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Russia's Nuclear Forces: Doctrine and Force Structure Issues

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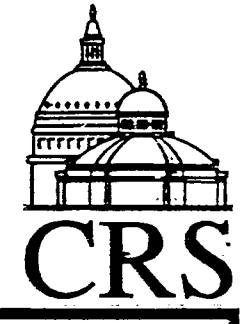

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RUSSIA'S NUCLEAR FORCES: DOCTRINE AND FORCE STRUCTURE ISSUES

SUMMARY

In 1991, the Russian Federation inherited most of the Soviet Union's nuclear weapons, nuclear command and control system, and nuclear doctrine and employment strategy. It has altered both the nuclear doctrine and force structure in response to domestic economic pressures and its evolving position in the international environment.

Russia has placed a greater reliance on nuclear weapons than did the Soviet Union, both as a measure of its superpower status and as a deterrent to a wide range of challenges and conflicts. Where the Soviet Union focussed on the prospects of a global conflict, Russia focuses more on emerging regional threats and challenges. And, although the Soviet Union stated that it *would not* use nuclear weapons first, it did plan to use these weapons early and offensively if a conflict occurred. Russia, in contrast, has stated that it *would* consider first use of nuclear weapons if its conventional forces were inadequate for its defense. This is worrisome because severe financial shortages have undermined the combat capabilities of Russia's conventional forces. Many in Russia believe that the threat to use nuclear weapons as a last resort will deter regional adversaries and protect Russia's national security interests.

Russia has continued a process begun by the Soviet Union to reduce and consolidate its nuclear forces. It has removed all the former Soviet nuclear weapons from the non-Russian former Soviet republics and it has proceeded with the reductions mandated by the START I Treaty. Russia has continued to modernize its strategic nuclear forces, although at a slower rate than did the Soviet Union, by producing new single-warhead ICBMs, a new ballistic missile submarine, and new submarine launched ballistic missiles. It has also continued work on some Soviet-era underground defense facilities. Russia has also continued to exercise and test its strategic forces and troops. Russian officials claim that the results of these exercises demonstrate that Russia's nuclear forces remain potent and reliable. Nevertheless, sharp economic constraints have slowed Russia's modernization programs and raised questions about the future viability of Russia's nuclear forces. Numerous concerns have surfaced about the status and reliability of Russia's nuclear command and control system.

The economic pressures on Russia's forces may increase the prospects for further negotiated reductions in strategic offensive forces. Russia would find it difficult to maintain its forces at START I levels for any length of time because many of its existing systems have neared the end of their service lives. But Russia might also find it difficult to keep its forces at START II levels, if that treaty enters into force, unless it keeps some of its missiles with multiple warheads. This would violate the terms of the treaty but would be far less costly than an effort to produce hundreds of new single-warhead ICBMs. On the other hand, if the United States and Russia agree to further reductions under a START III treaty, Russia could retire its older weapons systems and deploy a treaty-compliant force without producing large numbers of new missiles.

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INTRODUCTION

When the Soviet Union dissolved at the end of 1991, the Russian Federation inherited most of the nuclear weapons and much of the nuclear command and control system that had been a part of the Soviet arsenal. Russia also inherited key elements of Soviet nuclear doctrine and employment strategy, along with the Soviet status as the only nation capable of destroying the United States with nuclear weapons if a global conflict were to occur.

Nevertheless, there are numerous differences between Russia's nuclear posture and that of the Soviet Union. First, the threats that Russia believes it faces are different from those of the Soviet era; Russia focuses less on the prospects for a global conflict with the United States and more on the prospects for smaller conflicts with and among nations along its periphery. In addition, changes in Russia's political stature abroad and its economic distress at home have combined with the decline in its conventional military capabilities to alter the role that Russia sees for its nuclear arsenal. According to Russia's military strategy and statements from Russian officials, nuclear weapons may play a political role in enhancing Russia's stature and deterring challenges from regional adversaries, along with a military role if Russia's conventional forces prove unequal to the task in a regional conflict.

Russia's nuclear force structure resembles that of the Soviet Union and remains capable of inflicting massive damage on any adversary. But arms control and economic pressures have altered its current shape and future prospects. All the nuclear warheads have been removed from the other former Soviet republics, leaving Russia as the sole nuclear power to emerge from the collapse of the Soviet Union. In addition, sharp constraints on funding for nuclear weapons and the command and control network have raised questions about the near- and long-term reliability and viability of those forces. And, although Russia continues to produce some new missiles and submarines to replace aging systems, the rate of modernization has declined sharply since the end of the Soviet era, raising questions about whether Russia has the economic or political resources to maintain force levels that are equal to those of the United States.

These two contrasting trends -- Russia's growing reliance on nuclear weapons as a political and military tool and increasing financial pressures on the size and reliability of its nuclear force -- raise numerous questions about the future of Russia's nuclear arsenal. Most experts believe that Russia's forces will continue to decline in quality and quantity. Others, however, argue that Russia will devote whatever resources are necessary to maintain a robust nuclear

arsenal because these forces are the only remaining basis of Russia's superpower status and only source of political stature needed to counter the power and influence of the United States and U.S. allies.

Most agree that Russia will seek to maintain a nuclear balance with the United States in spite of its economic difficulties. As a result, some argue that now is an ideal time for the United States and Russia to negotiate further reductions in nuclear weapons through formal arms control agreements. This would not only relieve the economic pressures on Russia, it would also reduce the threat to the United States from the Russian arsenal. Others, however, believe that Russia might not be willing to accept further limits on its forces now because it would want to maintain its nuclear options in an era of conventional weakness and growing regional and international insecurity. Still others argue that the presence or absence of arms control agreements is irrelevant to Russia's nuclear future because economic constraints will force Russia to reduce its forces regardless of the arms control environment.

This report provides information and analysis on the future of Russia's nuclear forces. It also seeks to address the question of how changes in Russia's nuclear strategy and nuclear force posture might affect U.S. national security. The answer to this query might be clear if all agreed that Russia would continue to maintain a robust, modern nuclear arsenal with a solid and comprehensive command and control structure or if all agreed that Russia would pursue a coherent, orderly plan to reduce its nuclear arsenal. In either case, the United States might be able to predict the outcome, measure the threat, and devise an appropriate response to Russia's remaining nuclear arsenal.

But the answer to this query may be less obvious if Russia's nuclear forces and command and control structure continued to age with little modernization, particularly if this occurred without the predictability offered by arms control constraints or coherent policy. Some would argue that this outcome serves the U.S. interests because it would undermine the effectiveness and threatening nature of Russia's forces. Still others would see new threats in this circumstance because, as long as Russia continues to rely on nuclear weapons for its status and its security, it might seek ways to remain confident in its declining force posture. And some of Russia's solutions to the weaknesses in its nuclear posture could create new problems for U.S. security.

This report is divided into three sections. The first two describe Russia's nuclear strategy and its nuclear force structure. They highlight areas where Russia's nuclear posture differs from the posture it inherited from the Soviet Union and areas where the two remain similar. Both sections also identify ways in which Russia's economic and political positions have affected Russia's nuclear posture and ways in which these factors could affect Russia's nuclear forces in the future. The third section of this report reviews how Russia might structure its forces under alternative arms control scenarios. The analysis reflects the current limits in the START I and START II treaties and proposed limits for a START III agreement. In each case, the report identifies ways in which the United States might be affected by Russia's force structure choices.

RUSSIA'S NUCLEAR STRATEGY

The end of the Cold War and collapse of the Soviet Union ushered in a dramatically altered strategic reality for Russia. Russia has been unable to retain an international posture as commanding as that of the Soviet Union and is concerned about any decline in its influence in international affairs. This external situation has been exacerbated by fragile economic and military conditions throughout the country. In response to these events, Russia has adopted a nuclear doctrine and strategy that differ in several respects from those of the Soviet Union.

CHANGES IN NUCLEAR DOCTRINE

Soviet Nuclear Doctrine

Throughout much of the Cold War era, the Soviet Union valued nuclear weapons for both their political and military attributes. From a political perspective, nuclear weapons provided the Soviet Union with stature and influence in the international arena. They were not the only measure of Soviet status -- the Soviet Union's massive army and alliance structure also enhanced the Soviet Union's position as a leader in international affairs -- but nuclear parity with, or superiority over, the United States also offered the Soviet Union prestige and influence in international affairs. From the military perspective, the Soviet Union considered nuclear weapons to be instrumental to its warfighting plans. Soviet leaders apparently believed that it could prevail in a conflict against the United States and NATO if it both stationed superior numbers of conventional forces in Central Europe and also threatened to use nuclear weapons offensively and on a large scale if a conflict did occur.

Although the Soviet Union integrated nuclear weapons into its warfighting strategy and doctrine, it also espoused a policy of "no-first use" for nuclear weapons. This policy can be traced back to the Brezhnev era of the 1970s, when the Soviet Union and United States began an effort at detente and the Soviet Union sought to expand its influence among developing nations. Most U.S. analysts doubted that the Soviet Union's "no-first use" pledge would influence its actual warfighting plans, but the policy did place the Soviet Union on the moral high ground with non-aligned nations when the United States and its NATO allies refused to adopt a similar pledge or policy. The United States and NATO, in fact, explicitly relied on the option of first use of nuclear weapons to counterbalance the Soviet-Warsaw Pact advantages in conventional forces along the Central European front.

The Soviet Union reiterated its no-first-use policy during the Gorbachev era from 1985 to 1991. During this time, actual Soviet military doctrine may have become more consistent with this declaratory doctrine as the Soviet Union began to reduce its emphasis on nuclear warfighting strategies. This noteworthy change was primarily a result of Gorbachev's belief that the willingness of the Soviet Union to escalate to the nuclear level against the United States or NATO

in a conflict would lead to catastrophic consequences. As such, he believed the Soviet Union should avoid the use of nuclear weapons if at all possible. Nevertheless, nuclear weapons remained a key tool in the Soviet arsenal for deterring and, if necessary, fighting a large-scale conflict with the United States and NATO.

Russia's Nuclear Doctrine

Russia maintains the Soviet belief that nuclear weapons can serve both political and military objectives.[1] Nevertheless, a comparison of Russia's policy with Soviet doctrine provides some interesting contrasts. For example, where nuclear weapons were but one measure of the Soviet Union's superpower status, many believe they remain as the sole indicator of Russia's stature in international affairs.[2] In addition, the Soviet Union declared that it *would not be the first to use nuclear weapons*, but it actually planned for their offensive use by stressing their utility for surprise attack and preemptive strike options. Russia, in contrast, *explicitly rejected a no-first-use policy* in its 1993 Doctrine, but it seems to view nuclear weapons more as a tool for defensive, war-prevention and termination goals than for offensive operations and surprise attack.[3]

In their statements explaining their nuclear policy, Russian officials have sought to emphasize the deterrent nature of Russia's nuclear weapons and to play down the implicit threat to use these weapons first in a conflict. For example, the 1993 military doctrine stated:

> The aim of the Russian Federation in the sphere of nuclear weapons is to eliminate the danger of a nuclear war by deterrence against the unleashing of aggression against the Russian Federation and allies. Russia, does not see nuclear weapons as a means of conducting military acts, rather as a means of deterrence against such aggression.[4]

Former Foreign Minister Andrei Kozyrev further elaborated:

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[1] Russia first outlined its nuclear policy in its 1993 Basic Provisions of the Military Doctrine of the Russian Federation. See *Jane's Intelligence Review*, Basic Provisions of the Military Doctrine of the Russian Federation, January 1994, pp. 6-12.

[2] General Igor Sergeyev, Commander of the Strategic Missile Forces, recently told the media that Russia's strategic missile forces can "evolve into a real measure of Russia's military might which will ensure strategic stability in the world [and] maintenance of Russia's status as a great power." Interfax, April 23, 1997.

[3] Spencer D. Bakich, Toward a New Quality: The Russian Military Doctrine and Eurasian Security, *Journal of Social, Political, and Economic Studies 21*, Spring 1996, p. 10.

[4] Spencer. Toward a New Quality: The Russian Military Doctrine and Eurasian Security, p. 10.

> It would be a mistake to make out that our new approach to nuclear weapons [the abandoning of the no-first-use pledge] increases the risk of nuclear war. The fact that we do not intend to be the first to use any weapons, and see nuclear weapons as a last resort, is of fundamental importance.[5]

Nevertheless, Russian officials have underscored that Russia believes the threat to use nuclear weapons in a conflict is an essential part of Russia's military strategy. Former Defense Minister Pavel Grachev stated that a purely defensive posture is unrealistic; Russia must have the option of employing those types of weapons that are most effective against an aggressive action.[6] This point of view has remained evident in further iterations of Russia's military doctrine.[7] And, in early 1997, when Russian officials were voicing strenuous objections to NATO's plans to enlarge by adding nations in Central Europe, Ivan Rybkin, head of Russia's Security Council, stated that Russia reserved the right to use nuclear weapons first in a conflict. He told a Russian newspaper that "we are not talking of a preventive nuclear strike but if an aggressor starts a war against us using conventional weapons, we may respond with nuclear ones." He highlighted the deterrent nature of this threat by stating that the threat to use nuclear weapons first could "discourage miliary adventurers bent on exploiting Russia's difficulties," but he made it clear that Russia was prepared to respond to a direct military challenge with nuclear weapons.[8] Although many officials in the Yeltsin government sought to play down these comments, Rybkin's statement is consistent with Russia's military strategy.

THE CONTEXT FOR RUSSIA'S NUCLEAR POLICY

In recent years, Russia's leaders have grown concerned about regional threats from an expanded NATO or other nations along Russia's periphery. But Russia may not be able to rely on its conventional forces alone as a credible deterrent to these local and regional threats. The poor handling of the Chechen rebellion and careful analysis of the U.S. success in the Persian Gulf War

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[5] Spencer. Toward a New Quality: The Russian Military Doctrine and Eurasian Security. p. 16.

[6] Grachev, Pavel S. Drafting a New Russian Military Doctrine: Guidelines for the Establishment of the Russian Armed Forces, *Military Technology*, February 1993, p. 1.

[7] In late 1996, reports in the Russian press indicated that the Ministry of Defense and the Defense Council had produced a new document that outlined a new military doctrine and plans for military reform. This document reportedly stated that "in the event of aggression moving from the phase of a regional armed conflict into a wide-scale war, Russia may be the first to employ nuclear weapons to deliver a disarming strike against military targets." See, Military Reform in Russia, Army Soon to Ax About 500 Generals. *Nezavisimaya Gazeta*, Moscow, December 16, 1996. Translated in FBIS-SOV-96-242.

[8] Khalip, Andrei. Russia may use nukes first in self-defense. Reuters. February 11, 1997.

demonstrated that Russia's conventional forces have declined in quality and are not up to international standards. The emphasis on the possible use of nuclear weapons in these conflicts does not indicate that Russia believes any conflict, even one with a break-away republic, could become nuclear. In contrast, many in Russia believe that it might actually deter challenges to its security by reminding potential adversaries that Russia has nuclear weapons at its disposal.

Potential Threats to Russian Security

As the possibility of a global nuclear conflict has decreased, Russia has shifted its attention toward threats in its immediate vicinity. Of primary concern are local wars and armed conflicts in the near abroad (meaning the other former Soviet republics) and in other nations around its periphery. Russia has also shown a concern with possible challenges from states who possess or may acquire weapons of mass destruction. For example, General Yuri Yashin, Chairman of Russia's State Technical Commission, expressed concern in December 1994 that Britain, France, and China were modernizing their nuclear arsenals as Russia embarked on major reductions in its strategic offensive weapons systems under START I and II.[9] In addition, several nations that may have nuclear, chemical, or biological weapons -- such as Iran, Iraq, India, and Pakistan -- ring Russia's southern flanks. With its weakened conventional forces, Russia may believe it needs to demonstrate to these countries that it retains the ability and intent, with its nuclear forces, to counter their possible use of weapons of mass destruction.

NATO's plans to add new members from Central Europe also worries many in Russia. Not only have these plans renewed some Russia's historic fear of encirclement, they also have raised concerns about a change in the balance of power -- to Russia's disadvantage. Many fear that NATO will move advanced weapons and technology to the borders of Russian territory, and that NATO's new members will offer basing rights to the United States. Some in Russia also believe that NATO's enlargement will isolate Russia. In December 1995, Dr. Alexander Konovalov, Director of Moscow's Center for Military Policy and Systems Analysis, stated, "The West is taking advantage of Russia's current weakness to gain the most favorable strategic position for further confrontation."[10] Such sentiment goes a long way in casting NATO's conventional strength in a threatening light and pushing Russia toward adopting a flexible response policy similar to NATO in the 1950s. Namely, because Russia cannot match NATO's conventional forces with its own, it may view nuclear weapons as a more likely means of deterrence and response.

Russia also sees U.S. development of theater missile defenses as a provocation because it believes these systems could undermine strategic stability.

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[9] Mathers, Jennifer G. Deja Vu: Familiar Trends in Russian Strategic Thought, *Contemporary Security Policy*, v. 16, December 1995, p. 390.

[10] Ulbrich, Jeffrey. NATO Expansion Threatens to Isolate Russia: East Bloc Nations Want In, *Washington Times*, September 19, 1995, p. A12.

Many are convinced that an advanced theater missile defense system, like the Theater High Altitude Area Defense (THAAD), could protect large areas of the United States. This would undermine Russia's confidence in its ability to launch a devastating attack after absorbing a first strike.[11] Perhaps more disturbing to Russia is the chance that the United States might be more prone to initiating an attack if it believed its troops or territory could be shielded from a retaliatory strike.

Russia may also view Chinese military modernization efforts as a potential growing threat.[12] The pace and direction of Chinese modernization efforts, particularly in aircraft and missiles, could threaten Russia should relations between the two countries sour.[13] As a result, Russia may eventually have to decide if the benefits of arms trade with China to generate cash outweigh the growing military power of a neighbor.

Russia's Conventional Forces

The weakened state of Russian conventional forces may also influence Russia's nuclear strategy. Russia's Army faces severe problems that have already greatly diminished its combat-readiness and overall capability to function. Plagued by severe personnel and housing shortages, discipline problems, and rampant corruption, morale is unsurprisingly low.[14] But Russia cannot now afford the high defense expenditures needed to correct the problems. Current levels of defense spending, which equal approximately 3.4% of Russia's GDP, have produced frequent and chronic underfunding of the defense establishment.[15] Projections for future defense spending mark 5.4% of GDP

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[11] Mendelsohn, Jack. START II & Beyond, *Arms Control Today*, October 1996, p. 4.

[12] Steady increases in Chinese military expenditures since 1986 have resulted in an official military budget reaching $7.5 billion in 1995-96 or 9.9% of China's total state expenditures. See Shambaugh, David. China's Military: Real or Paper Tiger? *Washington Quarterly*, v. 19, Spring 1996, p. 21.

[13] Some believe Russia may be causing its own problems by selling military hardware to China. For example, in 1991, China purchased 48 Su-27 fighters from Russia (with a follow-on order placed in April 1996) and more recently ordered 4 Kilo class submarines (with future expectations of acquiring an additional twelve). See, Bluth, Christopher. Beijing's Attitude to Arms Control, *Jane's Intelligence Review*, July 1996, p. 330. See, also, U.S. Library of Congress. Congressional Research Service. *Russia-Chinese Cooperation: Prospects and Implications*. CRS Report 97-185 F. by Stuart D. Goldman and Robert G. Sutter. January 27, 1997.

[14] Slagle, New Russian Military Doctrine, p. 89.

[15] FBIS Daily Report, "Russia: Economic Side of Defense Industry, Military Reforms," FBIS-UMA-96-216-S, October 17, 1996.

as a realistic goal, but Russia will not reach this level at least until the year 2000.[16]

Many in Russia recognize the need to restructure and reform the military to maintain its combat capabilities. Officials have announced a plan for reform, but there are no assurances that they will follow through. This plan contains two stages. Stage I, which would occur from 1997-2000, envisions a 30% reduction of the armed forces, to 1.2 million troops, and the development of a unified command and control system. During Stage II, between 2000 and 2005, Russia would shift toward a professional army of contract serviceman (rather than conscripts) and trained reserve units.[17]

Russia hopes these structural changes will create a highly capable and mobile army. Until then, however, nuclear weapons will assume an enhanced deterrent role for Russia. Although these forces also suffer from funding shortfalls, they remain more coherent and cohesive than Russia's conventional forces. The commander of Russia's Strategic Rocket Forces, Army General Igor Sergeyev, stated in December 1996 that the rocket forces have maintained their combat readiness and continue to perfect their skills at launching intercontinental ballistic missiles.[18]

RUSSIA'S NUCLEAR FORCE STRUCTURE

INITIATIVES INHERITED FROM THE SOVIET UNION

Withdrawals and Reductions of Nonstrategic Nuclear Weapons

During the Cold War, the Soviet Union deployed thousands of tactical nuclear weapons in the Warsaw Pact nations of Eastern Europe and in republics outside Russia.[19] The Soviet Union had moved most of these weapons to facilities on Russian territory prior to the end of 1991. Hence, by the latter half

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[16] "Russia: Economic Side of Defense Industry, Military Reforms," Translated in FBIS, October 17, 1996.

[17] FBIS Daily Report, "Russia: Paper Sketches Main Provisions of New Defense Doctrine," FBIS-SOV-96-242, December 16, 1996.

[18] FBIS Daily Report, "Russia: Commander on Combat Readiness, Future Prospects," FBIS-SOV-96-243, December 16, 1996.

[19] NRDC Nuclear Notebook. Estimated Russian Stockpile, End of 1996. *The Bulletin of the Atomic Scientists*, March/April 1996. v. 53, p. 63.

of 1991, Belarus, Ukraine, and Kazakhstan were the only non-Russian former Soviet republics with nuclear weapons on their territories.[20]

Responding to a U.S. initiative,[21] President Gorbachev announced in October 1991 that the Soviet Union would withdraw all land-based and sea-based non-strategic weapons (those with ranges of less than 360 miles) from deployment and place them in storage areas in Russia.[22] Although official estimates remain classified, many U.S. experts calculated that these initiatives could affect several thousand nuclear warheads in the Soviet Union. After the Soviet Union collapsed, the other former Soviet republics continued to transfer non-strategic nuclear weapons to Russia. According to officials in Russia and the other former republics, all of the warheads for land-based systems had been returned to Russia by July 1992 and all sea-based tactical nuclear weapons had been removed from operation by mid-1993.[23]

Russian officials contend that they have begun to dismantle warheads removed from these nonstrategic nuclear weapons and that they can do so at a rate of 2,000 warheads each year. The United States has little direct evidence to support Russia's claims because U.S. officials have not observed the dismantlement process. Nevertheless, some have stated that Russia's force of nonstrategic nuclear weapons may have declined by more than 25% from its peak of around 25,000 warheads in the late 1980s.[24] In addition, Russia has consolidated its storage facilities for the remaining warheads for land-based

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[20] U.S. Library of Congress. Congressional Research Service. *Nuclear Weapons in the Former Soviet Union: Location, Command and Control,* CRS Issue Brief 91144, by Amy F. Woolf, Updated Regularly.

[21] On September 21, 1991, President Bush announced that the United States would withdraw all its land-based and sea-based tactical nuclear weapons (those with ranges of less than 360 miles) from bases outside the United States. He noted that these withdrawals were not dependent on Soviet reciprocity. But he suggested that Soviet President Gorbachev take similar steps, in part to remove nuclear weapons from regions where independence movements or political unrest raised questions about the safety and security of Soviet nuclear weapons. See "The Peace Dividend I Seek Is Not Measured in Dollars," Text of Presidential Address, *Washington Post,* September 28, 1991. p. A23 and The White House, Office of the Press Secretary. Presidential Initiative on Nuclear Arms; Fact Sheet. September 27, 1991.

[22] Gorbachev Announces Wide Arms Reductions in Response to Bush. *Washington Post.* October 6, 1991. p. A1.

[23]Congressional Research Service. *Nuclear Weapons in the Former Soviet Union: Location, Command and Control,* IB91144, updated regularly.

[24] Russian Defense Budget Continues Downward Spiral, Says CIA, DIA. *Arms Control Today,* v. 24, September 1994. p. 27.

nonstrategic nuclear weapons, reducing these facilities from more than 600 to perhaps less than 100 locations.[25]

Many in the United States remain concerned about the safety and security of Russia's warheads from nonstrategic nuclear weapons, so U.S. officials have urged Russia to further consolidate its storage infrastructure. In addition, some storage facilities for these weapons remain close enough to operational bases for Russia to return some of these weapons to deployment if it believed they would be needed in a conflict. Such an option would be consistent with Russia's growing emphasis on nuclear deterrence in regional contingencies.

Reductions in Strategic Nuclear Weapons

Russia has reduced the Soviet Union's strategic nuclear forces while implementing the 1991 Strategic Arms Reduction Treaty (START I).[26] The table below summarizes the changes that have occurred in those weapons that count under the START I treaty. By mid-1996, Russia had destroyed more than 430 ICBM launchers, 275 SLBM launchers, and 40 bombers to comply with START I. And it had removed from service hundreds more warheads by deactivating weapons in Ukraine and Russia. These weapons still count under START I, and, therefore, appear on the table below, because the launchers have not been destroyed according to treaty procedures. Subtracting them out of the totals in the table would leave Russia with fewer than 6,000 warheads deployed on its operational strategic offensive forces. This compares with the more than 11,000 warheads on Soviet forces before START I entered into force.

Table 1: START I Reductions in Soviet Strategic Nuclear Weapons

	September 1990		January 1997	
	Launchers	Warheads	Launchers	Warheads
ICBMs	1,398	6,612	877	4,574
SLBMs	940	2,804	664	2,496
Bombers	162	1,776	123	914
Total	2,500	11,192	1,664	7,984

Source: U.S. Arms Control and Disarmament Agency, Arms Control Association

In addition, Belarus, Kazakhstan, and Ukraine have all returned to Russia the nuclear warheads that were on their territories after the collapse of the

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[25] Estimated Russian Stockpile, End of 1996. *The Bulletin of the Atomic Scientists, March/April 1996.* v. 53, p. 64.

[26] For details on the provisions in this treaty see, U.S. Library of Congress, Congressional Research Service, *The START I and START II Arms Control Treaties: Background and Issues*, by Amy F. Woolf. June 30, 1993.

Soviet Union. Belarus returned 81 SS-25 ICBMs and their warheads to Russia by late November 1996. Kazakhstan had returned all 370 bomber weapons and 1,040 warheads from the SS-18 ICBMs on its territory by May 1995, and had destroyed all the silos on its territory by September 1996. Ukraine completed the removal of all the nuclear warheads from its territory by June 1, 1996; it has begun to destroy the silos on its territory. Russia also plans to buy back 19 Blackjack bombers and 25 Bear H bombers currently based in Ukraine.[27]

NUCLEAR MODERNIZATION PROGRAMS

Modernization During the Soviet Era

During the 1970s and 1980s, the Soviet Union consistently added to the quantity and quality of its strategic offensive nuclear weapons. It simultaneously produced several different ICBMs, SLBMs, and ballistic missile submarines and introduced improved versions of its missiles every few years. The United States, in contrast, produced only one or two new missile types at a time and would then deploy each system for at least 20 years before introducing a new system to replace aging weapons.

There are several possible explanations for the vigorous weapons modernization programs in the Soviet Union. First, there are the "arms race" explanations. The Soviet emphasis on weapons modernization may have reflected Soviet efforts to achieve first, parity, then superiority, over the United States in terms of the numbers of warheads deployed on its strategic offensive forces. Second, some Soviet modernization may have been driven by "bureaucratic" factors. The Soviet Union may have produced several types of missiles simultaneously because it had several missile design bureaus working on new missiles at the same time. It did not require any competition or selection among the design bureaus. The United States, in contrast, customarily requests that several defense contractors offer designs for new missiles, but then "down selects" to one contractor who produces a single system for the U.S. force.

In addition, the Soviet Union may have introduced new missiles into the force before they carried the most advanced technologies, then modified the missiles to accommodate new technologies when they became available. The United States, in contrast, designs its missiles to take advantage of the most advanced technologies available, and therefore, has less need for later modifications. Finally, some have noted that the Soviet Union never expected its missiles to last for 20-30 years, as the United States does, but, instead,

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[27] Negotiations on this sale have not reached a conclusion. As a result, the aircraft remain at bases in Ukraine. According to press reports, they have not received enough maintenance to remain fully operational. See Colonel General Volodymyr Antonets Believes That the Question of the Transfer of Strategic Bombers to Moscow Must Be Decided Not by the Military but by Politicians. Nezavisimoye Voyennoye Obozreniye, Moscow, February 15, 1997. Translated in FBIS-SOV-97-035.

designed them knowing that they would be replaced by a modified or new missile within 10 years of their initial deployment.

Recent Changes in Modernization Programs

By the time the Soviet Union collapsed in 1991, economic pressures and the improving relationship with the United States had combined to slow the Soviet Union's nuclear modernization efforts. In October 1991, Soviet President Gorbachev announced that he planned to curtail or cancel several nuclear weapons programs.[28] He announced that the Soviet Union would forgo the deployment of additional rail-mobile ICBM launchers and that it would not modernize the SS-24 ICBMs that were already deployed on 46 of these systems. He also announced that the Soviet Union would cancel the modernization program for its SS-25 road-mobile ICBM. However, as is discussed below, the Soviet Union and Russia have proceeded with the production of a new single warhead silo-based ICBM that may also replace existing mobile SS-25 ICBMs.

Russian President Yeltsin also canceled some programs in 1992. He stated that Russia would cease production of new Bear H and Blackjack bombers. He also announced that Russia would cancel production of a new long-range sea-launched cruise missile and long-range air-launched cruise missile.[29] Russia has not, however, completely ceased to modernize its nuclear forces. It continues to produce a new single-warhead ICBM and to design a new SLBM, a new class of ballistic missile submarines, and some new bomber weapons. According to recent press reports, it has also continued to construct underground subways and command posts that its leadership could try to use to survive attack and to command its forces in the event of a nuclear war.[30]

Russia's Ongoing Nuclear Modernization Programs

ICBM Modernization

Russia is currently producing a new, single warhead ICBM. This missile, known as the Topol-M in Russia and the SS-27 in the United States, is a follow-on to the SS-25 road-mobile ICBM (known as the Topol in Russia). The new missile will resemble the older version with its three-stage, solid fuel design. It

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[28] As with the withdrawal of nonstrategic nuclear forces, this announcement responded to a similar initiative by U.S. President Bush. In September, President Bush announced that the United States would cancel its mobile launcher programs for two new ICBMs and that it would cancel plans to modernize its air-launched short-range attack missile.

[29] Duncan, Andrew. Russian forces in decline - Part 5. *Jane's Intelligence Review, v. 9*, January 1997. p. 14.

[30] Gertz, Bill. Moscow Builds Bunkers Against Nuclear Attack. *Washington Times*, April 1, 1997. p. 1. See also, Expert Says Report on Secret Bunkers in Moscow Partially True. Interfax. April 3, 1997.

will have a throwweight of 1,200 kilograms and a range of more than 10,000 kilometers when equipped with a single nuclear warhead.[31] With its size and reported throwweight, the missile probably could be equipped to carry 3 or 4 warheads without losing the ability to strike at intercontinental range. The new missile may also be more robust than its predecessor, with major overhauls needed after 15, rather than 10 years.[32] Russia is designing the missile for deployment in fixed ICBM silos, such as those that currently hold SS-18 and SS-19 ICBMs, but it might also produce a road-mobile version in the future.[33]

Russia conducted its first successful flight test of the new Topol-M ICBM in December 1994, its second in September 1995, and its third in July 1996. According to Russian officials, each of these tests demonstrated the capabilities of the new missile system.[34] However, financial pressures may have altered the plans for the Topol-M. In recent years, the program may have received only one-third of the funds needed for development and flight testing. Some sources indicate that Russia had initially planned to conduct around 20 flight tests in 1995 and 1996, but had only completed one each year. Although Russian officials seem pleased with the results of these tests, they may be insufficient to offer high levels of confidence in the system. In addition, Russia had initially announced that the Topol-M would begin deployment in late 1996, and that 10 missiles would be operational by the end of 1997. But the chief of the Strategic Rocket Forces, General Sergeyev, has stated that the missile may experience problems "with its development rates due to insufficient and uneven financing."[35] As a result, the initial deployment has now slipped until later in 1997, in part because construction at missile deployment sites was behind schedule.[36] And, with production rates as low as 12 missiles per year, Russia may take several years to deploy a significant number of these ICBMs.[37]

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[31] Litovkin, Viktor. Nonetheless We are Making Missiles! Details of New "Topol-M" Missile System. Moscow, *Izvestia*. January 20, 1995.

[32] Handler, Joshua. The Future of Russian Strategic Forces. *Jane's Intelligence Review*, v. 7, April 1995. p. 163.

[33] Litovkin, Viktor. Nonetheless We are Making Missiles! Details of New "Topol-M" Missile System. Moscow, *Izvestia*. January 20, 1995.

[34] Yurkin, Anatoliy. Russia: Officials Comment on Test of Intercontinental Missile. Moscow, ITAR-TASS. July 25, 1996. Translated in FBIS-TAC-96-009.

[35] Dzhibuti, Vitaliy. A Superpower's Final Attribute: New-Generation Missiles Will Go on Alert Status Before Year's End. Interfax. March 17, 1997. Translated in FBIS-SOV-97-076.

[36] Yudin, Pyotr. Moscow Budget Squeeze May Stall New Nuke Missile. *Defense News*, v. 11, August 19-25, 1996. p. 1.

[37] Estimated Russian Stockpile, End of 1996. *The Bulletin of the Atomic Scientists*, March/April 1996. v. 53, p. 62.

SLBM and SSBN Modernization

Russia reportedly has several programs in place to modernize the sea-based leg of its strategic triad. First, it is developing a new ballistic missile for deployment on its existing Typhoon submarines. At least two of the six Typhoons in the fleet are currently in shipyards where they will be fitted with the new missile, and all six may have been scheduled for this modification.[38] Russia has apparently made little progress with this program, however and some reports indicate that it may have cut off all funding for overhauls and upgrades so that it can focus its resources on submarine operations and new construction.[39] As a result, several reports cite rumors that the overhaul program for the Typhoon submarines may stall and at least two of these submarines may be retired during the next ten years.[40]

Second, in late October 1996, Russia laid the keel for the first boat in a new class of ballistic missile submarines. This is the first new ballistic missile submarine to begin construction in Russia (or the Soviet Union) in over ten years and, when completed, it will be the first new submarine to enter the fleet since 1990. Russia is also reportedly developing a new ballistic missile for this new class of submarines.[41]

Russian sources report that the new submarines will be larger than current 16-missile Delta IV submarines but smaller than the 20-missile Typhoon submarines. Russia plans to complete construction of this first boat by 2002-2003 and some reports indicate it may construct 10 or 12 submarines in this class by the year 2010.[42] Others, however, doubt that this program is feasible. In late 1996, workers at the shipyard went on strike to protest unpaid wages

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[38] Handler, Joshua. The Future of Russian Strategic Forces. *Jane's Intelligence Review*, v. 7, April 1995. p. 163.

[39] Pengelley, Rupert. Grappling for Submarine Supremacy. *Jane's International Defense Review*, v. 7, September, 1996. p. 49.

[40] Estimated Russian Stockpile, September 1996. *The Bulletin of the Atomic Scientists*. September/October 1996, p. 62. See also, Sutyagin, Igor. Sharks of Strategic Designation. *Submarine Review*, October 1995, p. 78; and Handler, The Future of Russian Strategic Forces. p. 165.

[41] Russian Stockpile, End of 1996. *The Bulletin of the Atomic Scientists*, March/April 1996. v. 53, p. 62.

[42] Litovkin, Viktor. The Nuclear Submarine that Luzhkov and Chubays Are Going To Board Will Surface in the 21st Century. Russia Prepares for Construction of New Class of Submarines. Moscow, *Izvestia*. October 25, 1996. Translated in FBIS-TAC-96-010.

and, according to some in Russia, it could take 50 years to finish even the first submarine if funding levels do not improve.[43]

Bombers and Bomber Weapons

Russia may also need to modernize its bomber fleet if it wants to retain a bomber component for its strategic forces. At the present time, most of the Soviet Union's Blackjack bombers and many Bear H bombers remain at bases in Ukraine. Russia and Ukraine have been negotiating a sale of these aircraft back to Russia, but they have been unable to agree on the terms of a deal.[44] If Russia eventually recovers these aircraft, it may lack the spare parts and maintenance funds needed to return them to service.[45] Blackjack bombers have long been plagued by maintenance and operational problems, and only six aircraft are currently operational in Russia.[46] As a result, according to press reports, Russia is developing a new long-range bomber to bolster its force in the 2005-2010 timeframe. In the meantime, it may upgrade the Bear and Blackjack bombers by deploying a new non-nuclear cruise missile.[47] This program might enhance the conventional capabilities of Russia's aircraft, and could be a response to Russia's new emphasis on regional conflict and to the lessons learned by watching U.S. bombers in the Persian Gulf War.

Reports indicate that Russia is also developing a new medium-range bomber to replace the Air Force version of the medium-range Backfire bomber. The Navy has already retired its older Backfires, but the Air Force may upgrade those in its fleet while it awaits delivery of the new aircraft.[48] If funding is tight, Russia may place a higher priority on this aircraft than on the long-range

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[43] Defense Workers Protest at Russian Wage Delays. Reuters, September 19, 1996. See also, Gavrilenko, Andrey. Yuriy Dolgorukiy Would Not Have Approved. At No Other Time in the 20th Century Has Russia Been Building So Few Ships. February 12, 1997. Translated in FBIS-SOV-97-031.

[44] Colonel General Volodymyr Antonets Believes That the Question of the Transfer of Strategic Bombers to Moscow Must Be Decided Not by the Military but by Politicians. Nezavisimoye Voyennoye Obozreniye, Moscow, February 15, 1997. Translated in FBIS-SOV-97-035.

[45] NRDC Nuclear Notebook. Russian (C.I.S.) Strategic Nuclear Forces, End of 1995. *Bulletin of the Atomic Scientists*, March/April 1996. p. 63.

[46] Comments attributed to Petr Deynekin, Commander-in-Chief of the Russian Air Force. Feature examines role of strategic aviation. Vesti newscast, Moscow Russian Television Network, April 5, 1997. Translated in FBIS-UMA-97-095

[47] Butowski, Piotr. Russia's Air Force Looks Beyond 2000. *Jane's Defense Weekly*, January 17, 1996. p. 29. See, also, NRDC Nuclear Notebook. Estimated Russian Stockpile, September 1996. *The Bulletin of the Atomic Scientists*. September/October 1996, p. 62.

[48] Butowski. Russia's Air Force Looks Beyond 2000. p. 29-30.

bomber because bombers have never played a significant role in Russian or Soviet nuclear forces. As a result, Russia may believe that the medium-range bomber would be better suited to the regional threats highlighted in Russia's recent military plans.

Deep Underground Command and Control Facilities

Russia continues to construct deep underground facilities that could protect its leadership during a nuclear conflict. The Soviet Union initiated many of these projects in the 1970s and 1980s, and Russia has proceeded with them in spite of their high costs and financial constraints in Russia's economy. One project, a huge underground military complex, is reportedly located at Yamanatau in the Ural Mountains. Neither Russian nor U.S. officials have specified that this facility is a command and control center, but it could serve that purpose because it would be able to withstand a nuclear attack.[49] Recent reports indicate that Russia has also continued to construct "a nuclear-survivable, strategic command post" at Kosvinsky Mountain; this may be the site where Russian officials would gather to implement Russia's nuclear employment plans. Russia may also be upgrading and expanding a dedicated subway system in Moscow that would evacuate leaders from the city to two bunkers, at Voronovo and Sharpovo, that are about 35-45 miles outside Moscow.[50]

Officials in the Clinton Administration do not believe these programs threaten the United States.[51] They note that money spent on these projects is not spent on offensive forces, which would pose a direct threat. They also point out that the United States has pursued its own programs to ensure "continuity of government" during a nuclear crisis. Additionally, the Administration has stated that these programs are not new and have not accelerated in the past few years. Russia may simply be completing efforts begun in the past, even if the need for the projects has diminished.

Some analysts, however, believe that Russia's continuing efforts to build defensive bunkers for leadership and command and control do pose a threat to the United States because they indicate that Russia continues to believe it might need to fight and win a nuclear war with the United States.[52] They also

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[49] Gordon, Michael R. Despite Cold War's End, Russia Keeps Building a Secret Complex. *New York Times*, April 16, 1996. p. 1.

[50] Gertz, Moscow Builds Bunkers Against Nuclear Attack. *Washington Times*, April 1, 1997; and Expert Says Report on Secret Bunkers in Moscow Partially True. Interfax. April 3, 1997.

[51] See, for example, the comments of Kenneth H. Bacon, Assistant Secretary of Defense for Public Affairs. DOD News Briefing, April 1, 1997.

[52] See the comments of Peter Pry in Gertz, Bill. Moscow Builds Bunkers Against Nuclear Attack. See also, Expert Says Report on Secret Bunkers in Moscow Partially True. Interfax. April 3, 1997.

believe that these projects show a misuse of scarce resources, given Russia's current economic condition, and argue that these resources would be better used to dismantle nuclear weapons and improve security at nuclear storage facilities.

Future Prospects For Russia's Modernization Programs

Although Russia continues to design and produce new strategic offensive nuclear weapons, most experts agree that these efforts differ sharply from those of the Soviet Union. It is pursuing a much smaller number of simultaneous programs than did the Soviet Union and each program is proceeding at a much slower pace than did Soviet modernization efforts.[53] For example, in 1991, the Soviet Union reportedly produced 175 strategic ballistic missiles. Between 1992 and 1993, the production rate for strategic ballistic missiles dropped by 50 percent, from around 70 to 35 total missiles. Some estimates indicate that Russia may now be producing fewer than a dozen new ICBMs each year.[54]

Although the improving relationship between the United States and Russia may have contributed to some of the slowdown in modernization, Russia's lack of economic resources is probably also a significant factor. Insufficient funding has already slowed the Topol-M ICBM modernization program and could impede Russia's efforts to construct new ballistic missile submarines. Russia may, however, continue to modernize its strategic offensive weapons, in spite of its economic difficulties. As was noted above, until Russia has the means to reform and modernize its conventional forces, it has placed a greater emphasis on nuclear deterrence in its military strategy. Hence, Russia may view these programs as essential to its efforts to maintain its superpower status and protect its national security.

NUCLEAR WEAPONS MAINTENANCE AND OPERATIONS

To remain confident in the reliability of its nuclear forces, Russia must maintain, test and train with the weapons in its arsenal. But reports in both the Russian and U.S. press paint contradictory pictures of the quality of Russia's nuclear forces. On the one hand, Russia has continued to test its

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[53] For example, General Eugene Habinger, Commander in Chief of the U.S. Strategic Command, stated "Ten years ago, if I were to list all the emerging strategic systems that the Russians were developing, there would be column after column after column. Today there are four systems. One of the four is doing well. The other three are not." See Aging weapons alone will prompt Duma's okay of START II: General. *Aerospace Daily*. v. 181, August 30 1996. p. 324. See also, the testimony of Walter B. Slocombe, Undersecretary of Defense for Policy, before the International Security, Proliferation and Federal Services Subcommittee of the Senate Governmental Affairs Committee. Hearing on the Future of Nuclear Deterrence. The Federal Document Clearing House, Transcript, February 12, 1997.

[54] Handler, Joshua. Working Paper on The Future of Russian Strategic Forces. Greenpeace. February 16, 1995. p. 2. See, also, Russian Defense Budget Continues Downward Spiral, Says CIA, DIA. *Arms Control Today*, v. 24, September 1994, p. 27.

nuclear weapons systems and to train the forces that operate these systems. On the other hand, many officials in Russia have complained that insufficient financing has led to low morale among the troops and lower than necessary levels of training and maintenance for the forces. Over time, these factors could undermine the effectiveness of Russia's nuclear forces.

Ongoing Tests and Training

In 1996 and early 1997, Russia conducted several tests of older weapons in its force structure. On June 6, 1996, Russia conducted a flight test of its 6-warhead SS-19 ICBM. Around 100 of these missiles may remain in Russia's force under the START II Treaty. Even so, it is important to note these missiles entered the Soviet force structure in the 1970s and may be reaching the end of their expected service lives. As a result, Russia used the flight test to evaluate the tactical and technical characteristics of this type of missile and to determine if its life could be extended past the year 2003. Russian officials announced that the test proved the missile remained reliable.[55] In late November 1996, Russia test-fired a 10-warhead SS-24 ICBM from a rail-mobile launcher.[56] This was the first test of this type of missile in more than 6 years. And, although all SS-24 missiles would be eliminated under the START II Treaty, the test demonstrated that the missiles remain reliable and could remain in the force if the United States and Russia never implement START II. In April 1997, Russia conducted a similar flight test with a 20-year old SS-18 ICBM. This test also was designed to confirm the operational performance of an older missile and to provide information about the possibility of extending the system's life. Officials in Russia declared the test a complete success.[57] Although these missiles would be banned under the START II Treaty, some may remain in service if START II does not enter into force.

In late June 1996, Russia conducted a nuclear staff exercise that included test launches of three SLBMs from three different ballistic missile submarines. Russian officials stated that this was the first time that Russia had launched missiles simultaneously from separate submarines and that the exercise was a successful check of the submarine fleet's combat readiness.[58] The officials also noted that the exercise had tested "new methods of combat management in coordination with other kinds of strategic forces and with Russia's ballistic missile early warning system." They further stated that missiles fired in the test

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[55] Russia Launches "Unique" Intercontinental Ballistic Missile. Interfax. June 6, 1996.

[56] Kemp, Ian. Russia: NATO expansion may prompt retargeting. *Jane's Defense Weekly*, December 4, 1996. p. 5.

[57] 20-year-old SS-18 test-fired from Baikonur. *Aerospace Daily*, v. 182, April 23, 1997. p. 134.

[58] Pacific Fleet Fires Ballistic Missiles in Nuclear Staff Exercise. Interfax. July 1, 1996.

had been in storage for a number of years, so the exercise demonstrated the continued readiness of Russia's older missile systems.[59]

Russia conducted a similar exercise in early October 1996, when its forces simultaneously launched an SS-25 ICBM, an SLBM, and two bomber-carried cruise missiles. These tests coincided with an exercise of Russia's central command and control authority; press reports stated that a signal was transmitted by satellite from Moscow to initiate the launch of all three nuclear systems. General Sergeyev, chief of the Strategic Rocket Forces, stated that the missile tests demonstrated reliability and technical readiness of his troops.[60]

In November 1996, the Strategic Missile Forces Military Council stated that its forces were capable of fulfilling their tasks. It concluded that the training and operational launches during the year had confirmed the high reliability of the missiles and command and control system and the high skills of the troops. The Council noted that all the missile flight tests were rated as excellent, 76% of units were assessed as good and the remainder were satisfactory.[61]

Russia has continued to test its strategic offensive forces during the first few months of 1997. For example, in January and February 1997, Russia conducted two separate tests of missiles launched from Delta III submarines; one of the submarines launched 2 missiles in a short time span. Officials stated that these tests were designed to verify the combat readiness of the missiles and to demonstrate that the crews retained their high level of combat training.[62] And, in March 1997, Russia launched 19 SS-N-20 SLBMs from Typhoon submarines (it had launched one missile in a similar fashion in late 1996). These tests were used to destroy the missiles, rather than to test their operational capabilities, but Russian officials also noted that these launches tested the capabilities of the Navy's forces and demonstrated the continuing reliability of the missiles.[63] This information may be useful if Russia retains Typhoon submarines under START II, but lacks the funds to backfit them with new SLBMs.

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[59] Two SLBMs fired in Russian Fleet Exercises. *Aerospace Daily*, v. 182, July 18, 1996. p. 91.

[60] These tests were a part of on ongoing military staff exercise -- known as Redoubt-96 -- that was designed to practice Russia's management of all of its armed forces and to check on the readiness of all kinds of troops. See Russia test fires cruise missiles -- agencies. Reuters. October 3, 1996.

[61] Baychurin, Ilshat. Strategic Missile Forces Remain Russia's "Nuclear Shield". Moscow, Krasnaya Zvezda. November 16, 1996. Translated in FBIS-Sov-96-224.

[62] Russian Arctic Sub Successfully Tests Ballistic Missile, Interfax. January 15, 1997; and Russian Nuclear Sub Makes Two Successful Missile Launches, Interfax. February 5, 1997.

[63] Russian Navy destroys SS-N-20s by low-level launches. *Aerospace Daily*, v. 182, April 7, 1997. p. 40.

Concerns about Manpower and Maintenance

General Sergeyev has stated that the Strategic Rocket Troops are as ready for combat as they were 10 years ago, and that they are capable of performing all their required missions.[64] Nevertheless, he and other Russian officials have highlighted some concerns about the effects that budget constraints are having on maintenance, manpower and morale in the land-based Strategic Rocket Forces. For example, General Sergeyev and Defense Minister Rodionov have both noted that ICBM units are undermanned, so the troops must stay on their posts in launch facilities for 13-15 days per month.[65] This has allowed the troops to maintain their combat readiness, but it has increased stress and fatigue, while reducing morale within the ranks. The troops have also faced a shortage of housing and lack of pay. In addition, they have had trouble procuring spare parts and fuel needed to operate mobile systems. This has created problems with routine servicing and maintenance of weapons systems.[66] Funding shortfalls have also reduced the number of tactical drills and exercises for the forces. In addition, more than half of Russia's ICBMs have exceeded their "warrantied" service lives, and, therefore, would have been retired if new missiles were available to replace them. But many remain in the force because low funding has slowed the production of the new Topol-M ICBM that will eventually replace them.[67]

Problems with aging and inadequate financing have also affected Russia's ballistic missile submarine force. As was noted above, Russia may lack the funds to modernize and maintain its older Delta and Typhoon submarines. As a result, only one or two Typhoon submarines may be operational at the present time. In addition, in late 1996, U.S. sources reported that Russia appeared to have stopped all major maintenance work on its existing classes of submarines and that it was reducing the number of deployed submarines so that it could devote additional resources to the construction of its new class of submarines.[68] According to some sources, Russia has already withdrawn more than 35 ballistic missile submarines from its fleet.[69] These funding restrictions have also

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[64] Commander: Strategic Missile Forces Guarantee Russian Security. Interfax. April 23, 1997.

[65] RUSSIA: Commander Says Missile Troops Guarantee of Russian Security, Interfax, December 14, 1996. Translated in FBIS-SOV-96-242.

[66] Commander: Any Conflict May Evolve into Nuclear War Today. Interfax. March 9, 1997. Translated in FBIS-TAC-97-068.

[67] Commander: Any Conflict May Evolve into Nuclear War Today. Interfax. March 9, 1997.

[68] Holzer, Robert. *Defense News*. September 9-15, 1996. p. 14.

[69] Ovcharenko, A.M. Russia's Strategic Naval Forces. *Problems and Prospects*. Moscow Vooruzheniye, Politika, Konversiya. December 26, 1996. Translated in FBIS-UMA-96-245-S.

sharply reduced the combat patrol rates for Russia's ballistic missile submarines. Most spend much of their time moored in their ports, although they can maintain their alert status and launch missiles from their bases.

Russia currently has perhaps 26 operational ballistic missile submarines.[70] Because most of these have a 25 year "warrantied" service life, only the newest Typhoon and Delta IV submarines (there are currently 6 Typhoon and 7 Delta IV submarines) may remain in service into the next decade if they receive the required maintenance.[71] Nevertheless, even if Russia constructs one new submarine each year between 2003 and 2010 -- a pace that some believe it cannot sustain -- its fleet may decline to 10-12 submarines, with only 800-1200 warheads on SLBMs, as new boats replace aging Typhoons.[72]

Finally, reports indicate that some of Russia's military bases, including those that house nuclear weapons, have been unable to pay their utility bills. In September 1995, electricity was cut at submarine bases, the Plesetsk ICBM test site, and Moscow's central command and control center for the Strategic Rocket Forces. In late September 1995, the Yeltsin government banned any more power cutoffs to military facilities, but the bills remain unpaid and energy disruptions continue to occur.[73]

COMMAND AND CONTROL OF NUCLEAR WEAPONS

Russia's Nuclear Command and Control System

Early Warning

Timely and accurate warning of emerging threats is the foundation of a robust, secure command and control system. Russia uses both orbiting satellites and radars and sensors located throughout its territory to monitor the possible launch of missiles towards Russian territory. This is the information that the leadership in Russia (or in the United States) would use to determine whether an attack might be underway.

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[70] NRDC Nuclear Notebook. Estimated Russian Stockpile, End of 1996. *The Bulletin of the Atomic Scientists*, v. 53, May/June 1997. p. 62.

[71] Ovcharenko. Russia's Strategic Naval Forces. *Problems and Prospects*. December 26, 1996.

[72] Maslyukov, Yuriy Dmitriyevich. Chairman of the Duma Committee on Economic Policy. Degradation of Russia's Nuclear Forces: This alarming Process Must be Kept in Mind Constantly in Discussing the Fate of the START II Treaty. Moscow, Nezavisimoye Voyennoye Obozreniye. February 5, 1997. Translated in FBIS-UMA-97-025-S.

[73] Emergency at Russian Nuclear Submarine Base Tass. Reuters, September 21, 1995. Russian Strategic Missile Troops Stationed at Plesetsk Denied Electricity Supply, Reuters, September 15, 1995. Russian Premier Bans Power Cutoffs to Military, Reuters, September 24, 1995.

High-Level Decisions

If the officers who man the early warning system detect evidence of a missile launch in the direction of Russian territory, they would notify key political and military leaders who would then decide whether Russia should prepare to launch its own nuclear weapons in response to the attack. These steps require both reliable communications channels and a clear identification of political and military leaders who will participate in the high-level decisions. Although the lines of communication include numerous transmitters, receivers, and channels -- a system known as "Kazbek" in Russia -- most analysts focus on the "nuclear suitcase" as the pinnacle of this communications structure. This is the briefcase that holds the communications set through which leaders at the highest levels would receive notice that an attack were underway, consult about the appropriate response, and transmit the codes needed to authorize the use of nuclear weapons.

According to most reports, three individuals -- the President, Boris Yeltsin; the Minister of Defense, and the Chief of the General Staff -- hold versions of the nuclear suitcase and all three would participate in the decision on whether to launch Russia's nuclear weapons.[74] Most descriptions of this process assume that the President must approve a decision to authorize the use of nuclear weapons and that the military leadership cannot initiate a strike without his concurrence. Nevertheless, some analysts believe that the military's central command post for the General Staff, at least during the Soviet era, may have had the ability to override or replace orders received from the political leadership.

The political process and participants who would authorize a nuclear response may have changed in recent years. For example, the Chief of the General Staff may have lost his access to a nuclear suitcase in the latter days of the Soviet Union, when the Chief's role in the abortive coup raised questions about the loyalty of many senior military leaders. And frequent changes in this position since 1991 may have left Russia's Chief of the General Staff out of this decision-making loop. Former Defense Minister Rodionov may also have lost his suitcase when he retired from the military and retained his government position

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[74] Several U.S. and Russian analysts have offered descriptions of the decision-making process for nuclear authorization. They differ in their assessments of whether the President, Minister of Defense, and Chief of the General Staff would have to concur in such a decision. See, for example, Blair, Bruce. The Logic of Accidental Nuclear War. Washington, D.C., The Brookings Institution, 1993. p. 72. For a more detailed description, see also, Blair, Bruce. Global Zero Alert for Nuclear Forces. Washington, D.C., The Brookings Institution, 1995. pp 46-51. See, also, Volkov, Oleg and Vladimir Umnov. In Whose Hands is the Button?: The President Has Authorized the Premier to Carry the Nuclear Suitcase For a While. Moscow, Ogonek. September 1, 1996. Translated in FBIS-SOV-96-212-S.

as a civilian.[75] If these changes remained in place, then the Russian president would have the sole responsibility for authorizing a nuclear attack. Although such a circumstance could relieve some concerns about rogue military commanders overruling the political leadership, it could also raise concerns about nuclear control in the event of a coup or illness that removed President Yeltsin from his position of authority.

Authorizing and Enabling a Nuclear Launch

Once they decide that a nuclear response is warranted, the key political and military leaders would transmit their decision to the commanders-in-chief of the nuclear forces, who would pass that decision along to the launch officers in the field and on board submarines. According to Alexei Arbatov, the Deputy Chairman of the Duma Defense Committee and an expert on Russia's nuclear force posture, "The nuclear button transmits presidential sanction for the use of nuclear weapons to command centers where general staff officers are on duty around the clock. On receiving the coded signal, officers, using appropriate codes, determine that it was the President who sent it, rather than someone else. When the authenticity is confirmed, duty officers open safes with their own codes and send them to missile launch pads and SSBNs."[76]

The procedures and technologies employed in this process are designed to minimize the risk of a nuclear launch without the proper authorization. For example, the military commanders would only open the communications channel used to transmit the authorization for a nuclear launch *after* they had received confirmation that Russia was under attack and considering a nuclear response.[77] In essence, then, they could not communicate launch orders to officers in the field unless the President and other key officials had decided a nuclear response might be needed. Troops in the field reportedly could not launch their missiles without proper authorization because Russian systems carry permissive action links (PALs) and other technical blocking devices that preclude the launch of missiles and arming of nuclear weapons without the proper codes. In their communications to the launch crews, the commanders-in-chief of the nuclear forces would transmit the *enabling* codes needed to unlock the PALs and to arm the missiles.[78]

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[75] Golotyuk, Yuriy. Russia's Nuclear Forces Control System Will Probably Change. Together with it, the Alignment of Forces is Changing in Top Military Leadership. Moscow, Segodnya. December 17, 1996. Translated in FBIS-SOV-96-244.

[76] Shchedrov, Oleg. Russian Nuclear Button Signals Presidential Power. Reuters, November 5, 1996.

[77] Blair, Bruce. Global Zero Alert for Nuclear Forces. p. 48.

[78] For a description of the specific launch procedures for Soviet/Russian strategic forces, see, U.S. Library of Congress, Congressional Research Service. *Nuclear Weapons in the Former Soviet Union: Location, Command and Control.* CRS Issue Brief 91144, by Amy F. Woolf, Updated Regularly. p. 10-11. See, also, De Andreis, Marco and Francesco Calogero. *The Soviet Nuclear Weapon Legacy*. Stockholm International Peace

Concerns about Russia's Command and Control System

Concerns about Russia's nuclear command and control system first surfaced during the 1991 coup and the subsequent collapse of the Soviet Union. At the time, many in the United States wondered who in the Soviet political and military leadership had the ability to authorize the use of nuclear weapons and whether a launch might occur, either by accident or at the bidding of a rogue commander, without authorization from the central command authorities in Moscow. Assurances from Moscow, in spite of the lack of hard knowledge in the West about the political and military participants in Russia's command and control system, have eased many of the early fears of accidental or unauthorized launch.

But concerns remain about the possibility that continuing financial and political pressures could eventually undermine Russia's command and control system. These were exacerbated in early 1997 when Russia's Defense Minister Rodionov noted that he was worried by "deteriorating reliability and stability in the command system of the strategic nuclear forces."[79] He said that Russia could soon pass a point when its missiles and nuclear systems would become unmanageable. In response to these concerns and at the request of President Yeltsin, Prime Minister Chernomyrdin inspected the command posts and concluded that Russia's nuclear weapons were under firm and effective command and control. But he did note that there could be long-term problems if continued shortfalls in funding stalled modernization.[80]

For some in the United States, Rodionov's statements recalled concerns about Russia's ability to maintain control over the *non-use* of its nuclear weapons; they speculated that the risk of accidental or unauthorized launch might increase.[81] Others understood Rodionov's statements as a warning that Russia might not be able to control the *use* of its nuclear weapons, i.e. that it might not have the ability to launch weapons when the central command structure authorized their use. Many saw the warning as a plea for added funds; if Rodionov raised concerns about Russia's ability to control its nuclear

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Research Institute. 1995. pp. 32-35.

[79] Rodionov Said "Powerless" over Disintegration of Army. Moscow, Interfax, February 7, 1997. Translated in FBIS-SOV-97-026.

[80] Dolinin, Aleksandr and Aleksandr Pelts. Nuclear Shield as Firm and Reliable as Ever. Russia's Government Head Viktor Chernomyrdin Has Visited the Strategic Missile Forces Central Command Post. Krasnaya Zvezda, Moscow. February 22, 1997. Translated in FBIS-SOV-97-038.

[81] Bykov, Robert. A Nuclear Launch May Happen Accidentally. *Komsomolskaya Pravda*. March 15, 1997. See also, Threat? What Threat? *Washington Times*. October 29, 1996. p. 16.

weapons, then the military might receive a larger budget for the modernization and maintenance of its command and control system.[82]

Russia's command and control system has come under increasing financial stress in recent years. For example, Defense Minister Rodionov noted in his statements in February 1997 that many of Russia's weapons and command and control systems would need to be modernized and replaced to remain effective in the future. Other Russian observers have voiced similar concerns about aging problems in Russia's command and control system. One analyst has noted that the "Kazbek" system -- the communications network used to transmit authorization codes from the political leadership to military commanders -- has been on active duty since 1983. It originally was intended to last only 10 years, but Russia's leadership has not provided the money needed for repairs or modernization. In addition, this analyst noted that many of the scientists and engineers who designed the system have left their research institutes due to a lack of funding and salaries, so there are few people left with the knowledge needed to repair the system.[83]

Another Russian military expert has said that "Russia's strategic missile system is currently in a state of full battle readiness and is functioning effectively. However, the failure to strengthen and modernize the system could mean that early in the next century a series of components, including the information infrastructure, will be in a critical state."[84] According to one observer, this stage has already been reached in some areas. He stated that "the missile troops' biggest headache is communications, the quality of which is often only a little better than the average telephone network in Russia." Instead of investing in repairs and improvements, the troops are devoting all their resources to security and weapons maintenance.[85]

Some have also focussed on weaknesses in Russia's early warning network. For example, Defense Minister Rodionov noted that the early warning system had deteriorated due to a shortage of new satellites needed to track an adversary's nuclear force. He stated that this had led to gaps in coverage that lasted several hours each day.[86] Others have also highlighted holes in Russia's

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[82] Gertz, Bill. Rodionov's Armageddon talk chalked up to angling for funds. *Washington Times*. February 8, 1997. p. 2. See also, Diamond, John. U.S. unable to assess status of Russia's nuclear weapons. Associated Press. April 29, 1997.

[83] Umnov, Vladimir. Who Will Repair the "Nuclear Suitcase"? Moscow, Ogonek. March 1, 1997. Translated in FBIS-SOV-97-060.

[84] Russian PM to Visit Strategic Rocketry Central Command Post. Interfax. February 19, 1997.

[85] Security at Ivanovo Nuclear Missile Base Examined. Vremya. February 15, 1997. Translated in FBIS-SOV-97-032.

[86] Rodionov Said "Powerless" over Disintegration of Army. Interfax, February 7, 1997.

ground-based early warning radars and space-based satellites, both because many had exceeded their "warrantied service life" without receiving the funds needed for modernization and because funds did not exist to produce and deploy new systems.[87] In addition, after the breakup of the Soviet Union, some radar stations, such as the Skrunda radar in Latvia, ended up outside Russia's territory in other former Soviet republics. This reduces Russia's control over their operations, maintenance, and modernization.[88]

Finally, political instability could undermine confidence in the security and reliability of Russia's nuclear command and control structure. This issue received a significant amount of attention in late 1996, when President Yeltsin prepared to undergo heart bypass surgery. At the time, it was not clear who would assume responsibility for the President's nuclear suitcase while he was under anesthesia. In the United States, such a responsibility would fall on the Vice President, first, then on other officials outlined in the line of succession to the President. But Russia does not have a similar line of succession. The Russian constitution states that the Prime Minister would become acting President if the President died or were incapacitated, but he would have to call a new presidential election within 90 days. It is not clear whether he would gain authority over the nuclear suitcase as acting President. As a result, shortly before his surgery, President Yeltsin signed a decree that passed authority for the nuclear suitcase to Prime Minister Chernomyrdin for the time when the President was under anesthesia. Russia still lacks a formal transfer protocol for nuclear authority if the President dies or becomes incapacitated.

IMPLICATIONS

At first glance, it may appear that the declining quantity and quality of Russia's nuclear forces and the weaknesses in its command and control network could contribute to a further reduction in the threat of nuclear war. If Russia cannot rely on its ability to detect a nuclear attack on its territory, identify the appropriate leaders who will assess that attack and develop a response, communicate a decision to respond with nuclear weapons to its forces in the field, and, finally execute those orders by launching its nuclear forces, then it might reduce its reliance on nuclear weapons as a guarantor of national security. Or, knowing about these weaknesses in Russia's nuclear forces, an adversary may alter its assessment of the likelihood that Russia could or would respond with nuclear weapons if attacked.

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[87] See, for example, Maslyukov, Yuriy Dmitriyevich. Chairman of the Duma Committee on Economic Policy. Degradation of Russia's Nuclear Forces: This alarming Process Must be Kept in Mind Constantly in Discussing the Fate of the START II Treaty. Moscow, Nezavisimoye Voyennoye Obozreniye. February 5, 1997. Translated in FBIS-UMA-97-025-S.

[88] Security at Ivanovo Nuclear Missile Base Examined. February 15, 1997.

But this scenario presumes that Russia will accept the decline in its nuclear deterrent without taking any steps to compensate for its weakness, a prospect that is by no means assured. While it is unlikely that Russia would be able to allocate sufficient sums of money in the near term to reverse this decline, it could seek other solutions to counteract the effects described above. Some of these solutions could weaken central control over Russia's nuclear weapons, increase the possibility of an unintended or unauthorized use of nuclear weapons, and increase the threat to U.S. national security.

For example, weaknesses in Russia's early warning network, such as the gaps in radar and satellite coverage, could reduce Russia's ability to identify and characterize potentially threatening events. In the current environment, with the improved relationship between the United States and Russia, it is extremely unlikely that Russia would face a coordinated nuclear attack. But it is possible that Russia might think that nuclear missiles were heading its way if it were unable to identify the source of an object in space or to accurately track the trajectory of a missile.[89] Under such a circumstance, Russia could choose not to respond to warnings unless it was certain the incident was a nuclear attack, or it could choose to respond to all warnings where the threat might be a nuclear attack. In the second case, Russia might raise its nuclear alert on the basis of incomplete information about a benign event. This type of response could result in an unintended escalation of alert rates between the United States and Russia and, possibly, an increased risk of nuclear launch.

Similarly, the age and technical limits of Russia's communications system could lead Russia to take steps that might weaken central control over nuclear weapons. As communications links age and wear out, Russian leaders might not be certain that troops in the field could receive the messages that would authorize the use of nuclear weapons and provide the enabling codes needed to launch those systems. Consequently, the central command authority could choose to disperse some of the needed codes during peacetime to relieve the pressure on the communications system during a crisis. This type of response would remove some of the safeguards against an unauthorized launch because the commanders in the field would need less information from the central authorities to employ their weapons. Hence, although these steps might increase the likelihood that a launch would occur when intended, it might also make it easier for commanders in the field to employ nuclear weapons without receiving proper or complete authorization from central authorities.[90]

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[89] This may have happened in 1995, after the launch of the Norwegian scientific rocket triggered a false alarm in Russia's early warning system. See, Blair, Bruce G. *Global Zero Alert for Nuclear Forces*. p. 47.

[90] In 1996, press reports indicated that the U.S. Central Intelligence Agency expressed concerns in 1991 about the possibility that some of these changes might have already occurred and that the commanders of the Strategic Rocket Forces and commanders on Russia's submarines may have acquired the ability to launch their missiles without receiving authorization from central political authorities. See Threat? What Threat? *Washington Times*, October 29, 1996. p. 16

The lack of clarity in Russia's political line of succession could also undermine confidence in central control over nuclear weapons. Because the nuclear suitcase serves as a symbol of political power and authority, the death or incapacitation of the President could generate an ad hoc scramble for power and control. Alternatively, without a clear civilian successor, control of Russia's nuclear weapons could fall to the military, without direction from the nation's political leadership. In either case, the risk of the an unintended nuclear attack might increase if the resulting struggle for power produced significant levels of instability and uncertainty.

Possible U.S. Responses

These scenarios raise the question of whether and how the United States should react to the declining quality of Russia's nuclear forces and its command and control structure. For example, the United States could stand by and do nothing, hoping that Russia responded to these weaknesses by reducing its reliance on nuclear weapons. Alternatively, the United States could encourage the Russians to take steps that would strengthen central control over nuclear weapons. For example, some have suggested that the United States and Russia share early warning data from U.S. satellites and sensors to enhance Russia's ability to detect threats and to reduce the likelihood that Russia would feel compelled to respond to false or incomplete data from its own early warning network.[91]

As another alternative, some analysts have offered suggestions for steps that both sides might take to step away from the nuclear "hair-trigger" and, therefore, reduce the threat that either side would launch an intentional or unintended nuclear strike.[92] Two of these proposals include removing nuclear weapons from a high state of alert and removing and placing in storage the nuclear warheads carried by deployed missile systems.

According to those who favor this idea, the United States and Russia could relieve the pressure on the Russian command and control system if the two nations agreed to remove their deployed nuclear forces from alert status.[93] At the present time, with a significant portion of their forces on a high state of alert (i.e. the forces are postured so that they can be launched in just a few minutes), both nations place a high premium on receiving, understanding, and responding to early warning information quickly. Both sides might believe that their weapons would be destroyed before they could use them if they tried to "ride-out" an attack by the other side. Advocates of this option believe that, if

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[91] The United State and Russia have, in the past, held preliminary discussions about this type of cooperation.

[92] See, for example, von Hippel, Frank. Paring Down the Arsenal. *The Bulletin of the Atomic Scientists*, v. 53, May/June 1997. p. 33-40. See also, Blair, Bruce G. *Global Zero Alert for Nuclear Forces.*

[93] Blair, Bruce G. *Global Zero Alert for Nuclear Forces.*

both sides removed their weapons from high alert, so that neither could launch on a moment's notice, then neither would have to fear that the other had just launched a surprise attack. And, if a surprise attack were not likely, then neither side would have to make a quick decision about how to respond. This would help the Russians address the weaknesses in their early warning satellites, because, with the reduced likelihood of a surprise attack, Russian leaders would have time to collect added data on a perceived threat before they authorized a, perhaps unnecessary, nuclear response. And it would help address weaknesses in the communications systems because the longer time available to assess and respond to threats would reduce the pressure on Russia to get messages to troops in the field quickly.

Some believe that the United States and Russia might also reduce the risks of inadvertent (and intentional) nuclear attacks if they not only removed their weapons from alert but also removed the warheads from the deployed weapons. The theory here is that it would take each side weeks or longer to put the warheads back on missiles, and, if each allowed the other to monitor activities around the warhead storage facilities, then both would have a significant amount of warning if the other sought to restore an operational missile force. While the warheads remained in storage, neither side would have to rely on early warning systems to detect missile launches from the other, because missiles would have no warheads on them, and neither would have to decide on a response or communicate with troops in the field quickly because the likelihood of a missile launch would be so low. On the other hand, many who oppose this idea have noted that it could make both the United States and Russia vulnerable to attack by terrorists or other nations with nuclear weapons. They contend that it would be far easier to destroy a nation's nuclear retaliatory force if all the warheads were concentrated in a small number of storage areas then if they were spread out on hundreds of missiles and aircraft. In addition, this type of deployment could be very destabilizing if it fueled a "rearmament race" when one or the other side detected evidence that the other had begun to restore warheads to missiles.

Hence, there is little agreement on what steps, if any, the United States should take to help Russia address the evident weaknesses in its nuclear force posture and command and control systems. Nevertheless, most experts agree that Russia will continue to experience severe economic pressures that could undermine its own confidence in the reliability of its nuclear arsenal and U.S. confidence in Russian control over those forces. For many, arms control offers a promising response. If the United States and Russia agree to reduce further the numbers of warheads on their deployed weapons systems, they might not only reduce the economic costs of maintaining and modernizing those weapons, but they might also eventually reduce their reliance on, and therefore, the threat from the remaining nuclear forces.

ARMS CONTROL AND THE FUTURE OF RUSSIA'S NUCLEAR FORCE STRUCTURE

STATUS OF ARMS CONTROL EFFORTS

The United States, Russia, Ukraine, Belarus, and Kazakhstan are all implementing the 1991 START I Treaty. This treaty requires each side to reduce its strategic offensive forces to no more than 6,000 accountable warheads on 1,600 strategic offensive delivery vehicles. Ukraine, Belarus, and Kazakhstan must eliminate all the launchers for strategic offensive delivery vehicles on their territories and return the nuclear warheads from those launchers to Russia. All the parties are required to complete the reductions mandated by this treaty by the end of the year 2001.[94]

The United States and Russia signed a second strategic arms reduction treaty, START II, in 1993. This agreement has not yet entered into force because the Russian parliament has not approved its ratification.[95] Under START II, the United States and Russia would each reduce their strategic offensive forces to between 3,000 and 3,500 deployed warheads, while eliminating completely their multiple warhead ICBMs and limiting their forces to no more than 1,750 warheads on SLBMs.[96]

The United States and Russia had initially agreed that they would reduce their forces to START II levels by the beginning of the year 2003. However, that date presumed that the treaty would enter into force shortly after it was signed in 1993. After the ratification process stalled, many in Russia argued that Russia did not have the time or money needed to eliminate hundreds of missiles and dozens of submarines in the remaining years before the treaty's deadline. As a result, during their summit meeting in Helsinki in March 1997, Presidents Clinton and Yeltsin agreed that both sides could take until the year 2007 to dismantle the ICBM launchers, submarines, and bombers eliminated by START II, as long as those systems were deactivated by the end of 2003. This change presumed that the two sides would also negotiate a third treaty, START III, that would reduce their forces to between 2,000 and 2,500 warheads on deployed strategic offensive weapons. Reductions to that level would also be completed by the end of 2007.

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[94] For a detailed description of the provisions in this Treaty see, *The START I and START II Arms Control Treaties: Background and Issues*. CRS Report 93-617F, June 30, 1993.

[95] For a description of the Duma's concerns with START II and other issues affecting its ratification, see U.S. Library of Congress. Congressional Research Service. *START II in the Russian Duma: Issues and Prospects*. CRS Report 97-359F, by Amy F. Woolf, March 14, 1997. Washington.

[96] *The START I and START II Arms Control Treaties: Background and Issues*. CRS Report 93-617F, June 30, 1993.

ALTERNATIVE ARMS CONTROL FUTURES

The prospects for the ratification of START II and the negotiation of START III remain uncertain. The United States has long insisted, and President Yeltsin agreed in Helsinki, that negotiations on START III would not begin until START II entered into force. This position generally reflects the strong support in the United States for the START II ban on multiple warhead ICBMs. If the nations move to START III without START II in place, this ban might fall aside. But many in Russia believe that START II is a bad deal for Russia and, therefore, they support a START III treaty that would replace, not supplement, START II. This position is, in part, a reflection of dissatisfaction with the START II ban on MIRVed ICBMs and other treaty provisions that some in Russia believe favor the United States.

If this impasse remains, START I would be the only treaty limiting U.S. and Russian strategic offensive forces. In this instance, both sides could seek to keep their forces close to the levels permitted by that treaty. Alternatively, the United States and Russia could agree to reduce their forces to START II levels, even if that treaty did not enter into force, so that they could gain some of the economic benefits of smaller force structures. In this instance, they might reduce to the START II level of 3,000-3,500 warhead without abiding by the treaty provision that bans MIRVed ICBMs. On the other hand, if the impasse is broken, the two sides could complete a START III treaty that would reduce their forces to between 2,000 and 2,500 warheads by 2007. In this instance, it is likely that the ban on MIRVed ICBMs would remain in place. The remainder of this report describes each of these three alternatives in more detail.[97] In each case, the report identifies an illustrative Russian force structure and reviews the possible implications of that force for U.S. security.

START I Implementation Without Further Reductions

Under START I, the United States and Russia must reduce their strategic offensive forces to no more than 6,000 accountable warheads on 1,600 strategic offensive delivery vehicles, with no more than 4,900 warheads on their ICBMs and SLBMs. As was described above, both sides have already eliminated hundreds of ICBM and SLBM launchers and heavy bombers as they implement this treaty. Neither side has ever specified what mix of weapons it would retain in a "START I" force, in part because both expected to continue on to START II levels without stopping at a START I force. Nevertheless, Table 2, below, presents an illustrative force for each nation that would be consistent with the limits in START I.

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[97] Although it is possible that START III would enter into force without a ban on MIRVed ICBMs, this report does not assess such an outcome as likely. First, Presidents Clinton and Yeltsin linked these two treaties together during their discussions in Helsinki, so, at this time, START II remains a prerequisite to START III. Second, even if START III negotiations began without START II in place, the United States could insist that the new treaty retain the ban on MIRVed ICBMs from START II.

The first force structure in this table assumes that Russia would retain many of its older weapons systems, including 154 SS-18 ICBMs and 105 SS-19 ICBMs. It also assumes that Russia would retain 8 of its older Delta III submarines and all of the Typhoon submarines that are in need of modernization at this time. The table also assumes that Russia succeeds in buying back the bombers that are currently based in Ukraine and in providing these aircraft with the spare parts and maintenance needed to return these aircraft to service. Each of these assumptions is inconsistent with information about the age and condition of some of Russia's forces; as was discussed above, Russian officials have stated that many of the ballistic missiles have passed the end of their service lives and the bombers are not even close to operational. However, as some of Russia's recent missile tests demonstrated, Russia could possibly extend the lives of some missiles with modest investments or an acceptance of lesser reliability.

Table 2: Illustrative Russian Forces Under START I

	Retain Older Weapons		Retire Older Weapons	
ICBMs	Launchers	Warheads	Launchers	Warheads
SS-18	154	1,540 (10 RVs on each)	0	0
SS-19	105	630 (6 RVs on each)	0	0
SS-24	46	460 (10 RVs on each)	46	460 (10 RVs on each)
SS-25 SS-27	400	400 (1 RV on each)	400	1,200 (3 RVs on each)
SLBMs				
Delta III	128 (8 subs)	384 (3 RVs on each)	0	0
Delta IV	128 (8 subs)	512 (4 RVs on each)	128 (8 subs)	512 (4 RVs on each
Typhoons	120 (6 subs)	1,200 (10 RVs on each)	120 (6 subs)	1,200 (10 RVs on each
Bombers				
Bear H	85	680 (8 wpns on each)	57	456 (8 wpns on each)
Blackjack	24	192 (8 wpns on each)	6	48 (8 wpns on each)
Total	1,190	5,998	757	3,876

On the other hand, Russia may not be able to maintain this force structure for any length of time. The second force shown on Table 2 assumes that Russia eventually retires older weapons -- such as the SS-18 ICBMs, SS-19 ICBMs and Delta III SSBNs -- and abandons the bombers in Ukraine. In this case, Russia's forces would slip well below START I levels by the middle of the next decade. To offset these losses, Russia could seek to produce a new MIRVed ICBM and to accelerate production of its new class of ballistic missile submarines to replace those that it had retired. But this may not be feasible without a significant increase in resources. As was noted above, accelerating the SSBN program may not be feasible with current levels of expenditures. And Russia may need to construct a new production facility to manufacture new MIRVed ICBMs; both its SS-18 and SS-24 ICBMs were produced at a facility that is now in Ukraine. But the costs of a new production facility could be prohibitive.

Alternatively, Russia could put 3 warheads on the only ICBM currently under production, the single-warhead Topol-M (SS-27). However, because Russia has already tested this missile with one warhead, it would violate the START I treaty if it followed this approach. In addition, even if it deployed several hundred 3-warhead missiles, Russia would still be left with fewer than 4,000 warheads on its strategic offensive forces.

Implications for the United States

Although the first force structure in Table 2 assumes that Russia would continue to deploy MIRVed ICBMs, it may not create any unanticipated threats for the United States. Without START II in place, the United States could also retain 6,000 warheads on a START I force, with 500 Minuteman III ICBMs, 50 MX ICBMs, 18 Trident submarines, and around 200 B-52, B-1, and B-2 bombers. The weapons systems in this force would not be as near the end of their service lives as many of the weapons in the Russian force. In addition, the United States would probably find it possible, although not preferable, to allocate the resources needed to maintain this force for several more years than Russia could. Hence, it appears likely that the United States is in a far better position than Russia to maintain its forces at START I levels.

START II Force Levels Without Treaty Ratification

As is evident in the discussion above, age and economics may move Russia's forces towards START II levels with or without a formal treaty in place. Consequently, the two nations could agree to reduce their forces to between 3,000 and 3,500 warheads even if the Russian Duma does not approve ratification of START II. This would constitute an informal arrangement that might not include all the provisions contained in the treaty. Table 3, below, displays two possible forces that Russia might deploy under these circumstances.

The first force on Table 3 assumes that the United States and Russia would observe all the provisions of START II, including the ban on MIRVed ICBMs. Russia would have to deploy 700 single warhead Topol or Topol-M ICBMs (it currently has around 360 in its force) and retain all 6 of its aging Typhoon

submarines to keep its forces near 3,500 warheads. It if could not afford these two programs, its forces would drop to less than 2,000 warheads. As an alternative, Russia could seek to retain perhaps 2 of its Typhoon submarines and it could deploy 400 Topol or Topol M missiles with 3 warheads on each missile. As Table 3 indicates, this force would put Russia at nearly 3,200 warheads, which is within the range permitted by START II. However, it includes a new MIRVed ICBM, which is not only inconsistent with START II, but, as was noted above, could also constitute a violation of START I.

Table 3: Illustrative Russian Forces at START II Levels

	With Ban on MIRVed ICBMs		Without Ban on MIRVed ICBMs	
ICBMs	Launchers	Warheads	Launchers	Warheads
SS-19	105	105 (1 RV on each)	105	105 (1 RV on each)
SS-25 SS-27	700	700 (1 RV on each)	400	1,200 (3 RVs on each)
SLBMs				
Delta IV	128 (8 subs)	512 (4 RVs on each)	128 (8 subs)	512 (4 RVs on each
Typhoons	120 (6 subs)	1,200 (10 RVs on each)	40 (2 subs)	400 (10 RVs on each
Bombers				
Bear H	55	880 (16 wpns on each)	55	880 (16 wpns on each)
Blackjack	6	96 (16 wpns on each)	6	96 (16 wpns on each)
Total	1,114	3,493	734	3,193

Implications for the United States

If the United States and Russia agreed to reduce their forces to START II levels without having the treaty enter into force, the United States could choose to deploy the same force that it planned for under START II. This force includes 500 single-warhead Minuteman III missiles, 14 Trident submarines with 5 warheads on each of their 24 D-5 (Trident II) missiles, 71 B-52 H bombers with between 8 and 20 cruise missiles on each bomber, and 21 B-2 bombers. Alternatively, the United States could retain some of its MIRVed ICBMs -- either by keeping 3 warheads on some Minuteman III missiles or by keeping some of its 10-warhead MX missiles, but these choices would put U.S. forces over the 3,500 warhead limit in START II.

Neither of the Russian forces displayed on Table 3 is likely to cause serious concerns for U.S. security; both assume that Russia would eliminate the heavily MIRVed SS-18 ICBMs that the United States has found most threatening to its deterrent forces. But the second force, where Russia deploys a 3-warhead version of its SS-25 and SS-27 ICBMs, could cause concerns because it is inconsistent with the START I Treaty. As a result, if the United States and Russia agree to reduce their forces to START II levels without ratifying that treaty, Russia's chosen force structure could undermine continued adherence with START I. This might not be consistent with U.S. efforts to pursue continued reductions in the threat posed by Russia's nuclear weapons.

Potential Limits and Force Structures under START III

As mentioned above, Presidents Clinton and Yeltsin agreed that they would negotiate a START III Treaty, reducing forces to between 2,000 and 2,500 warheads, after START II enters into force. President Yeltsin and others in Russia have long sought an agreement that would reduce forces to this level because it is consistent with the number of warheads Russia would retain if it retires its older weapons systems and does not construct significant numbers of new missiles or submarines. Hence, as Table 4 below shows, Russia could easily deploy a force within these proposed START III limits without developing a new MIRVed ICBM and without retaining all of its aging Typhoon submarines.

Table 4: Illustrative Russian Force Under Prospective START III Treaty

ICBMs	Launchers	Warheads
SS-19	105	105 (1 RV on each)
SS-25 SS-27	400	400 (1 RV on each)
SLBMs		
Delta IV	128 (8 subs)	512 (4 RVs on each)
Typhoons	40 (6 subs)	400 (10 RVs on each)
Bombers		
Bear H	55	880 (16 wpns on each)
Blackjack	6	96 (16 wpns on each)
Total	734	2,393

Implications for the United States

Although officials in the United States have apparently concluded that reductions to 2,000-2,500 nuclear warheads would not undermine U.S. security, they have not yet indicated how the United States would structure its forces

under such an agreement. Table 5, below displays two alternative forces that would be consistent with a limit of 2,500 warheads; one retains 14 Trident submarines and reduces ICBMs and bombers, while the other retains 500 ICBMs and 71 B-52 bombers, but reduces the Trident fleet to 10 submarines.

As these tables demonstrate, START III could leave a significant discrepancy in U.S. and Russian SLBM warheads. Russia's force could include fewer than 1,000 SLBM warheads and the U.S. force could include more than 1,300 SLBM warheads if the United States retains 14 Trident submarines. Many in Russia would like the treaty to impose deeper reductions on U.S. SLBM warheads to eliminate this discrepancy. As a result, Russia could propose that START III also reduce the limit on SLBM warheads from the START II level of 1,750 to perhaps 1,000-1,250 warheads. This restriction could force the United States to select the second force on Table 5, with only 10 Trident submarines. Many in the U.S. defense establishment have resisted a reduction to 10 Trident submarines because this would concentrate the whole fleet at one base and could sharply reduce the number of warheads at sea at any one time. Others, however, including some in the U.S. Navy, believe that the United State should reduce to 10 Trident submarines because this would reduce operating costs and eliminate the need to spend billions of dollars to backfit older submarines with the new D-5 Trident II missiles. Congress and the Department of Defense are likely to take a closer look at these issues if the United States and Russia begin START III negotiations in the near future.

Table 5: Illustrative U.S. Forces under a Prospective START II Treaty

	With 14 Tridents		With 10 Tridents	
	Launchers	Warheads	Launchers	Warheads
Minuteman III	350	350 (1 RV on each)	500	500 (1 RV on each)
Trident	336 (14 subs)	1,344 (4 RVs on each)	240 (10 subs)	960 (4 RVs on each
B-52H	60	490 (8 wpns on each)	71	568 (8 wpns on each)
B-2	20	320 (16 wpns on each)	20	320 (16 wpns on each)
Total	766	2,494	831	2,348

CONCLUSION

The preceding discussion indicates that, although Russia continues to maintain a sizeable nuclear arsenal, the quantity and quality of its forces have declined since the demise of the Soviet Union. Arms control and economic pressures have led to the elimination of hundreds of deployed missiles and bombers that had carried thousands of nuclear warheads. Testing, training, and modernization all continue, but these efforts have slowed as well. As a result, although some continue to express concerns about the pace and direction of Russian nuclear force modernization, many analysts have focused on the potential implications of weaknesses in Russia's nuclear force structure and command and control assets. These problems could introduce new threats and risks of unintended launch if Russia continues to raise the profile of its nuclear weapons in its foreign and defense policy. On the other hand, these weaknesses, and Russia's apparent inability to invest considerable sums of money in its nuclear forces, could strengthen interest and improve the prospects for the further reductions in U.S. and Russian strategic offensive nuclear weapons through START II and a prospective START III Treaty.