CHAPTER ONE

Nuclear Arms Control at a Crossroads

Nuclear arms control is at a crossroads. The old regime has been assaulted by the degradation of Russia's nuclear command and control and early warning network; a standstill in the development of U.S.-Russian cooperation on the securing and safety of nuclear weapons and fissile material stockpiles; China's ongoing development of strategic nuclear forces; new threats of nuclear proliferation from South Asia and North Korea; and a gathering opposition in Russia and the United States to a continuation of negotiations on strategic arms reductions that led to the START I and START II agreements.

The Danger of Accidental, Unauthorized, Mistaken Nuclear Launch

There is growing apprehension among experts that Russia's command, control, and intelligence system, including its network of radar installations for warning of a missile attack, is deteriorating in ways that could jeopardize the ability of the country's central authority to control nuclear weapons. This is deeply worrisome because U.S. and Russian command and control systems could interact in dangerous and unstable ways, given that both the United States and Russia maintain and regularly exercise a capability to launch on warning thousands of nuclear warheads after a missile attack is detected but before the incoming warheads arrive. The United States could launch approximately 2,700 strategic warheads within minutes; Russia 2,100. Even after the full implementation of the START I and START II Treaties, the United States would still be able to launch more than 1,600 warheads and Russia at least several hundred within a few minutes of an order to do so (see the tables at the end of chapter 7).

The early warning and nuclear release procedures for U.S. and Russian strategic nuclear missiles require a response time of fifteen to thirty minutes, allowing as little as three or four minutes for assessing attack information, and another three or four for top-level decisionmaking. Russia evidently initiated the early phases of the launch-on-warning procedures in January 1995 when the launch of a U.S. scientific rocket from Norway triggered a false warning of attack. This led to activation of President Boris Yeltsin's nuclear suitcase, an emergency telecommunications conference of the president and his nuclear advisors, and an alert broadcast to missile-launch control posts.

U.S. and Russian launch-on-warning postures are maintained for various reasons. First, their nuclear war plans are dominated by thousands of time-urgent military targets, particularly nuclear forces and associated command and control posts. Second, intercontinental ballistic missiles (ICBMs) in fixed silos or on mobile launchers in garrison and pier-side submarine-launched ballistic missiles (SLBMs) are vulnerable, which creates a strong incentive to fire them before they could be pulverized by incoming warheads. Finally, the command, control, and communications networks are themselves vulnerable, increasing pressures to use nuclear weapons early while the systems are still intact.

The only certain way to move the United States and Russia away from day-to-day reliance on launch on warning is to verifiably remove from alert as many nuclear weapons as possible, especially those that are vulnerable to attack. This de-alerting of nuclear forces is a centerpiece of our deep cuts program outlined later.

The Decline of Russia's Nuclear Forces

Many of Russia's nuclear weapons, both strategic and tactical, are approaching the end of their projected lifetimes, and the country's ability to refurbish them or to produce a new generation of weapons is increasingly in doubt. In an appendix to this book, Alexei Arbatov, a member of the Russian Duma and one of the most knowledgeable Russian nuclear weapons experts, projects the rapid decline of Russian nuclear forces over the next ten years and beyond under a variety of assumptions. Overall, it is clear that Russia will be unable to deploy more than about 2,000 strategic warheads by 2010 under a START II constraint that requires it to dismantle its multiple-warhead, silo-based intercontinental ballistic missiles, although START II allows

up to 3,500 deployed warheads. (The START agreements are discussed more fully in the next section.) If its present very low deployment rate of new missiles and inadequate maintenance capability for existing forces persist, Russia would probably have to reduce its force to fewer than 600 total strategic warheads by 2010.[1]

The situation with respect to tactical nuclear weapons is similarly dramatic. Again referring to Arbatov, in 1991 the Soviet Union had about 22,000 tactical nuclear warheads. At present Russia probably has fewer than 4,000, most or all in military depots. If, as Arbatov believes, the manufacture of new weapons is proceeding very slowly, it is likely that Russia will have, after 2003, at most 1,000 tactical nuclear warheads, about the same number as the United States.

Despite this looming obsolescence of Russian forces (and, on a somewhat longer timetable, U.S. forces as well; see note 1), development and production of new nuclear weapons by the United States and Russia is at a virtual standstill. Russia began deployment in 1998 of a new ICBM, the SS-27, a single-warhead missile with both mobile and silo-basing options, to replace its SS-25 single-warhead missile. In 1996 it began construction of a new ballistic missile submarine, although this work is proceeding very slowly. Development work has commenced on a new solid-propellant missile to be deployed on the new submarines.[2] And Russian military leaders talk vaguely about a new strategic bomber sometime in the next decade. That is it. Although the United States is modernizing its present systems, it has no entirely new strategic weapon system in assembly. "For the first time since the beginning of the Cold War, the assembly lines for submarines, missiles, and bombers are largely idle."[3]

1. U.S. forces also will eventually face obsolescence. In the spring of 1998 the U.S. Strategic Command released a viewgraph titled "The Brick Wall" that showed schematically the expected lifetimes of U.S. and Russian strategic weapons. Although the schematic did not label the weapon systems, it is possible to decode the figure, as was done by Chuck Ferguson of the Federation of American Scientists. The figure with Ferguson's decoding indicates "rust-out" dates for U.S. weapons as follows: Trident submarines and missiles, 2023 (subsequently increased to 2040); B-52 bombers, 2033; B-2 bombers, 2040; Minuteman III missiles, 2025. Estimated rust-out dates for Russia are also given, but in light of comments by Arbatov and other Russians, they may assume an unrealistic longevity. They are as follows: Delta III submarine, 2006; Typhoon submarine, 2014; Delta IV submarine, 2015; Bear bomber, 2015; Blackjack bomber, 2020; SS-19 ICBM, 2006; SS-24, 2005; SS-18, 2012; SS-25, 2015; and SS-27, 2030. Charles Ferguson, Federation of American Scientists, private communication, June 1998.

2. Paul Podvig, "The Russian Strategic Forces: Uncertain Future," *Breakthroughs*, Security Studies Program, Massachusetts Institute of Technology (February 1998).

3. William Arkin, "What's 'New'?" *Bulletin of the Atomic Scientists* (November-December 1997).

One could argue that the decline in Russian forces and the pause in the development of new weapons reduce the urgency for the United States to seek agreed reductions in nuclear weapons. But this view is short-sighted. Although Russia's current economic crisis does not realistically allow significant deployment of new weapons, economic recovery and a worsening of U.S.-Russia relations could in the future spur Moscow to undertake a new round of nuclear arms production. By 2000, with the first enlargement of NATO mostly implemented, a second wave of candidates, including the Baltic states, might be pressing for admission. Russia may also be faced by then with a U.S. decision to deploy a nationwide ballistic missile defense system. Both developments would increase political pressures on Russia to reinforce its nuclear deterrent.

In any case, given the long gestation required to develop and deploy new strategic weapon systems, Russia very soon, and the United States not long after, will have to begin planning their next generation of weapons. The United States, for example, is already investigating a host of technologies for a next generation of ballistic missile submarines, reentry vehicles, ICBMs, and submarine-launched ballistic missiles. It also has an active "stockpile stewardship" program to maintain capabilities in the national weapons laboratories that could lead eventually to the development of new nuclear warheads.[4]

U.S. policy at present is to hedge against the eventuality of a resurgent and hostile Russia by maintaining a large nuclear arsenal with a capacity for relatively rapid expansion if necessary. It would be far wiser for Washington to catch the moment of decline in Russian nuclear forces to secure binding U.S.-Russian agreements for irreversible deep cuts in nuclear arms.

U.S. and Russian Cooperation on Nuclear Security

The state of cooperative U.S.-Russian programs to secure and dispose of weapons and fissile material in Russia is also at a crossroads, with formal negotiations on transparency in warhead dismantlement and warhead and fissile-material storage at a standstill, but with enough work now done at a technical level to allow rapid progress in the negotiations if there is a political decision to move forward.

The dangers of diversions of nuclear weapons and materials in Russia

4. C. E. Paine and M. G. McKinzie, "Does the U.S. Science-Based Stockpile Stewardship Program Pose a Proliferation Threat?" *Science and Global Security*, vol. 7, no. 2 (1998).

are recognized by the Russian government, which has taken steps to strengthen security. It has consolidated stocks of tactical warheads and warheads removed from missiles and bombers, once dispersed over several hundred sites, into about eighty sites.[5] And it is dismantling excess and obsolete warheads.

The United States is providing vital assistance in upgrading the security of fissile materials and warheads. The cooperative effort includes both government-to-government programs, in which technical and financial assistance are channeled to Russia through formal agreements between U.S. and Russian government agencies, and lab-to-lab programs in which the critical cooperation is directly between U.S. and Russian national laboratories. Modern material protection, control, and accounting systems are now being installed in virtually all Russian facilities where weapons-usable materials are used for nonmilitary purposes and in many other facilities as well, including weapons design labs. Excess weapon-grade uranium is also being blended down to the low enrichment used in power reactor fuel and sold to the United States. With assistance from the U.S. Cooperative Threat Reduction (Nunn-Lugar) program under which the United States provides financial support for disarmament efforts in the former Soviet Union, a high-security storage facility for excess fissile material recovered from weapons is under construction near Chelyabinsk 65, a once closed nuclear weapons manufacturing city in the Ural Mountains.

During 1994–95 the United States proposed a transparency and irreversibility regime that would include U.S.-Russian exchanges of detailed information on aggregate stockpiles of nuclear warheads and fissile materials, reciprocal inspections to confirm the stockpiles of highly enriched uranium and plutonium recovered from nuclear weapons, cooperative measures to confirm reciprocal declarations of fissile material stocks, and exchanges of fissile material production records and visits to production sites. A U.S.-Russian working group was established to examine these ideas, but Russia cut off negotiations in November 1995. (The failure of the transparency negotiations is discussed in chapter 9.)

It is critical that Russia and the United States continue to move steadily and in parallel to eliminate most or all tactical and strategic warheads removed from deployment and to embrace a transparency regime that will provide greater assurance to each other and to the international community that the nuclear weapons and materials are secure.

5. Department of Defense, *Proliferation: Threat and Response* (November 1997), p. 43.

The Future of Chinese Nuclear Forces

China has relatively few nuclear weapons compared with the United States and Russia, but it is unlikely to remain content with this disparity. It will also have to decide how to respond to possible U.S. deployment of a national ballistic missile defense or high-altitude theater defenses that could be redeployed as national defenses. Either could bring into question the deterrent value of its small strategic missile force. Although resources that can be devoted to new weapons systems are still limited in China, in the long run, given its rapidly growing economy, such constraints may weaken.

A worrisome sign is an apparent rise of interest among Chinese strategists in concepts introduced by the United States and Russia during the height of their cold war confrontation, including counterforce options and even the development of launch-on-warning capabilities.[6] China today does not have the capabilities to target a significant fraction of U.S. or Russian nuclear forces and apparently has kept its nuclear forces essentially de-alerted. But it is believed to have used its final nuclear tests during 1994–96 to develop more compact warheads, which could be used either to equip existing missiles with multiple warheads or to make possible a transition from large ICBMs and intermediate-range ballistic missiles to smaller, single-warhead, solid fuel mobile missiles.

Whether a U.S.-Russian program of deep reductions and adherence to the Anti-Ballistic Missile Treaty would be sufficient to get China to formally cap its forces at current levels is unclear, but such a program appears to be an essential precondition for it to do so and a precondition for its eventually joining an arms reduction regime.

The Shaky Nonproliferation Regime

The international community has responded to the Indian and Pakistani nuclear tests by demanding that the testing moratorium informally adopted by the two countries be converted into a formal obligation under a Comprehensive Test Ban Treaty (CTBT) and that the two countries not deploy their nuclear weapons. It has also pressed them to enter into negotiations on a Fissile Material Cutoff Treaty to ban production of highly enriched

6. Alastair Ian Johnston, "China's New 'Old Thinking': The Concept of Limited Deterrence," *International Security*, vol. 20 (Winter 1995–96), pp. 5–42.

uranium and plutonium for weapons. India and Pakistan have now agreed to participate in negotiations on a cutoff. Immediately after its tests, India indicated a willingness to be similarly forthcoming on the CTBT but soon reverted to its demand that it be coupled to commitments by the nuclear weapon states to eliminate their nuclear weapons by a specified date, a linkage that most of the charter nuclear weapon states are not willing to accept.

It is too early to know how far negotiations to include India and Pakistan in a test ban and cutoff will go, but it is clear that India certainly and Pakistan probably will insist on being treated as members of the nuclear weapons club. With Iran and Iraq waiting in the wings (Israel informally joined the club long ago), the international community is naturally reluctant to do so.

A program of deep cuts in nuclear weapons, such as the one put forward in this book, could provide a way out of this impasse by making it more credible that final negotiations on nuclear disarmament will not be put off indefinitely. And because of the end of the cold war and the unprecedented support for nuclear disarmament among senior retired military officers and ministers in the United States, Russia, and elsewhere, for the first time in many years very deep cuts in nuclear weapons forces appear politically realistic. The following section summarizes briefly the recent history of nuclear arms control, which for all its shortcomings has nevertheless prepared the ground for a deep cuts program.

The Interrupted Revolution in Nuclear Arms Control

From 1986 to 1992 the United States and the Soviet Union (and, in the last stage, Russia) took dramatic initiatives to reduce the dangers of nuclear war. In December 1987 they signed the Intermediate Nuclear Forces (INF) Treaty, which eliminates all ground-launched missiles with ranges between 500 and 5,500 kilometers. They followed this success by completing and signing START I in July 1991 and in May 1992 negotiating the Lisbon Protocol to START I, which committed Belarus, Kazakhstan, and Ukraine to eliminate the strategic nuclear weapons left within their territories after the breakup of the Soviet Union. In January 1993 the United States and Russia signed START II. This treaty has not yet been ratified by Russia, but if it eventually enters into force, it will reduce U.S. and Russian actively deployed strategic nuclear warheads to roughly one-third of their 1990 levels by 2003 (box 1-1).

Along with the START negotiations and in the wake of the August 1991

Box 1-1. START I and START II

START I is a multilateral treaty between the United States, Russia, Ukraine, Kazakhstan, and Belarus.[1] It limits the United States and Russia to 1,600 strategic nuclear delivery vehicles each and places a ceiling on each country of 6,000 "accountable" warheads.[2] It also requires Russia to limit the number of its heavy ICBMs in fixed silos to half the number possessed by the former Soviet Union. And it requires Ukraine, Kazakhstan, and Belarus to become free of nuclear weapons, which they have.[3] The reduction of weapons called for under START I is to be completed seven years after the treaty entered into force (that is, by December 2001). Currently, all the parties are ahead of schedule. When completed, START I will have accomplished a 30 to 40 percent reduction in the strategic nuclear arsenals deployed at the time of the treaty signing.

START II is a bilateral treaty between the United States and Russia.[4] Its main elements are a ban on all land-based, multiple-warhead ballistic missiles by January 1, 2003, with an overall ceiling on deployed strategic warheads of 3,500 by 2003, and a limit on sea-based ballistic missile warheads of 1,750. START II, which is to be implemented simultaneously with START I, would reduce the deployed strategic offensive arsenals of the United States and Russia by roughly two-thirds compared with the level at the beginning of the START process. START II was ratified by the U.S. Senate in January 1996, but it has not yet been ratified by the Russian Duma.

1. *The START Treaty*, report of the Senate Committee on Foreign Relations (Government Printing Office, September 1992).

2. START I attributes an agreed number of accountable warheads to a weapon system for purposes of counting toward the maximum aggregate limits provided for in the treaty, whether or not the system actually carries that number of warheads. The biggest disparity between the treaty's accounting and reality involved strategic bombers not equipped to carry long-range cruise missiles; each bomber was counted as carrying only one accountable warhead, although it could actually carry sixteen. In START II, bombers have attributed to them the maximum number of warheads that they are actually equipped to carry.

3. Ukraine completed its nuclear disarmament in June 1996 when its remaining strategic nuclear warheads were loaded on a train and sent to Russia for destruction. Kazakhstan completed its shipment of nuclear weapons to Russia in 1995; Belarus completed its by the end of 1996. "START I Aggregate Numbers of Strategic Offensive Arms as of July 1, 1996," U.S. Arms Control and Disarmament Agency release, October 2, 1996.

4. U.S. Arms Control and Disarmament Agency, *Treaty between the United States of America and the Russian Federation on Further Reduction and Limitation of Strategic Offensive Arms—START II*, January 3, 1993.

Moscow coup, Presidents George Bush and Mikhail Gorbachev took parallel actions to remove most tactical nuclear weapons from deployment. These unilateral but reciprocal actions resulted in all the Soviet Army's short-range nuclear weapons being relocated to storage sites within Russia by June 1992, the denuclearization of the U.S. and Soviet Armies, the removal to storage of all nuclear weapons from U.S. and Russian surface ships and attack submarines, and the dismantling of a significant fraction of the warheads withdrawn from deployment.[7]

The United States and Russia also took significant steps to accelerate the pace of the START I reductions by deactivating the nuclear weapons that were to be eliminated. The United States took 450 Minuteman II missiles off alert by removing the launch keys from their underground control posts and installing pins in each missile silo to physically block the possibility of first-stage rocket motor ignition. It also took all strategic bombers off alert and unloaded their warheads to storage in nearby depots. Russia responded by announcing that it would deactivate 503 intercontinental ballistic missiles and pledging to keep its bomber force at a low level of readiness. Both countries also took off alert the ballistic missile submarines that were to be retired by the START I Treaty.

Since 1995, however, the pace of bilateral nuclear arms reductions has slowed. In part this was due to the unwillingness of the Russian Duma to ratify START II. The Duma was reluctant first because START II requires

7. As announced by Bush and Gorbachev, the United States would withdraw all nuclear artillery shells and all nuclear warheads for short-range ballistic missiles to the United States. These and any similar warheads stored in the United States would be dismantled and destroyed. All tactical nuclear weapons, including nuclear-armed cruise missiles, would be withdrawn from U.S. surface ships and attack submarines. Nuclear weapons associated with land-based naval aircraft also would be removed. Many of these weapons would be dismantled and destroyed and the remainder placed in secure central storage areas. All strategic bombers would be removed from day-to-day alert and their weapons returned to storage areas. All ICBMs scheduled for deactivation under START I would be taken off alert status. The single-warhead ICBM would be the sole remaining U.S. ICBM modernization program; certain other nuclear weapon programs would be terminated. President Bush called on the Soviet Union to take comparable although not identical measures. "White House Fact Sheet," September 27, 1991, published in *NATO Review*, no. 5 (October 1991).

All Soviet nuclear artillery ammunition and nuclear warheads for tactical missiles would be destroyed. Nuclear warheads of antiaircraft missiles would be removed from the army and stored in central bases; part of them would be destroyed. All nuclear mines would be eliminated. All tactical nuclear weapons would be removed from surface ships and multipurpose submarines. These weapons, as well as weapons from ground-based naval aviation, would be stored and part would be destroyed. *Novosti* report of President Gorbachev's televised address of October 5, 1991, published in *Survival*, vol. 33 (November-December 1991).

that Russia dismantle by 2003 all its multiple-warhead ICBMs, except for 105 SS-19 missiles, which must be downloaded to one warhead each. This would leave the country about 1,000 warheads below the START II ceiling. However, the Helsinki Summit, which established a framework agreement for START III, may have effectively addressed this Russian concern.

Second, with the elimination of its multiple-warhead ICBMs, Russia will be unable to match the U.S. capability under START II to load stockpiled warheads onto missiles and bombers that are not themselves eliminated under the treaties. By reloading 500 Minuteman III ICBMs with 3 warheads each (up from the START II limit of 1 warhead), reloading back from 5 to 8 warheads on each of the 336 Trident II submarine-launched ballistic missiles, and reconverting B-1B bombers to nuclear missions, the United States would be able to regenerate a strategic force roughly double that permitted by START II. By contrast, Russia's principal hedge would be to reload from 1 to 6 warheads each its 105 remaining SS-19 missiles.

Perhaps most important, NATO's decision to expand eastward into central Europe, ratified in the spring of 1998, has been invoked by some members of the Duma as political grounds to oppose ratification of START II. The NATO/Russia Founding Act, signed on May 27, 1997, sought to reassure Moscow that the members of NATO had "no intention, no plan, and no reason to deploy nuclear weapons on the territory of new members, nor any need to change any aspects of NATO's nuclear posture or nuclear policy—and do not foresee any future need to do so."[8] But this reassurance has not completely allayed Russian concerns, especially among Russian hardliners who denounced the agreement at Paris as a complete collapse in the face of Western aggression and the NATO expansion itself as the aggressive action of a hostile military bloc. Even if START II is soon ratified, the subject of NATO expansion is sure to remain active as long as there is a prospect of membership for the Baltic States. According to Alexei Arbatov, NATO expansion is "universally perceived in Russia (by some with grief, by others with malevolence) as a major defeat of Moscow's policy of broad partnership with the West. It is considered a great setback for Russian democrats, whose domestic political positions, commitments, and reform plans are largely predicated on such cooperation."[9]

8. *Founding Act on Mutual Relations, Cooperation, and Security between NATO and the Russian Federation*, Paris, May 27, 1997.

9. Alexei Arbatov, "As NATO Grows, START 2 Shudders," *New York Times*, August 26, 1997.

Box 1-2. Helsinki Summit on the START III and ABM Treaties

At their summit of March 21, 1997, Presidents Bill Clinton and Boris Yeltsin reached an understanding that START III will establish by December 31, 2007, a ceiling of 2,000–2,500 strategic nuclear weapons for each of the parties. They also agreed that START III will include measures relating to the transparency and destruction of nondeployed inventories of strategic nuclear warheads.

To deal with imbalances in U.S. and Russian post–START II forces, they further agreed to extend the START II deadline for eliminations to the START III deadline of December 31, 2007, but agreed that all systems scheduled for elimination under START II would be deactivated by December 31, 2003. In addition the presidents agreed to explore measures relating to limitations on long-range nuclear sea-launched cruise missiles and tactical nuclear systems.

Finally, they reaffirmed their commitment to the Limitations of Anti-Ballistic Missile Systems (the ABM Treaty), but President Yeltsin accepted the U.S. view that effective theater missile defenses (TMD) were necessary and agreed that any ground-based missile defense system not tested against a target with a speed exceeding 5 kilometers per second or a range exceeding 3,500 kilometers would be regarded as a TMD system and exempt from any ABM Treaty limits. However, the subsequent TMD demarcation agreement concluded in September 1997 only stated that TMD systems with interceptors with speeds less than 3 kilometers per second that obeyed this testing limit would be compliant, leaving the compliance of higher-speed systems unresolved. (See chapter 5 for discussion of these systems and the meaning of the demarcation of TMD systems).

Nuclear reductions also slowed because a go-slow approach was adopted in 1994 as a result of the U.S. Defense Department's Nuclear Posture Review (NPR). The NPR recommended that Washington delay making any commitments to post–START II reductions, a recommendation later endorsed in a presidential decision directive. (The internal bureaucratic struggle that shaped the NPR is discussed in chapter 12.)

This policy of delay began to change in late 1996 as the United States considered commiting to further reductions as a way to encourage Duma ratification of START II. At the March 1997 Helsinki Summit, President

Clinton committed to a follow-on START III agreement that would reduce the START II limit of 3,500 deployed strategic warheads to 2,000–2,500 by the end of 2007 (box 1-2). However, the United States is refusing to negotiate START III before the Duma ratifies START II.