear warheads.

MODERNIZATION

France is in the midst of upgrading or replacing several elements of its nuclear arsenal over the coming five years, including its SLBMs, nuclear warheads and nuclear-capable aircraft. A 2013 white paper on defense strategy reaffirmed the importance of both legs of the deterrent as essential to France's security.⁴⁴ In his 2015 speech, Hollande announced that from 2014-2019 France would allocate 12.3 percent of its planned 180 billion euros in military spending, or approximately 22.1 billion euros, towards the modernization of its nuclear capabilities.⁴⁵

France is currently replacing its M45 SLBMs with longer-range M51 SLBMs and plans to deploy an upgraded version of the latter, the M51.2, by 2018.⁴⁶ The M51.2 will have a range of over 8,000 kilometers

(about 4,800 miles) and will carry a new nuclear warhead—the Tête Nucléaire Océanique (TNO).⁴⁷ The warhead is intended to be more “robust” than previous models.⁴⁸

Paris also plans to replace its contingent of Mirage 2000N aircraft with nuclear-capable Rafale F3 aircraft, a process which should be complete by 2018. The Rafale jets would carry the ASMP-A initially, but France has begun studies aimed at creating a new air-launched, hypersonic missile, the air-sol nucléaire fourth-generation missile (ASN4G), which would enter service in the 2030s. In the meantime, the ASMP-A is slated for an upgrade, which would ensure its reliability until 2035.⁴⁹

France has also begun to plan for the replacement of its Le Triomphant-class submarines. The new, third-generation SSBNs are slated to enter service by 2035. They would be armed with a further-upgraded SLBM, the M51.3.

DOCTRINE

Official French doctrine holds that the purpose of France’s nuclear arsenal is to guarantee its sovereignty. The decision to conduct a nuclear strike cannot be made without the approval of the president, and any decision would likely involve the president, the chief of the presidential military staff and the chief of the defense staff.

France’s four Le Triomphant submarines maintain continuous-at-sea deterrence via 10-week deployments carried out on a rotational basis.⁵⁰ As with Britain, at any given time one French submarine is deployed. Two others are kept operationally ready at all times, with a fourth undergoing training or maintenance.⁵¹

In his 2015 speech, Hollande said that France’s nuclear weapons are intended to deter “any aggression by a state against France’s vital interests,” including its overseas territories.⁵² He noted the importance of France’s nuclear weapons in bolstering NATO’s deterrent and contributing to European defense pol-

icy, though French nuclear weapons are not formally committed to NATO.

In his remarks, Hollande also reiterated France’s commitment to targeting adversary “centers of power” with its nuclear weapons. He indicated that France would, for the first time, focus its planning exclusively on these strategic “nerve centers” and not on population centers. (It is unclear whether this policy would preclude striking nerve centers in or near urban industrial centers.) Hollande stressed that France would not use nuclear weapons against non-nuclear weapons states, with the exception of countries that are not adhering to their non-proliferation commitments. Despite such negative security assurances, France has stressed that, as stipulated by Article 51 of the United Nations Charter, it views a nuclear response as justifiable in the case of any aggression against its vital interests.⁵³

PARTICIPATION IN ARMS CONTROL EFFORTS

Paris has repeatedly reaffirmed its commitment to maintaining its strategic nuclear deterrent. But French leaders at the highest levels have acknowledged the importance of working towards the elimination of nuclear weapons as a long-term goal, and have said that disarmament efforts are critical in the near term.⁵⁴ In 2015, Hollande said that France will maintain its sea-based and airborne nuclear deterrent forces, including modernizing its warheads and delivery platforms, but will strive for the lowest possible levels in keeping with a principle it terms “strict sufficiency.”⁵⁵

France has remained reluctant to commit to broad disarmament goals, and a majority of the French public is believed to be supportive of maintaining the country’s nuclear arsenal. Hollande stated in his 2015 speech that the size of France’s arsenal is not directly linked to the size of other countries’ stockpiles. However, he said that major cuts in nuclear weapons, including France’s arsenal, would only be possible with a dramatic improvement to the global security environment.⁵⁶

Though French officials have taken a more conservative approach to disarmament than their British and U.S. allies, they have emphasized their commitment to arms control and nuclear stability by highlighting transparency initiatives. French leaders have said that broad steps on disarmament must take into account a wide range of issues, including missile defense, conventional and space capabilities.⁵⁷

CHAPTER 5

CHINESE NUCLEAR FORCES

China's nuclear arsenal, though small, is growing in number and variety as modernization programs add significant capabilities to its forces. It is estimated that China possesses approximately 260 nuclear warheads, which may be deliverable via land-based ballistic missiles, submarine-launched ballistic missiles (SLBMs) on nuclear-powered submarines and aircraft. China's entire missile force is under the control of the People's Liberation Army Rocket Force (PLARF), formerly the Second Artillery. This change was instituted in December 2015 and affords the PRC's strategic forces the same standing as its army, navy and air force.⁵⁸

NUCLEAR FORCES

China fields approximately 140 Dongfeng (DF)-series land-based ballistic missiles, which can carry approximately 160 warheads, or nearly two-thirds of its total arsenal.⁵⁹ Of the deployed DF-series missiles, only the DF-5 can carry more than one warhead; it is capable of deploying multiple independently targetable reentry vehicles (MIRVs).⁶⁰ It is estimated that weight constraints prevent this new missile, the DF-5B, from carrying more than two or three warheads.⁶¹ Experts estimate that China possesses approximately 20 DF-5 missiles, approximately 10 of which are the MIRV-capable DF-5B. China's classes of ICBMs, the DF-4, DF-31 and DF-5, have ranges of 5,500 to 13,000-plus kilometers (3,300 to 7,800 miles). As of now, China is estimated to have deployed about eight DF-31 missiles and 25 DF-31A missiles. Its 10 remaining DF-4 missiles will likely be replaced by the DF-31A in the near future.⁶²

China's 10 nuclear-capable DF-15 shorter-range ballistic missiles and approximately 80 DF-21 intermediate-range ballistic missiles have ranges of 600 and 2,150 kilometers (360 and 1,300 miles), respectively. During its September 2015 military parade, China unveiled its new DF-26 road-mobile intermediate-range ballistic missile. The new missile, which will likely enter service in 2016, is thought to be dual-capable with a range of approximately 4,000 kilometers (2,400 miles).⁶³

Information on the locations of China's nuclear missiles is scarce. An estimated 40-50 of China's missiles, which can carry a total of 60-70 warheads, are ICBMs capable of reaching the continental United States.⁶⁴ China is believed to keep its warheads de-mated from delivery vehicles—but this could presumably change with the deployment of SLBMs and canisterized intercontinental ballistic missiles (ICBMs).

Until recently, China possessed only a nuclear dyad of land-based ballistic missiles and nuclear-capable aircraft. But, in December 2015, U.S. military officials indicated that the People's Liberation Army Navy (PLAN) had deployed a ballistic missile submarine on a deterrent patrol.⁶⁵ It remains unclear whether there were nuclear-armed SLBMs aboard.⁶⁶

However, following the patrol by the Type-094 Jin-class ballistic missile submarine (SSBN), China is now thought to possess a credible at-sea second-strike capability. China currently operates four Jin-class submarines from Hainan Island, each of which can carry 12 SLBMs. Though estimates have indicated that China may field between one and five additional submarines by 2020, the most recent

assessments indicate that China will begin building a next-generation submarine after it completes its fifth Jin-class craft.⁶⁷

China possesses two types of SLBMs, the JL-1 and JL-2, with ranges of 1,000-plus kilometers and 7,000-plus kilometers (600 and 4,200 miles), respectively. The JL-1 was designed for China's Type-092 Xia-class submarines, which are not considered operational. Hence, experts believe that the JL-2 will serve as the backbone of a prospective PLAN SLBM force.⁶⁸

China flies the H-6K bomber, an upgraded variant of the Soviet Tu-16 Badger aircraft, which reportedly has a range of 1,900 miles without refueling, and 3,100 miles with refueling, while carrying 12 tons of weaponry.⁶⁹ The H-6K is equipped to carry the CJ-20 ALCM, which may be nuclear-capable and is thought to have a range of approximately 2,200 kilometers (1,300 miles).⁷⁰ The CJ-20 is still under development, but, according to U.S. estimates from 2013, it may be deployed by 2018.⁷¹ Experts have estimated that any current Chinese air-based nuclear delivery capability is inactive and held in reserve, but the U.S. Department of Defense assessed in 2016 that China might develop a nuclear bomber capability, which could serve as the aerial component of a nuclear triad.⁷² In addition, China may field approximately 250 CJ-10 land-attack cruise missiles, which may be dual-capable. The CJ-10 has an estimated range of 1,500 kilometers (900 miles).⁷³

MODERNIZATION

China is replacing its ICBMs with newer, mobile, solid-fueled missiles, such as the DF-31A.⁷⁴ Its newest ICBM is reportedly the road-mobile DF-41. The U.S. Department of Defense assessed in a 2016 report to Congress that the DF-41 is capable of carrying MIRVs.⁷⁵ In a December 2015 test, a canisterized DF-41 was launched from a rail car in western China. The most recent DF-41 test, in April 2016, is believed to have involved two MIRVs.⁷⁶

China is developing a new class of SSBN, the Type-096. This new, longer-range submarine is still in the

design stages.⁷⁷ Some estimates indicate that it may be capable of carrying up to 24 SLBMs, and may have a hull shape similar to that of modern Western SSBNs.⁷⁸

Recent media reports in Chinese Communist Party publications have raised the possibility of a new Chinese long-range bomber. Articles in the Chinese media have emphasized China's need for a stealthy bomber capable of penetrating enemy air defenses and striking targets at beyond medium ranges.⁷⁹ According to *China Daily*, the bomber would have a minimum range of 8,000 kilometers (4,800 miles) without refueling, and a payload of at least 10 tons.⁸⁰ This information hews closely to previously reported details of a Chinese subsonic long-range strike bomber, designated the H-20.⁸¹ But a Chinese expert stressed that it would take time for China to develop a suitable airframe and engine for such an aircraft.⁸²

DOCTRINE

Official statements on nuclear weapons indicate that China's leaders intend to pursue a doctrine of minimum deterrence, with China's arsenal playing a defensive role, preventing nuclear blackmail and providing a retaliatory strike capability. In spite of isolated reports that China would consider first-use of nuclear weapons, possibly in response to a U.S. attempt to disarm it with conventional strike forces, Beijing has recently reaffirmed its long-standing, unilateral no-first-use policy and said that China would strike with nuclear weapons only in response to a nuclear attack on China.⁸³ China's leaders have cited its relatively small arsenal and low readiness levels as proof that the purpose of its nuclear forces is defensive.

"The Science of Military Strategy," a 2013 publication of the Chinese Academy of Military Sciences, presents the following criteria for nuclear use: "1. China will not use nuclear weapons to attack or threaten non-nuclear states; 2. China will not use nuclear weapons to respond to conventional attacks; and 3. China will use nuclear weapons only after it has confirmed an incoming nuclear attack."

The strategy also sets out three operational rules for China's nuclear second-strike capability. First, a retaliatory attack by China would be limited, partially to allow for additional retaliatory strikes. Second, a retaliatory attack would target population centers, and not military capabilities. Third, China's objective in launching a retaliatory strike would be to compel an adversary to abandon future plans to attack China with nuclear weapons. Beijing's choice to target population centers rather than military sites lowers the number of weapons the Chinese believe that they would need to devote to a retaliatory strike and thereby reduces their nuclear requirements.⁸⁴

Reports have indicated that China is considering placing its nuclear weapons on a "launch under attack" alert status similar to that of the U.S. ICBM force. However, there seems to be an ongoing debate in China over whether such an upgrade would undermine China's no-first-use pledge, or otherwise run contrary to its security interests.⁸⁵ Current Chinese modernization programs, which replace China's liquid-fueled ICBMs with solid-fueled variants, would enable Beijing to raise the alert status of its nuclear force. China is also believed to be preparing to deploy its SSBNs on deterrence patrols, which would likely involve mating nuclear warheads to SLBMs before they deploy, and could further encourage Beijing to put its nuclear forces on higher alert.

PARTICIPATION IN ARMS CONTROL EFFORTS

China was a relative latecomer to arms control and nonproliferation efforts, and the views of its leadership regarding arms control and disarmament have varied widely since China tested its first nuclear weapon in 1964. In the years after it joined the nuclear club, China stressed that it viewed development of nuclear weapons as a fundamental national right and said that proliferation would break the hegemony of the superpowers.⁸⁶ It assisted Pakistan in developing its own nuclear arsenal by providing information on nuclear weapons design and enough highly enriched uranium for two bombs.⁸⁷

Official statements indicate that Beijing now believes that arms control efforts are valuable in preventing nuclear use and nuclear accidents, and that China will participate in multilateral arms control at some future date. However, "The Science of Military Strategy" indicates that China also views arms control negotiations as a key area of international competition, and a means for the large nuclear weapons states to preserve their superiority. In that vein, China aims to ensure that its participation in arms control and disarmament does not undermine its strategic interests, but rather brings it strategic dividends. Some PLA documents have advocated for building the Chinese arsenal to lay a foundation for participation in arms control negotiations and gain "the initiative" in talks.⁸⁸

China's stated concern is that U.S. missile defense and Conventional Prompt Global Strike (CPGS) weapons, coupled with the relatively small size of China's arsenal, would allow the United States to mount a first strike on Chinese nuclear forces, perhaps just or predominately with conventional weapons, and then use missile defenses to intercept any surviving missiles, rendering the U.S. homeland invulnerable to a Chinese retaliatory nuclear strike. To counter this perceived threat, China has begun to emphasize command and control, mobility, rapid response and penetration capabilities in its nuclear modernization.⁸⁹ China has also insisted that, before it engages in arms control talks, the United States in particular must cut its arsenal and accept limitations on its missile defense and CPGS capabilities.⁹⁰

China has historically been reluctant to engage in transparency initiatives regarding its nuclear arsenal, ostensibly due to a belief that opacity regarding the size and location of its nuclear forces increases their deterrence value.⁹¹ The Chinese also worry that transparency could facilitate targeting of their nuclear forces. China is the only P5 nation that does not provide official reports on its nuclear weapons. Beijing has demanded that the United States adopt a no-first-use policy as a precondition for China providing more information on its arsenal.⁹²

Despite its disinterested posture towards official negotiations on arms reductions, in recent years China has taken a greater role in dialogue on nuclear issues and transparency. Chinese have been active participants in Track II (non-official) discussions on nuclear weapons, including public conferences and private meetings. Beginning in 2014, Chinese monitoring stations began sending data to the International Monitoring Center of the Comprehensive Nuclear Test Ban Treaty Organization, though China has yet to ratify the treaty.⁹³ In addition, China led an effort by the P5 to produce a “P5 Glossary of Key Nuclear Terms,” which was published in April 2015 and is intended to provide a common terminology for addressing nuclear matters.

CHAPTER 6

OTHER STATES WITH NUCLEAR WEAPONS

In addition to Britain, China, France, Russia, and the United States (the five UN Security Council permanent members or P5), several other countries have declared nuclear arsenals or are thought to possess nuclear weapons. While a multilateral nuclear arms control effort could first focus on the P5 nuclear arsenals, at some point India, Pakistan and Israel would need to take part as well. (Beijing, in particular, might be reluctant to agree to constraints on its forces if India is not involved.) The international community currently seeks to press North Korea to give up its small nuclear arsenal, though near-term prospects appear limited.

INDIA

India's nuclear deterrent is estimated to consist of around 120 warheads. Approximately 55 are for use on land-based ballistic missiles, around 50 are gravity bombs, and 15 are reserved for use on sea-based ballistic missiles.⁹⁵ India is currently expanding its arsenal at a rate of approximately five warheads per year.⁹⁶

While India is developing land and sea-based delivery platforms for its nuclear weapons, its two to three squadrons of Mirage 2000H and Jaguar IS/IB fighter-bombers remain at the core of its nuclear strike force, with a range that extends deep into Pakistan and China.⁹⁷ India is in the midst of upgrading and extending the service life of its Mirage and Jaguar fighter-bombers.⁹⁸ It ultimately plans to purchase 36 Rafale aircraft from France to take up the nuclear strike role.⁹⁹

India's operational land-based ballistic missiles include the short-range Prithvi-2 and Agni-1 and the intermediate-range Agni-2 and Agni-3.¹⁰⁰ India is also developing and testing the longer-range Agni-4 and Agni-5.¹⁰¹ They are intended for maximum ranges of 3,500-plus and 5,000 kilometers (2,100 and 3,000 miles), respectively, and will be capable of striking China from more central deployment locations in India. Some have suggested that, once the Agni-5 is operational, India may focus on developing multiple independently targetable reentry vehicles (MIRVs) and more maneuverable warheads.¹⁰²

To complement its fighter-bombers and ballistic missiles, India is developing a sea-based nuclear weapons capability consisting of indigenously-produced nuclear-powered ballistic missile submarines (SSBNs) and a submarine-launched ballistic missile (SLBM). Its first SSBN, the *Arihant*, embarked on sea trials in 2014, and is currently undergoing its final tests in the Bay of Bengal before entering service.¹⁰³ The *Arihant* will eventually carry the K-15 SLBM, which has a range of 700 kilometers (420 miles).¹⁰⁴ In addition to the *Arihant*, India is currently building another ballistic missile submarine, the *Aridhaman*.¹⁰⁵ India plans to have four SSBNs in service by 2020.¹⁰⁶ India is also developing a new SLBM to succeed the K-15. Designated the K-4, the new missile is currently undergoing initial testing and is intended to have a range of 3,000-plus kilometers (1,800-plus miles).¹⁰⁷

India is also developing a subsonic nuclear-capable cruise missile, the Nirbhay, with a range of 1,000 kilometers (600 miles) and designed for launch from

land, air or sea. In October 2015, the missile failed a flight test—its second failure in three attempts.¹⁰⁸

PAKISTAN

Pakistan is estimated to possess 110-130 nuclear warheads.¹⁰⁹ Based on its production of fissile material, some experts have estimated that Pakistan may be building 20 nuclear warheads per year.¹¹⁰ Islamabad has expressed its desire to pursue “full spectrum” deterrence, which includes very short-range, non-strategic systems such as the Nasr ballistic missile as well as longer-range systems, such as the Shaheen-3.¹¹¹ Pakistan has a relatively small number of nuclear-capable delivery vehicles, many of which are dual-capable and may be assigned conventional missions.

Land-based ballistic missiles are the backbone of Pakistan’s nuclear forces, accounting for approximately 85 of its deployed warheads. The Hatf-9, or Nasr, with a range of just 60 kilometers (36 miles), is apparently intended for battlefield use. The solid-fueled and road-mobile Hatf-2, Hatf-3 and Hatf-4 short-range ballistic missiles have maximum ranges of 180, 290 and 750 kilometers (108, 175 and 450 miles), respectively. Pakistan also possesses intermediate-range ballistic missiles, the road-mobile, liquid-fueled Hatf-5 and the solid-fueled Hatf-6. Pakistan is currently developing two additional nuclear-capable ballistic missiles, the short-range Shaheen-1A and the intermediate-range Shaheen-3.¹¹²

Pakistan is developing two nuclear-capable cruise missiles, the ground-launched Hatf-7 and the air-launched Hatf-8. The Pakistani government claims that both have stealth and “terrain-hugging” capabilities as well as high accuracy and maneuverability.¹¹³

Pakistan’s nuclear-capable aircraft include its F-16A/B fighter-bombers, and possibly its Mirage III and Mirage Vs.¹¹⁴ A Mirage fighter was used in a successful test of the Hatf-8 nuclear-capable air-launched cruise missile (ALCM) as recently as January 2016.¹¹⁵ Pakistan plans to use the JF-17 fighter, a joint Pakistan-China project, to replace its aging

Mirage IIIs and Mirage Vs.¹¹⁶ Although the new aircraft will be equipped to deliver the Hatf-8 nuclear-capable ALCM, Pakistani experts have indicated that there is uncertainty as to whether the JF-17 will have a nuclear strike role.¹¹⁷

Reported efforts by Pakistan to pursue an SLBM capability are still in the early stages, though in 2012 Pakistan established a Naval Strategic Forces Command for deployment and management of a sea-based deterrent force.¹¹⁸ Islamabad recently finalized a deal to purchase eight submarines from Beijing—four will be produced in Pakistan, and four in China.¹¹⁹ Production could begin as early as 2016, but experts are not convinced that Pakistan’s warhead technology would allow deployment of sea-launched nuclear weapons.¹²⁰

ISRAEL

Israeli governments have long maintained that Israel, in the words of Prime Minister Benjamin Netanyahu, “won’t be the first to introduce nuclear weapons into the Middle East.”¹²¹ However, the meaning of “introduce” in such statements remains unclear. Experts believe that Israel acquired nuclear weapons decades ago, perhaps in the late-1960s.¹²²

The level of secrecy surrounding Israel’s nuclear activities makes the composition of its arsenal difficult to ascertain. Experts place the current size of its arsenal at approximately 80 warheads, though previous estimates based on alleged plutonium production at its Dimona reactor indicated that Israel might possess enough plutonium to fabricate over 100 warheads.¹²³

Israel’s potential delivery platforms for nuclear weapons include several variants of its Jericho ballistic missiles, which have estimated ranges of up to 3,970 kilometers (2,480 miles). Israel’s F-16 and F-15E aircraft may also be equipped to carry a nuclear payload, and Israel has confirmed purchase of the U.S.-manufactured F-35 fighter-bomber, which can be upgraded to carry out nuclear strike missions.¹²⁴

Additionally, Israel has purchased six Dolphin-class submarines, five of which have been delivered.¹²⁵ The submarines are equipped with cruise missiles, and media reports indicate that they may carry nuclear-armed cruise missiles, perhaps the Harpoon cruise missile purchased from the United States, or an indigenous design.¹²⁶

North Korea is also developing two road-mobile ICBMs, the KN-08 and the new, longer-range KN-14, neither of which has been tested.¹³² It has tested an SLBM, likely from a submerged barge, an indication that Pyongyang hopes to develop a sea-based nuclear capability.¹³³

NORTH KOREA

North Korea is known to possess some nuclear weapons capability, having detonated four nuclear devices. The United States and South Korea believe that the North already possesses the capability to deliver nuclear weapons to short and medium ranges, which would cover Japan and possibly Guam. However, the overall reliability of the North's warheads and delivery systems remains open for debate. Estimates indicate that the North possesses 10-16 warheads, some fashioned from plutonium and others from weapons-grade uranium. As of early 2016, North Korea is believed to be producing uranium for nuclear weapons at its Yongbyon facility and possibly at another secret centrifuge plant.¹²⁷ The IAEA has also reported that the North has reopened its plutonium production facility at Yongbyon.¹²⁸ Experts predict that it will continue to build its arsenal.¹²⁹

North Korea's nuclear-capable delivery systems are estimated to number about 1,000, including: the SCUD ballistic missile with a range of 300-600 kilometers (180-360 miles); the KN-02 Toksa short-range ballistic missile; and the Nodong intermediate-range ballistic missile, which can strike targets in South Korea and Japan. The Taepodong-2 missile, a militarized version of the Unha space launch vehicle, may also be deployable in a nuclear strike role in emergency scenarios. A road-mobile intermediate-range ballistic missile, the Musudan, may also be pressed into service in an emergency.¹³⁰ The Musudan recently featured in a string of recent failed missile tests, and one apparent success in June 2016, in which the lofted projectile flew approximately 250 miles.¹³¹

CHAPTER 7

POSSIBLE APPROACHES TO MULTILATERAL ARMS CONTROL

This chapter addresses approaches to multilateral arms control, with a focus on possible measures involving the United States, Russia, Britain, France and China, the five nuclear weapons states formally recognized by the NPT. The measures might later be expanded to include India and Pakistan, though there could be greater logic, at least in the near-to-medium-term, to those two countries pursuing confidence-building measures and strategic stability steps on a bilateral basis. Israel's nuclear forces would appear to be best addressed in the context of a broader settlement providing for a stable peace in the Middle. As for North Korea, for the foreseeable future, the international community will continue to look for ways to roll back its nuclear program, however challenging that may be. Including North Korea in a multilateral arms control format could give the appearance of legitimizing its nuclear capability.

Any effort beginning with the five U.N. Security Council permanent members (P5) could build on the work in P5 discussions to date, modest though it has been, which is described in chapter 2.

NEGOTIATED NUMERICAL LIMITS

Although Foreign Minister Sergey Lavrov and other Russian officials have insisted that the next stage of nuclear arms reductions negotiations should be multilateral rather than a bilateral U.S.-Russia exchange, they have not offered a specific proposal for how such a negotiation might be structured or what its goals would be. Participants in any effort to negotiate a treaty with numerical limits for the United States,

Russia, Britain, France and China would have to address several questions:

First, what nuclear weapons would the five countries include in multilateral negotiations? U.S. and Russian nuclear forces are thus far constrained by New START and the INF Treaty. New START limits strategic nuclear forces—intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs) and nuclear-capable heavy bombers, and warheads for such systems—while the INF Treaty bans all intermediate-range (500 to 5,500 kilometers, or 300 to 3,300 miles) ground-launched ballistic and cruise missiles. Thousands of U.S. and Russian nuclear warheads, including those for non-strategic systems and non-deployed strategic warheads, remain outside the limits of these two treaties.

Meanwhile, British nuclear forces consist solely of SLBMs as defined by New START. While most of the French nuclear arsenal consists of SLBM systems, French cruise missiles are launched by fighter-bombers that would not be captured by the definitions of either the New START or INF treaties. In the case of China, many, but not all, of its nuclear systems would be subject to limitations under New START and INF rules.

The most straightforward way to deal with this problem would be to negotiate a limit covering all of the five states' nuclear weapons under a multilateral approach. However, seeking to limit all their nuclear weapons would be ambitious. Such a broad limit would require that Russia be prepared to apply

constraints to its non-strategic nuclear weapons, something that it has staunchly resisted to date. It would require that a multilateral treaty develop definitions for different categories of nuclear weapons. It would also require intrusive verification measures going beyond those in the New START or INF treaties in order to monitor limits on non-deployed nuclear warheads—warheads not mated to delivery systems.

Alternatively, the sides could decide to hold negotiations on some subset of nuclear arms. However, agreeing on which category to limit could prove challenging. For example, it is difficult to see the sides agreeing to limit only strategic systems. Such a limit would leave a significant portion of the Chinese arsenal unconstrained, including systems that could reach Russia. This question could pose a particular dilemma for Moscow, which would want to include Chinese non-strategic nuclear weapons but has resisted discussing limits on similar systems in its own arsenal.

Second, would the five be prepared to accept equal limits, a principle which has been a key feature of every U.S.-Russian nuclear arms control treaty of the past 35 years? The total U.S. and Russian nuclear arsenals—counting strategic and non-strategic, deployed and non-deployed weapons—each amount to almost 15 times the size of the French or Chinese arsenals, and around 20 times the size of the British arsenal. Reaching equal limits would either require huge reductions by the United States and Russia—reductions that both Moscow and Washington would likely not be prepared to accept—or would entail allowing the other three countries the right to carry out a significant build-up of their nuclear forces, almost certainly exceeding whatever levels they might currently aspire to.

For example, a limit of 2,000 total nuclear weapons would require that the two nuclear superpowers reduce their arsenals by some 55 percent each. But that limit would allow France and China each to increase their current nuclear arsenals by a factor of more than six; Britain would be allowed to increase its arsenal almost tenfold. To address this question,

the five states might negotiate such an agreement with a political understanding that Britain, France and China would not build up their nuclear forces. That would preserve the principle of *de jure* equality in the treaty, but it would prove a transparent ploy and likely be unacceptable in several, if not all five, of the countries.

If reaching agreement on equal limits would not prove possible, what about unequal limits? If the five countries were prepared to consider such an approach, they might look to the 1922 Washington Naval Treaty as a model. Until it broke down in the mid-1930s, that treaty limited the aggregate tonnage of battleships and battle cruisers, and of aircraft carriers, of the United States, Britain, Japan, Italy and France in accordance with a ratio of 5-5-3-1.75-1.75.

Working out such a model for nuclear forces would raise many questions. The United States and Russia presumably would accept equality with one another, unless Moscow returned to its earlier demands for compensation for British and French nuclear forces, given that those countries are allied with the United States in NATO. Britain and France might also accept equality with each other. Where, however, would China fit and what numerical level would its leaders accept?

The larger problem is that Britain, France and China—particularly the latter two—likely would not accept unequal limits in a legally-binding treaty as a matter of principle. One might argue that such a treaty would only recognize the existing reality, in which the two nuclear superpowers vastly outnumber the arsenals of every other nuclear weapons state. London, Paris and Beijing appear to accept that reality, or at least they have shown no readiness to expend the resources necessary to change it. But codifying unequal limits in a legally-binding document could well be a step too far. Legal advisors at all three countries' foreign ministries would worry not only about the nuclear arms treaty's inequality but about the precedent such an agreement would set for other issues.

One way of overcoming, or side-stepping, these legal issues would be for the sides to agree to eliminate all their nuclear weapons, with interim limits that might be unequal but which would ultimately drive the nuclear forces of all five down to zero. In such a case, the outcome of the treaty would be an equal limit—zero—for all. But moving to zero seems exceedingly unlikely in the near future. At the present time, none of the five states appears ready to commit to that goal in a legally-binding arrangement. Negotiations on a treaty to eliminate all nuclear weapons would require tough settlements on a range of issues, including: overcoming daunting verification challenges; bringing in the other nuclear weapons states who are not members of the P5; and settling the underlying disputes that lead the states to believe that nuclear weapons are necessary for their security. In short, such a treaty will only be possible after significant steps are taken on a broad range of nuclear and non-nuclear issues, and likely not for some time.

Both Washington and Moscow concluded in 1987 that they could live without INF missiles, even if others had them, though neither may have anticipated the number of intermediate-range missiles that China would deploy or the speed with which horizontal proliferation of intermediate-range missiles would proceed. As noted in chapter 2, in 2007 Russia proposed multilateralization of the INF Treaty. At the U.N. General Assembly in October of that year, Russia and the United States issued a joint statement in which they stated their continued commitment to the treaty and called upon other countries to get rid of their intermediate-range missiles, but the proposal went nowhere. In the intervening years, Russian officials have sporadically expressed concern that third countries have intermediate-range missiles that Moscow is barred from possessing. However, China does not seem prepared to give up its intermediate-range missiles, the bulk of which are believed to be meant for use with conventional, not nuclear, warheads. Neither Britain nor France currently possesses intermediate-range missiles.

A variant of the Russian proposal to multilateralize the INF Treaty could be to adjust the treaty so that third countries would have some limit other than

zero on their intermediate-range arsenals, while the United States and Russia remain at zero. However, this would again require the countries to address the question of unequal limits in a legally-binding treaty. The United States and Russia may be better off with some constraints on third-country intermediate-range missiles, but would they accept inequality in such an agreement? That would be difficult to achieve, at best. Key to the success of such an initiative would be China's acceptance of an upper limit on its missile force. The higher the limit, the less likely that Washington and Moscow would accept it. Even then, the American negotiators could expect a challenge from the U.S. Senate on any unequal limits, especially in a treaty that required Senate consent to ratification. The sides might get around this by having the United States and Russia continue to adhere to the INF Treaty, while third countries negotiate a separate agreement.

Building on an idea suggested by Alexei Arbatov, the United States, China and Russia might consider an agreement that sets an aggregate limit covering both deployed ICBMs and intermediate-range ballistic missiles—perhaps 400-500 missile systems. That limit would cap U.S. and Russian deployed ICBM numbers and constrain China's build-up of its missile force. The downside for the United States is that the single limit might encourage the Chinese military to replace its intermediate-range ballistic missiles with ICBMs.¹³⁴ Britain and France presumably would not take part in such an agreement, since neither maintains ICBMs or intermediate-range ballistic missiles.

Perhaps inequality would be more palatable to London, Paris and Beijing if it were not codified in a legally-binding treaty. Assuming that the United States and Russia were able to reach a new nuclear arms reduction treaty that goes beyond New START limits (and ideally includes the two countries' non-strategic nuclear weapons), one way to approach limits on the three countries' nuclear forces would be for Britain, France and China to take on politically-binding unilateral commitments. Each of the three countries could commit to not increasing the number of its nuclear weapons so long as the United States and Russia remained on track to meet the constraints in

the New START successor treaty. This would presumably be easier for Britain and France to accept, as both have been cutting their arsenals on a unilateral basis. It could be more problematic for China, which has been modestly increasing the size of its nuclear arsenal and has not given an indication of its ultimate planned number of warheads. Additionally, linking further bilateral U.S.-Russia reductions to constraints by Britain, France and China may provide an additional rationale for Moscow to reject another round of U.S.-Russian negotiations, should China be reluctant to undertake a political commitment to limit its nuclear forces.

A variant of the above approach might involve Britain, France and China each agreeing in unilateral political commitments to not exceed a set number of nuclear warheads, with the number perhaps being a different value for each country. That would allow China to build its arsenal beyond its current level. Of course, the more warheads China was allowed to possess under such an agreement, the less interest this approach would garner in Moscow and Washington.

TRANSPARENCY AND CONFIDENCE-BUILDING MEASURES

If numerical limits prove too difficult to negotiate in the near term, could the five NPT nuclear weapons states agree on smaller steps, such as transparency and confidence-building measures? The point of such arrangements would be to reduce uncertainties about the nuclear forces of the other states and to build a base of confidence that might later enable negotiation of an agreement which would put in place meaningful limits.

One such confidence-building step would be to encourage a multilateral data exchange on nuclear weapons among the five states. In its most detailed format, a multilateral exchange would be similar to that required under New START. Under New START's terms, every six months the United States and Russia exchange data including the numbers of their deployed strategic warheads, deployed strategic delivery vehicles, and deployed and non-deployed

ICBM launchers, SLBM launchers and nuclear-capable heavy bombers. The data exchanged also provides the location of each deployed and non-deployed launcher. If the five were to agree to a data exchange that covers all of their nuclear weapons, they would have to develop new categories for exchanging data on non-strategic nuclear systems.

Britain and France would have an easier time engaging in such a data exchange than China. Since the majority of British and French nuclear weapons are SLBMs on submarines that operate from known naval bases, the exchange would not reveal much new information about the locations of their deterrent forces. Beijing will likely be loath to provide detailed data that includes locations of its nuclear systems. China's leadership remains unwilling to provide even basic information, such as numbers of warheads, types of weapons and modernization plans. China's concern stems from a belief that, for smaller nuclear weapon states, secrecy is a strategic asset, and fear that information provided for arms control transparency purposes could also be used by the United States or Russia to target its relatively small force.

Any data exchange would thus have to begin with less ambitious measures. However, even an exchange of numbers, omitting locations, could prove valuable. Having "official" numbers from the sides, even if unverified, could reduce uncertainties regarding the size and disposition of nuclear forces. It would also allow a country to test its own intelligence estimates of the others' nuclear forces. Building confidence in judgments of the size of P5 nuclear forces would prove important later if the five were to move to a legal treaty regime that mandated verified compliance with numerical limits.

Aside from a data exchange, the sides might consider additional transparency measures. The United States and Russia could consider allowing British, French and Chinese officials to join them on a set number of New START inspections that they conduct on each other's territory. For example, when a Russian inspection team visits Kings Bay, Georgia, homeport to U.S. Atlantic-based ballistic missile submarines

(SSBNs), it is given a list of the SSBNs in port, the deployed SLBM launchers on those submarines, and the number of warheads on each of the deployed SLBMs. The inspection team is then allowed to choose one of the deployed SLBMs for inspection, in order to confirm that the actual number of warheads matches the declared number. Allowing British, French and Chinese officials to take part in or observe such inspections could increase their confidence in any data exchanged in a five-party format and would begin to expose them to the kinds of verification measures that might be required in a future arms limitation agreement. Similar third-country observation of inspections conducted at U.S. and Russian ICBM bases could also be arranged.

The United States and Russia could consider offering such demonstrations on their New START-limited systems, without reciprocity from Britain, France and China, to try to induce them to be more forthcoming in any data exchange agreement. Ideally, at some point the latter three could reciprocate with demonstrations of their own nuclear systems.

Another possible transparency measure is a five-party format for notifications. The United States and Russia already exchange numerous New START-required notifications beyond the semi-annual data exchanges. These include notifications of planned ICBM and SLBM test launches. The five countries could consider whether they saw value in making similar notifications in a multilateral format. The concept of pre-notification of actions would be familiar to Britain and France, who already transmit and receive notifications regarding conventional military force activities under the Vienna Document on confidence- and security-building measures. However, this would probably be new territory for the Chinese military.

Of particular interest might be notifications of major exercises—something already required by New START for major strategic exercises that involve heavy bombers. Notification of an exercise reduces the chances that the other side will misread strategic activity and, in the worst case, misinterpret it as preparations for an actual attack. Notifications are

stabilizing, in part because they allow a country to concentrate its national technical means and better observe an exercise to confirm its true nature. The United States presumably shares notifications of Russian exercises with Britain and France. China might stand to gain the most from five-party notifications, though Chinese officials would have to weigh that gain against the requirement that they provide notice regarding their own exercises. This assumes that any multilateral requirement for notification of exercises would be broadened to cover activities beyond the major strategic exercises with bombers that require notification under New START.

Washington and Moscow currently exchange New START and other notifications through their nuclear risk reduction centers, which provide modern, direct communication links. Depending on the frequency of any notifications exchanged among the five, it could be worth considering establishing parallel centers in London, Paris and Beijing.

The United States, Russia, Britain and France are all party to the Open Skies Treaty. Parties to the treaty are allowed to fly unarmed aircraft equipped with cameras over the territory of other parties to the agreement. The treaty caps the number of overflights a state must accept and prescribes the nature of the photographic equipment to be carried by the aircraft, and copies of all photos are made available to the country whose territory is overflowed. The five countries might consider some kind of five-party Open Skies arrangement. However, China may object to this, again fearing that imagery collected might be used for targeting purposes.

Still another possible measure is an arrangement in which the five states agreed to de-mate and separate warheads from delivery systems for some portion of their nuclear arsenal. The United States does not currently keep non-strategic nuclear weapons mated to their delivery systems, though in some cases the weapons and systems are co-located. Experts believe that most Russian non-strategic nuclear weapons are stored separately from their delivery systems. The same is true of China and France, and Britain has no non-strategic nuclear weapons.

Strategic systems are a different question. The United States, Russia, Britain and France all maintain deployed warheads on their ICBMs and/or SLBMs; China has reportedly kept its strategic warheads separate from delivery systems, but that will likely change as its ballistic missile submarines begin deterrent patrols and as it deploys more modern ICBMs.

In addition to considering de-mating systems, Britain, France, Russia, and the United States could consider de-alerting their nuclear weapons. This would mean that the countries would have to accept a lower readiness level—particularly Russia and the United States, whose weapons are on higher alert than those of Britain and France—and give up the option of launching on warning or launching under attack.¹³⁵ China is not currently believed to have any of its nuclear forces on alert, though it is apparently considering doing so.¹³⁶ A decision by the other four countries to abandon a launch-on-warning or launch-under-attack status could convince China that it does not need to put its own weapons on alert. But some in China reportedly believe that adopting a higher alert level would signal China's ability to retaliate with nuclear weapons in the event of a U.S. conventional attack designed to eliminate its nuclear forces, and may not be dissuaded by U.S. steps to de-alert.¹³⁷

In any discussion of possible confidence-building measures among the five, Washington would have to be prepared for a proposal from Russia or China—or both—to withdraw all nuclear weapons to national territory. The United States is the only nuclear weapons state that bases nuclear arms on another country's territory. The United States and NATO maintain that U.S. B61 nuclear gravity bombs in Europe are a key element of the U.S. security commitment to NATO. The Russians have long sought the withdrawal of those bombs, and China would almost certainly support a proposal that nuclear weapons be based on national territory, which would foreclose a U.S. option to return non-strategic nuclear weapons to the Western Pacific, where it maintained nuclear weapons until 1991.

OTHER APPROACHES

Other five-party arrangements may be possible. One would initiate a regular series of discussions among officials of the five on issues such as strategic stability, the relationship between offense and defense, the impact of new technologies, and doctrines concerning nuclear forces. The discussions would aim to reduce uncertainty and prevent—or overcome—misperceptions regarding each side's nuclear and related forces, and how it intends to operate them. Such discussions could also address related issues that might affect strategic stability, such as anti-satellite capabilities and space-based weapons. Strategic stability talks have long been a feature of the U.S.-Russia dialogue. Among other issues, that channel provides a format for discussing each side's view of the relationship between missile defense and strategic offensive arms reductions. Washington has tried a number of times to initiate a parallel dialogue with China, with little result.

Another question that the five might take up would be a moratorium on production of fissile material—highly-enriched uranium and plutonium—for nuclear weapons. Efforts to launch a negotiation on a fissile material cut-off treaty in the Conference on Disarmament have been stymied for years by Pakistan (the Conference on Disarmament operates on a consensus principle, allowing any one state to block movement). The five might consider negotiating a cut-off agreement among themselves, which they could later open to accession by other countries. However, though China is not believed to be producing highly enriched uranium for nuclear weapons, it has been reluctant to agree to a moratorium because it feels that doing so would limit its ability to build its nuclear arsenal should the United States threaten its secure retaliatory capability.

Former Secretary of State George Shultz has suggested yet another approach—that of a “joint enterprise” for creating the conditions for a world without nuclear weapons. The joint enterprise would be launched at the summit level, bringing together a group of leaders, hopefully including those of the United States, Russia, Britain, France and China,

who would reiterate their commitment to a world without nuclear arms. The group of participating states, which would initially include at least some non-nuclear weapons states with robust civil nuclear programs (e.g., Japan, Sweden, Ukraine), would be asked to bring “house gifts”—unilateral commitments to advance the cause of a non-nuclear world. Those might then generate momentum toward more formal arrangements.¹³⁸

The joint enterprise would provide an umbrella for a varied geometry of nuclear arms reductions efforts, which could include a U.S.-Russia negotiation aimed at achieving a new nuclear arms reduction treaty and a settlement of concerns over missile defense, a P5 group working initially on transparency and confidence-building measures before moving toward more substantive limits, and so on. A more formal negotiating process bringing in all nuclear weapons states would only become necessary as the joint enterprise made serious progress toward its goal.

Finally, the sides might consider parallel unilateral actions to reduce or limit their nuclear forces. In September 1991, President George H. W. Bush announced a series of unilateral steps to reduce U.S. nuclear weapons, which were reciprocated shortly thereafter by Soviet President Mikhail Gorbachev, who announced a number of unilateral Soviet steps. A second set of so-called presidential nuclear initiatives took place in early 1992, announced by Bush and Russian President Boris Yeltsin. Britain has separately announced its plans to reduce the number of its nuclear weapons. Some or all of the five NPT nuclear weapons states could announce unilateral measures with the goal of reducing nuclear force numbers in parallel, even if each state took its own steps independent of a legally-binding treaty.

CHAPTER 8

RECOMMENDATIONS

Significant, multilateral progress on arms control is unlikely in the near term. Third countries such as Britain, France and China may remain reluctant to engage in any kind of nuclear arms negotiation so long as the arms control stalemate persists between Washington and Moscow. If the United States and Russia do not negotiate an agreement to bring their nuclear weapons numbers down below the limits in New START, other nuclear weapons states may well feel that they have little reason to negotiate and accept constraints on their own nuclear forces. For China, however, a resumption of U.S.-Russian nuclear arms reduction talks may not suffice. Beijing worries about U.S. missile defenses and advanced conventional strike capabilities and might condition its readiness for serious multilateral arms control talks on Washington taking steps to address China's concerns regarding those issues.

That said, the nuclear arms reduction process should not remain forever a U.S.-Russian exercise. As nuclear weapons states recognized by the Non-Proliferation Treaty (NPT), Britain, France and China have the same obligation as the United States and Russia to pursue nuclear disarmament.

Resumption of serious dialogue between the United States and Russia on nuclear arms reductions—including talks that aim for significant cuts which capture non-strategic as well as strategic nuclear weapons—would provide cause for Washington and Moscow to ask the other three nuclear powers to also take steps forward. The goal of multilateral arms control should be to achieve considerably more than the discussions of the P5 to date, but progress

towards that goal would likely have to begin with small, incremental measures.

As noted in Chapter 7, negotiating numerical limits covering the United States, Russia, Britain, France and China in a legally-binding treaty would be hugely challenging. Washington and Moscow are not prepared to accept numerical parity with Britain, France and China, and it is very difficult to see those three countries accepting unequal limits in a treaty. This may explain why the Russians, who have argued for the past three years for a multilateral negotiation, have yet to set out a proposal with any specifics; they likely have not resolved the dilemma of what kind of limits might prove acceptable for all five.

Instead, as a first step, the United States and Russia should negotiate a new nuclear arms reduction treaty that goes beyond the limits of New START and includes non-strategic nuclear weapons. As part of that process, the two states with the largest arsenals should engage Britain, France and China to gauge their readiness to make unilateral political commitments. In those commitments, London, Paris and Beijing would each state its intent not to increase the size of its nuclear arsenal, so long as the United States and Russia implemented their new bilateral nuclear arms accord. Such a no-increase commitment would allow for modernization or replacement of older nuclear warheads with new weapons, so long as the net number did not increase. While securing those commitments would not be a simple task, it would surely prove more achievable than negotiating treaty limits.

Such unilateral, no-increase commitments would be even more impactful if accompanied by transparency measures. A detailed data exchange would likely not prove achievable. But it would not be unreasonable to ask that Britain, France and China declare their total warhead numbers, if for no other reason than that no-increase commitments should have a baseline starting point. Providing a total warhead number should not be difficult for Britain or France; the likelihood of China agreeing to participate remains unclear. When it comes to data exchange, Washington and Moscow cannot credibly seek data from third countries if they are not willing to provide it themselves; Russia could help convince Britain, France and China to participate by following the U.S. lead and declaring the total size of its nuclear arsenal.

In addition to total warhead numbers, a data exchange might break down the numbers by types of warhead or types of delivery systems. More specific data—in particular, the locations of specific nuclear systems—could be addressed later in the multilateral nuclear arms control process.

An additional confidence-building measure might involve a commitment by the states not to deploy non-strategic nuclear warheads on delivery systems, but rather store them separately. In fact, most of the five states apparently already keep their nuclear warheads de-mated from delivery systems, with the exception of strategic warheads on their submarine-launched ballistic missiles and intercontinental ballistic missiles. The commitment could be made in general terms, or the states might try to be more specific. However, some questions inherent to such an agreement, including what is meant by “separately”—i.e., how far away warheads should be stored from their delivery systems—could prove difficult to resolve.

As another confidence-building measure, the United States and Russia might invite the other three states to join some of their New START-mandated inspections. The three could, in turn, offer demonstrations of their own nuclear systems.

Finally, the five could build on the P5 discussions to date with more structured and detailed exchanges on questions related to strategic stability, the inter-relationship between strategic ballistic missiles and missile defense, and the impact of advanced conventional strike systems on the nuclear relationships between the United States and Russia, the United States and China, and Russia and China.

The recommended agenda thus includes: unilateral no-increase commitments, basic data exchanges; commitments to de-mate and store non-strategic nuclear warheads separately from delivery systems; multilateral inspections and demonstrations of nuclear weapons-related systems; and a multilateral dialogue on strategic stability. Such an agenda would strike many, including officials in non-nuclear weapons states, as modest—especially those seeking to promote a nuclear ban treaty in the Open-Ended Working Group. But other proposals, such as negotiated limits on the five states’ nuclear arsenals, are simply too ambitious to achieve in the near term.

For now, incremental progress is key. Securing agreement from Britain, France and China to collaborate even on this modest agenda would be a major step forward in arms control. In parallel with further negotiated U.S.-Russian arms reductions, such an agenda would set the stage for more ambitious multilateral measures.

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