Presidents Obama and Dmitry Medvedev discuss replacement treaty to reduce nuclear arms at APEC summit in Singapore

AP Images (RIA-Novosti, Mikhail Klimentyev, Presidential Press Service)

Post-START, Re-START and New START

DEFOGGING RUSSIAN-AMERICAN STRATEGIC NUCLEAR ARMS CONTROL

By STEPHEN J. CIMBALA

The accomplishment of a post–Strategic Arms Reduction Treaty (START) I nuclear arms reduction agreement by Russia and the United States calls to mind a Chinese character that stands for both opportunity *and* danger. Post-START success opens the door to further reductions in both states' nuclear arsenals, and it also creates a possible driver for U.S. and Russian leadership on nuclear nonproliferation. Danger lies in the expectation that post-START political or military success follows automatically from good intentions or less frosty diplomatic demarches.

Nuclear arms control, like strategy in general, is driven by politics—especially the high politics of state demands for power, prestige, and security. Therefore, the follow-

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ing discussion proceeds in two steps. We first consider the larger frame of political context for post-START restart. In a second step, we apply statistical analysis to establish boundaries on the possible, as opposed to the improbable or impossible. Arms control, like all policy issues, suffers from its vulnerability to claims of extremity, apart from any empirical referents or supportive context.

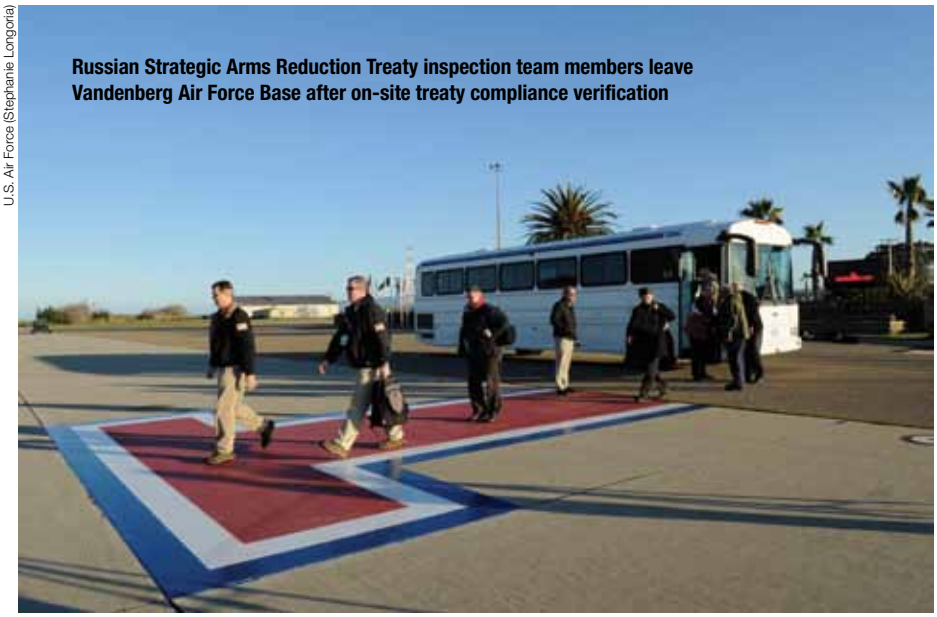
The Big Push

Opportunities. The Obama administration has committed the United States to an ambitious agenda with respect to the reduction of global nuclear danger.[1] This agenda includes:

- the accomplishment of a post-START agreement with Russia on the reduction of long-range or "strategic" nuclear weapons[2]
- resubmission of the Comprehensive Test Ban Treaty signed by the Clinton administration but rejected by the U.S. Senate for ratification in 1999
- review conference for the Nuclear Non-Proliferation Treaty (NPT), scheduled for May 2010, in New York
- in line with post-START and NPT objectives, encouragement of other nuclear weapons states to reduce their numbers of deployed nuclear warheads and nuclear-capable launchers
- international efforts on the part of International Atomic Energy Agency (IAEA) inspectors and various negotiating "contact groups" to disarm North Korea as a nuclear weapons state and to prevent Iran from joining the ranks of military nuclear powers.

This activist schedule of arms control and disarmament objectives is by no means the endgame for an ambitious U.S. President. Nuclear arms reductions and nonproliferation are way stations on the road to the eventual abolition of nuclear weapons worldwide.[3]

With respect to post-START reductions, U.S. and Russian negotiators were tasked by their respective governments to plan for reductions in each state's numbers of deployed strategic nuclear weapons to ranges from 1,675 to 1,500 warheads and 1,100 to 500 strategic delivery vehicles (intercontinental ballistic missiles [ICBMs] and long-range bombers). These reduction targets were to be reached within 7 years of the post-START treaty's entry into force—presumably, 2016 or so. The final text of the treaty would not necessarily include these exact ranges, which would be the subject of continuing negotiation. According to expert Obama administration testimony, the post-START agreement would "combine the predictability of START and the flexibility of the Strategic Offensive Reductions Treaty" (SORT, or the Moscow Treaty of 2002) by "borrowing from the best elements of START on definitions, data exchanges, notifications, eliminations, inspections and verification procedures" as well as "confidence building and transparency measures."[4]



U.S. Air Force (Stephanie Longoria)

Russian Strategic Arms Reduction Treaty inspection team members leave Vandenberg Air Force Base after on-site treaty compliance verification

The initial nuclear reductions agreement would not necessarily be the last word. Follow-on agreements might take the numbers of warheads and launchers deployed by both states even lower. Success in the initial or follow-on stages would require navigation of details that included the status of nuclear weapons that were removed from active service and stored, but not destroyed. Russians worried about this as a possible problem of "upload" potential that the United States might use to its advantage. Another possibly contentious issue for post-START negotiators was the conventionalization of nuclear-capable launchers. The Bush administration plan to equip some strategic ballistic missile submarines (SSBNs) with conventionally armed submarine-launched ballistic missiles (SLBMs), instead of nuclear warheads, caused concern in Russia. Other issues of possible disagreement included technical matters having to do with the extent to which the framework for verification would carry over from START I to the post-START regime, including inspection protocols.

The appearance of nuclear-strategic parity as between the United States and Russia has a political marketing niche, but it should not be oversold as military-strategic currency. Russia and the United States have more realistic and immediate concerns than the prospect of a Russian nuclear attack on North America or vice versa. The nuclear threat to each lies in other gargoyles lurking about, including those discussed in later sections. Therefore, the *perception* of a possible Russian lag in nuclear-strategic parity with the United States is a wasting political asset for pessimists because history has moved on to other, and more probable, sideswipes.

Connections: The Matrix. Even if these post-START offensive arms reductions succeed on their own terms, they cannot be isolated from other important issues, including problems directly related to nuclear arms control. Three obvious candidates for other related issues included nuclear nonproliferation, disarmament (including the call by Obama and other leaders for eventual nuclear abolition), and missile defenses. U.S.-Russian nuclear arms reductions are related to nonproliferation, disarmament, and missile defenses not only in the world of analysis and speculation, but also in the "real world" of policymaking.

With regard to nonproliferation, the United States and Russia have both congruent and conflicting objectives. Each recognizes the risks posed by terrorists or rogue states with nuclear weapons. However, Moscow and Washington differ as to their preferred methods for dealing with recalcitrant states

Inspection team meets during integrated field exercise in Kazakhstan

CTBTO

that have joined, or plan to join, the club of nuclear weapons states. The United States, at least under George W. Bush, asserted the right to use preemptive war and regime change as means of nonproliferation or counterproliferation. The distinction between the two modalities, nonproliferation and counterproliferation, is of two sorts. The first distinction is temporal. Nonproliferation usually refers to preventing nonnuclear states or others from acquiring, deploying, or using nuclear weapons. It emphasizes the "before" of nuclear weapons capability. Counterproliferation usually implies that a state or other actor has already obtained nuclear or other weapons of mass destruction (WMD) against the wishes of the international community, which is now operating in the "after" mode and must decide what to do about it.

A second customary distinction between nonproliferation and counterproliferation lies in the preferred means used by states or international actors. Nuclear nonproliferation has mostly depended upon diplomatic agreement, including treaties that have been supported by the United Nations (UN) or other international organizations. The NPT illustrates this kind of agreed regime for international containment of nuclear weapons spread, monitored by, and enforced through the UN and its arm for nuclear monitoring and inspection, the IAEA. Counterproliferation, on the other hand, is assumed to rely upon military or other coercive means to deter nonnuclear states from going nuclear, or disarming them if they do so in defiance of the international community. In practice, actual measures of enforcement may cross the line between nonproliferation and counterproliferation: coercive diplomacy, economic sanctions, and other means have been used as forms of military persuasions by "contact group" states against both North Korea and Iran within recent years.

U.S. intelligence revealed in September 2009 that Iran had a previously undisclosed nuclear research facility under construction near Qom. Complicated negotiations among Russia, France, the United States, and the UN in October 2009 resulted in a presumed agreement for Iran to ship low enriched uranium (LEU) back to Russia and then France for reprocessing and return to Iran for use in its Tehran Research Reactor. As of early November, Iran and its interlocutors were still haggling over the details of implementation. Meanwhile, skeptics feared that Iran had already become a "virtual" nuclear weapons state, with sufficient numbers of centrifuges to provide LEU for civil nuclear power or faster spinning centrifuges for weapons grade material.

U.S.-Russian cooperation on North Korea under Presidents Obama and Bush has taken place through the five-party contact group of South Korea, Japan, and China, together with Russia and the United States. The Obama administration indicated in October 2009 that it might agree to several bilateral meetings with North Korea in advance of further meetings among the six parties. North Korea's previous demarches forward, and then backward, with respect to disarmament of its nuclear weapons capabilities, have led U.S. and other interlocutors to understandable skepticism about its intentions. The President of South Korea suggested in the fall of 2009 that North Korean dictator Kim Jong-il was hoping to keep talks going around in circles until President Obama and he were both out of office. If so, the case of North Korean nuclear proliferation would be a "done deal" and a significant failure for the nonproliferation regime.

North Korea was politically isolated from meaningful support for its nuclear ambitions, and firm but friendly persuasion by China, Pyongyang's major economic benefactor, is an indispensable part of any journey toward the accomplishment of a denuclearized Korean Peninsula. Nevertheless, North Korea still wants some payoffs or quid pro quos from the United States, including continued delisting from the U.S. list of states that support terrorism, economic incentives, and guarantees against regime change. The best approach to the denuclearization of North Korea might be for Washington to propose an agreed, official termination of the Korean War, which is still officially in progress (an armistice terminated the fighting in 1953). A war termination agreement among the United States, North Korea, and South Korea might be brokered by China, an undeclared but significant military participant in that conflict. Concluding an official peace ending the Korean War would be a de facto recognition by the United States of North Korea's legitimacy as a regime—a symbolic payoff for the Kim family regime, and a possible barrier to imposed regime change.

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The good news about Iran is that, unlike the situation in North Korea, it does not

require reversing a case of proliferation that has already occurred. The bad news is that the mere possibility of an Iranian nuclear weapons capability might be more threatening to some states than a de facto North Korean nuclear weapons state. Iran's apparent aspiration to nuclear weapons status has already drawn warnings, including mock test flights over Iranian territory suggesting possible Israeli preemptive attacks on Iran's nuclear infrastructure. And Iran's well-documented connections to Middle Eastern terrorists raise the likelihood that the world's most destructive weapons might find their way into the hands of jihadists in Palestine, Lebanon, or other arenas of political meltdown and military opportunism.

The United States and Russia wish to avoid that outcome, but neither has a credible military option of its own at an acceptable political cost, and Moscow opposes such an option in any case. In this situation, China will oppose any measures that Russia firmly opposes, and China has its own economic interest in Iran. Tehran's negotiating strategy with the European contact group, Washington, Moscow, and the UN might be to spin out discussions until actual weaponization has been achieved. To achieve complete weaponization, Iran must not only have a sufficient supply of weapons-grade material (highly enriched uranium, or plutonium) but also be able to fabricate nuclear warheads that can be mated to suitable launchers (missiles or bombers).[5] The exact timing of an Iranian nuclear weapons "breakout" if Tehran is hell bent on going in that direction is a matter of some disagreement among the world's intelligence communities. Adding complexity to the calculations is that Tehran may opt for the status of a permanently "virtual" nuclear weapons state: a large civil nuclear power industry with the capability for near-term weaponization following a political decision to go that route.

Who Should Lead—and Why. Russia and the United States must be involved in these and other negotiations about nonproliferation, including possible measures of counterproliferation, because neither Washington nor Moscow can avoid their responsibility for leadership in nuclear nonproliferation and disarmament. They must lead because they own some 95 percent of the world's nuclear weapons, have the largest inventories of deployed and ready long-range nuclear charges, and have the longest history of managing nuclear operations without war. Failure on the part of the United States and Russia opens the door to not only nuclear weapons spread in the Middle East and Asia, but also to the possible first use of nuclear weapons in anger since Nagasaki—with all of its attendant consequences for world order, including the possible demise of the nonproliferation regime itself.

The importance of U.S. and Russian leadership in nonproliferation carries over into inevitable prominence in multilateral efforts toward nuclear disarmament. Disarmament will be accomplished, if at all, in two generic steps. First, it will be necessary to hold the roster of nuclear weapons states at the present number of de jure (NPT recognized) and de facto (acknowledged) powers. The door must be barred to Iran and slammed shut again on North Korea, to say nothing of additional members from those regions: Japan and South Korea in Asia, and Saudi Arabia and Egypt in the Middle East. To argue that drawing this line between internationally acceptable and unacceptable nuclear weapons states is unfair is a legalistic camouflage.

U.S. and Russian leadership in nonproliferation carries over into inevitable prominence in multilateral efforts toward nuclear disarmament

The history of the nuclear age is one of infinite regression: every "proliferator" including the first, the United States, was once a nonnuclear weapons state. China was once considered a rogue nuclear weapons state, and some leaders in both the United States and Russia recommended preemptive attacks against China's fledgling nuclear capabilities. Israel has never officially acknowledged its nuclear weapons capability, but unofficially has let the world know that it is prepared, in extremis, to use the nuclear weapons that it officially does not have. India, notwithstanding its Gandhian traditions, became a nuclear weapons state in order to balance against China, and Pakistan became a nuclear weapons state to balance against India.

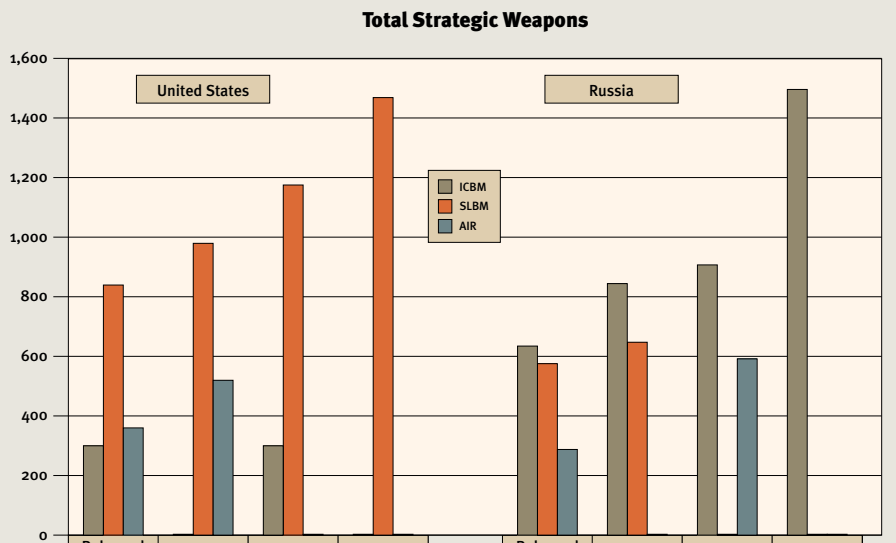
Second, the current nuclear weapons states must follow through on their obligations under the NPT to reduce their own numbers of deployed and stored nuclear weapons. However, this process of cooperative detoxification from nuclear addition will not be easy to accomplish. Nuclear weapons appeal to states for reasons of security (they feel threatened, or they wish to intimidate others), prestige (membership in elite clubs always carries its own cachet), and domestic politics (nukes can be symbols of national or cultural pride). In addition, all security dilemmas are not equal. A briefing on nuclear abolition might be received with more politeness in military staff colleges or think tanks in the United States or Britain than in Islamabad, New Delhi, or Pyongyang.

McGeorge Bundy's concept of "existential deterrence," although offputting to Cold War military planners and nuclear theorists who anticipated large-scale nuclear wars with acceptable political outcomes, has ironical resonance now, in the context of the risks attendant to unchecked proliferation in the second nuclear age. On one hand, a lot of deterrence and international diplomatic attention can be obtained if a state possesses even a few nukes (as North Korea has shown). This enhances the appeal of nuclear and perhaps other WMD as instruments for regional access denial to powers militarily inferior to the United States or its allies.

On the other hand, compared to any state except Russia, the United States has excess numbers of nuclear weapons with which to retaliate against a nuclear first use directed at its forces, allies, or homeland. In addition, the U.S. capability for "extended" nuclear deterrence, supplied to nonnuclear allies by virtue of America's nonpareil nuclear capabilities, dissuades friendly states who feel threatened from developing their own nuclear weapons capabilities. Therefore, while some reductions in U.S. and Russian strategic nuclear forces are obviously contributory to nonproliferation and disarmament, it is not self-evident that reducing U.S. and Russian nuclear forces to "minimum deterrents" of several hundred weapons, let alone abolishing those forces, would contribute to peace. (We argue the case for minimum deterrence in a later section.)

The unfortunate fact of strategic history is that for a peace to endure, someone or some group of states must enforce that peace.[6] Even if one passes this buck of enforcement to the "international community," it still requires the diplomatic collaboration and

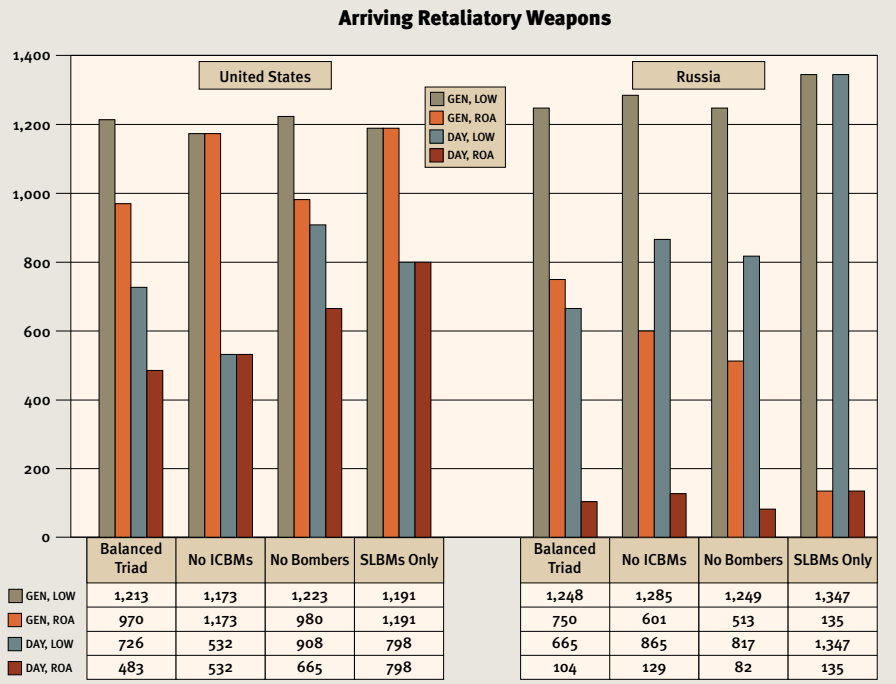
Figure 1. U.S.-Russia Total Strategic Weapons (1,500 limit)



United States	Balanced Triad	No ICBMs	No Bombers	SLBMs Only
ICBM	300	0	300	0
SLBM	840	980	1,176	1,470
AIR	360	520	0	0

Russia	Balanced Triad	No ICBMs	No Bombers	SLBMs Only
ICBM	635	845	908	1,497
SLBM	576	648	0	0
AIR	288	0	592	0

Figure 2. U.S.-Russia Arriving Retaliatory Weapons (1,500 limit)



United States	Balanced Triad	No ICBMs	No Bombers	SLBMs Only
GEN, LOW	1,213	1,173	1,223	1,191
GEN, ROA	970	1,173	980	1,191
DAY, LOW	726	532	908	798
DAY, ROA	483	532	665	798

Russia	Balanced Triad	No ICBMs	No Bombers	SLBMs Only
GEN, LOW	1,248	1,285	1,249	1,347
GEN, ROA	750	601	513	135
DAY, LOW	665	865	817	1,347
DAY, ROA	104	129	82	135

concerted military action of the great powers in any particular international system. Peace is not self-sustaining. Accordingly, the task of disciplining a 21st-century international peace, with or without nuclear weapons, will fall to a relatively few well endowed major states with robust militaries and prodigious budgets, as well as states with regimes and peoples prepared to pay the prices of armed constabulary work. The North Atlantic Treaty Organization (NATO) military commitment in Afghanistan at this writing, tasked with counterinsurgency and counterterror missions while engaged in armed nationbuilding, makes the point. NATO is in Kabul and Kandahar because there is no other alliance or international body that will accept responsibility to deny future jihadists a safe haven for terrorist plotting—including the plotting of attacks with nuclear weapons.

Colin S. Gray has noted that "peace" has at least two principal meanings: that war is not taking place now, and that war is unthinkable and impossible in the exigent circumstances of international or regional order.[7] A true security community only exists in the second situation, as in NATO Europe presently. However, it is also the case that the international institutions, including nonproliferation regimes and supporting technologies (perhaps for inspections *and* defenses!), cannot carry the ball toward the objective of enduring peace alone. Shared cultural values and compatible, if not identical, readings of history are equally important, as are institutions and mechanisms for dissuasion, deterrence, and defense.[8] Soft power and hard power—both persuasion and kinetic capability—are coconspirators in the construction of durable peace with fewer, or no, nuclear armed states.[9]

Methodology

Context and Cautionary Notes. Earlier discussion reviewed aspects of the policy background pertinent to the relationships among Russian-American nuclear arms reductions, nonproliferation, disarmament, and missile defense. In this section, we use data analysis to pin down more specifically the policy alternatives suggested by the foregoing arguments. However, the dangers of quantification in this sort of enterprise must always be appreciated, and the task must be approached with modesty of ambition.

First, even after one or more post-START agreements have been negotiated, the terms may or may not be fulfilled within the 7-year interim between concluding a pact and implementing it. For example, a 7-year timeline for retrofitting Russian and American strategic nuclear forces for a post-START agreement brings us to 2016 or so. By 2016, Barack Obama could be finishing his second term as President, historically a "lame duck" period of Presidential influence. Even more political uncertainty looms if Obama is defeated for reelection in 2012 with regard to American foreign and security policy priorities in 2016 compared to now.

Second, on the Russian side of the Atlantic, 7 years is a long time in the policy-making process for national security, including nuclear arms control. Russia's economic performance between now and 2016 will

dictate much of its ability to modernize its conventional and nuclear forces. Assuming that Russia's economy performs at some middling level (less spectacularly than during the halcyon years of 2001 to 2007, but better than in the 1990s), the challenge for defense planners will be to balance the costs of military modernization and reform as between conventional and nuclear forces.

On one hand, the need for modernization and reform of Moscow's conventional armed forces is urgent. Russia's war against Georgia in 2008 was short and declaredly victorious, but it nevertheless exposed fatal weaknesses in its equipment, as well as command, control, and coordination of air and ground elements in battle. In addition, the promised transition from a mass mobilization-conscript enlisted force to one based largely on contract soldiers of higher quality depends on the continuing sluice of defense funding for personnel and for improved equipment.

On the other hand, Russia must also modernize its strategic and other nuclear forces for two reasons. First, Russian military doctrine emphasizes that nuclear forces must compensate, in deterrence and in warfighting, for weaknesses in conventional fighting power.[10] Second, Russia's leadership wants to preserve the apparent condition of essential equivalence in strategic nuclear forces, as between the United States and Russia, for the diplomatic leverage and political influence it conveys.

A third uncertainty, also with respect to Russia, relates not to the availability of resources for military reform and modernization, but to the proclivities of Russian military strategy and doctrine. The political and military leadership must drag the troglodytes in the General Staff and other resistant forces beyond the Cold War mentality that sees the United States and NATO as the main enemy driving military threat assessments. Unfortunately, current prime minister and past president Vladimir Putin has had some difficulty controlling the DNA remaining in his political mindset from his Cold War experiences and, even more important, from Russia's post–Cold War weakness compared to the West (especially in the 1990s).

Russia is not entirely to blame for the continuing hangover of Cold War retro perspectives on European security. NATO has permitted its democratic enlargement to extend to 28 member states, to the very borders of Russia, Belarus, and Ukraine. While this extension pleases advocates of democracy, it involves some problematical security issues. NATO is a military alliance with shared commitments to respond with armed force if any one member is attacked by a nonmember state. NATO, in this respect, is now committed to defend a belt of states from the Black Sea littoral through East Central and Western Europe, northward to countries that border on the Baltic and North Seas as well as the Arctic Ocean (leaving aside North America). Not content with this, the Alliance has now taken on the military responsibility for the armed nationbuilding of post-Taliban Afghanistan (an issue that may present unique challenges to Alliance unity and burdensharing).

Carpe Diem—New Politics versus Old Missiles. With the advantage of post–Cold War hindsight, some would argue that "deterrence worked," although whether from luck or management is a matter of remaining dispute for historians.[11] Twenty years after the end of the Cold War, it is time for rethinking nuclear war plans and the underlying concept of maximum deterrence as between Russia and America. Instead, the framework or context for further planning should be one of cooperative security, based on minimum deterrence

Figure 3. U.S.-Russia Generation Stability (1,500 limit)

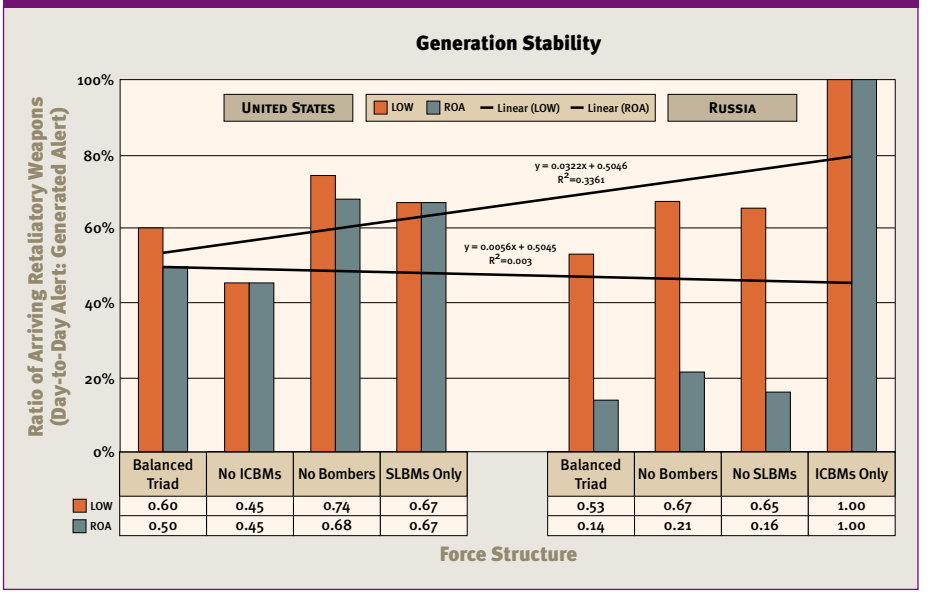


Figure 4. U.S.-Russia Launch on Warning Stability (1,500 limit)

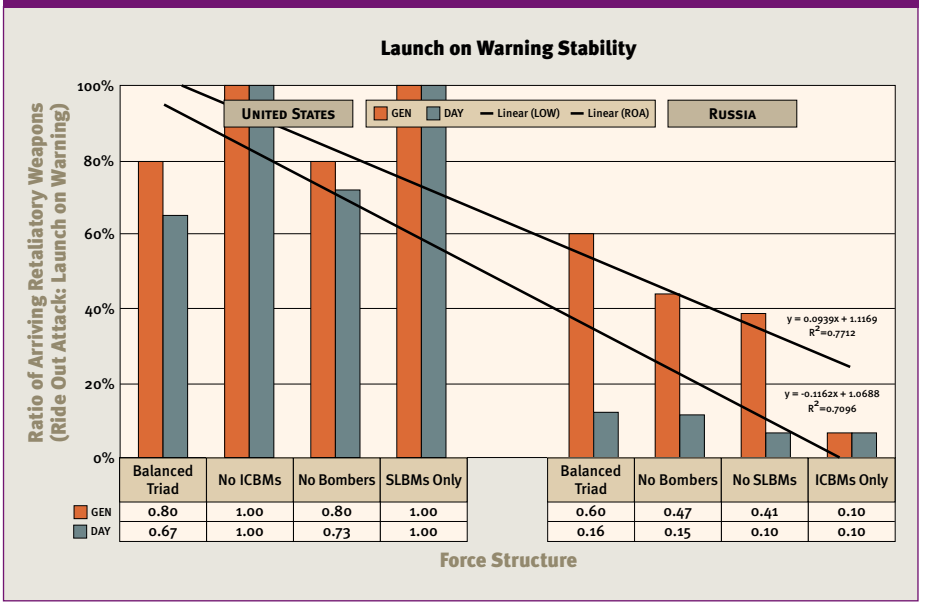
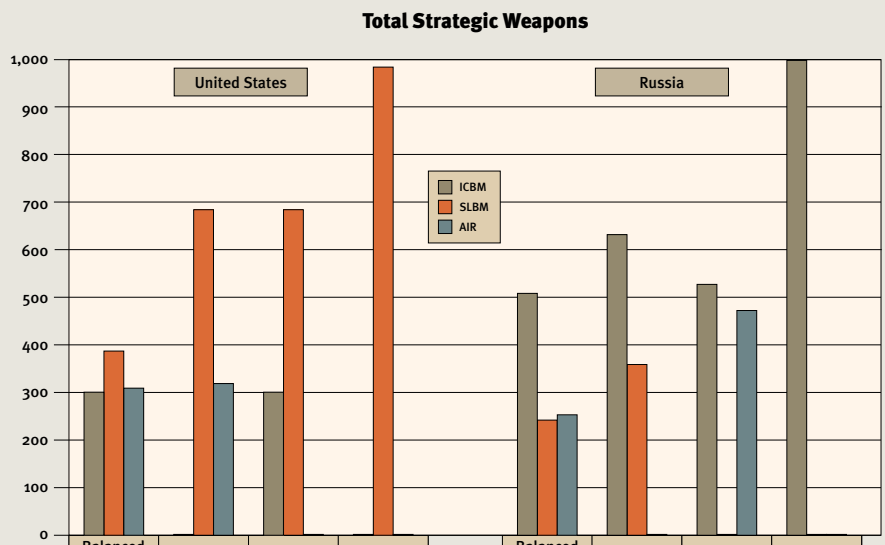


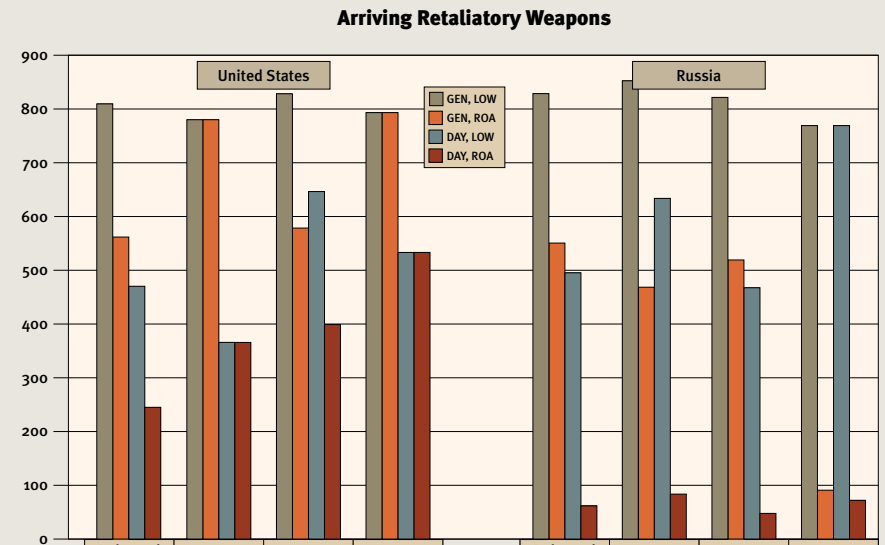
Figure 5. U.S.-Russia Total Strategic Weapons (1,000 limit)



United States	Balanced Triad	No ICBMs	No Bombers	SLBMs Only
ICBM	300	0	300	0
SLBM	392	686	686	980
AIR	308	314	0	0

Russia	Balanced Triad	No Bombers	No SLBMs	ICBMs Only
ICBM	504	635	525	999
SLBM	240	360	0	0
AIR	256	0	472	0

Figure 6. U.S.-Russia Arriving Retaliatory Weapons (1,000 limit)



United States	Balanced Triad	No ICBMs	No Bombers	SLBMs Only
GEN, LOW	812	785	826	794
GEN, ROA	569	785	583	794
DAY, LOW	483	372	642	532
DAY, ROA	240	372	399	532

Russia	Balanced Triad	No Bombers	No SLBMs	ICBMs Only
GEN, LOW	835	863	817	778
GEN, ROA	552	474	517	94
DAY, LOW	492	630	473	778
DAY, ROA	65	86	47	78

and forces configured for "retaliation only," and delayed retaliation at that.

If the United States and Russia were to move toward nuclear war plans based on minimum deterrence and not maximum, then changes in targeting, and therefore in strategy, are implied. Instead of seeking "prevailing" outcomes in a counterforce war or planning for massive attacks on population centers, the two states could emphasize infrastructure targeting, including electric power plants, refineries, transportation and communication networks and nodes, and other attributes of industrial and postindustrial modernity. Admittedly this target planning, if carried out, would still kill many people on either side, and for that reason, it would not be unimpressive as a deterrent. But it would target the sinews of economic security and public policy without gratuitous attacks on civilians for the purpose of terror per se.

Of course, target planners at U.S. Strategic Command and in the Russian Ministry of Defense will want "insurance"—war plans require options and branches for "just in case" situations. So one might suggest a target list for U.S. or Russian strategic nuclear retaliatory forces based on minimum deterrence with flexibility (see text box on page 102).

In addition, it is small consolation for Russia and the United States to accomplish progress toward minimum strategic nuclear deterrents, including the political and military reassurance related to those negotiations, if Russia retains its forward leaning posture on the possible first use of tactical or operational nuclear weapons in conventional conflicts. We can hope that Russia's improving conventional forces will gradually push its tactical nuclear options further back in its war plans and doctrinal formulations than is apparently now the case. But in addition, the United States and NATO should emphasize in discussions with Russian counterparts the futility of planning for fightable and winnable nuclear wars or, even worse, of anticipating nuclear first use in a conventional war as a measure of strategic "de-escalation."

Numbers and More. Does statistical analysis support the preceding arguments in whole or in part? Figures 1 through 8 provide a basis for summary assessments.[12] In figures 1 through 4, we project post-START U.S. and Russian strategic nuclear forces, under a limit of 1,500 deployed warheads. Figure 1 summarizes pertinent force structures for the two states. In figure 2, their numbers of second strike–surviving and retaliating warheads are calculated for four different mixes of land-based missiles, sea-based missiles, and heavy bombers, and under four alternate conditions of alertness and launch doctrine. Figure 3 displays the generation stability of U.S. and Russian forces by showing their ratios of arriving retaliatory weapons on day-to-day (DAY) alert, compared to generated alert (GEN), under two conditions of launch doctrine: launch on warning (LOW) and riding out the attack (ROA). Figure 4 summarizes the LOW stability for both states by showing their ratios of arriving retaliatory weapons when ROA is

compared to LOW, under conditions of generated alert compared to day-to-day alert.

In figures 5 through 8, the same procedures are repeated, in the same sequence, for Russian and American strategic nuclear forces downsized to within 1,000 deployed warheads, compared to the 1,500 ceiling in figures 1 through 4. An initially deployed force of 1,000 warheads would allow for a second strike–survivable force consistent with the targeting guidance, above, for a counter-infrastructure deterrent.

The results of the analyses summarized in figures 1 through 8 are as follows. U.S. and Russian strategic nuclear forces, within a maximum deployment limit of 1,500 warheads, or under a lower limit of 1,000 deployed weapons, can provide for assured retaliation inflicting socially unacceptable and historically unprecedented damage. In addition, even under the lower limit of 1,000 deployed weapons, both states would have sufficient numbers of retaliating weapons for strikes at targets other than populations or infrastructure. This finding holds true for all force structures and operational modes, with the possible exception of Russian forces under the worst case conditions of day-to-day alert and riding out the attack within a peacetime deployment limit of 1,000 weapons.

Are these U.S. and Russian forces sufficiently crisis stable to reassure both states against temptations toward hair-trigger alerts or launches on warning? The picture is mixed. Figures 3 and 4 for the 1,500-limit force, and figures 7 and 8 for the 1,000-limit force summarize the generation and LOW stability for U.S. and Russian forces. Each pair of bar graphs depicts the higher and lower numbers of arriving retaliatory warheads under relatively more favorable and less favorable conditions of alertness and prompt launch. A linear least squares regression model is then fitted to the data in each figure to establish a baseline for comparison between force sizes and among force types.

Although this dynamic analysis shows that U.S. and Russian forces at either 1,500 or 1,000 deployment levels might meet standards of *adequacy* in generation and prompt launch stability, each could improve its post-START *proficiency* in that regard. Russia's high dependency on land-based ICBMs for second-strike retaliation and its relatively anemic SLBM force create an operational dependency toward launch on warning. Russia's modernization of its SSBN fleet would be in the interest of both states. In turn, the U.S. Minuteman ICBM force is entirely silo based, dubiously first strike–survivable, and acts to attract additional Russian military aim points toward the U.S. homeland.

Would missile defenses counteract the idea of reducing American and Russian nuclear forces to mini-deterrents, as hypothesized above? On the available evidence, missile defenses for the next decade or so will have operational-tactical instead of strategic significance. They will not overturn the nuclear revolution or lead to a defense-dominant balance of terror. Russia's periodically expressed fear of a U.S. "last move" in the nuclear arms race, by combining preclusive antimissile defenses with a robust nuclear first strike option, is another hangover from the Cold War (that is, specifically, the Soviet reaction to the U.S. Strategic Defense Initiative). The Obama shift from the George W. Bush missile defense plan for Europe is consistent with the majority of post-Reagan visions of ballistic missile defense (BMD) as possible protection against limited strikes or accidental launches.

Leading U.S. defense officials are aware that an overly robust BMD directed against

Figure 7. U.S.-Russia Generation Stability (1,000 limit)

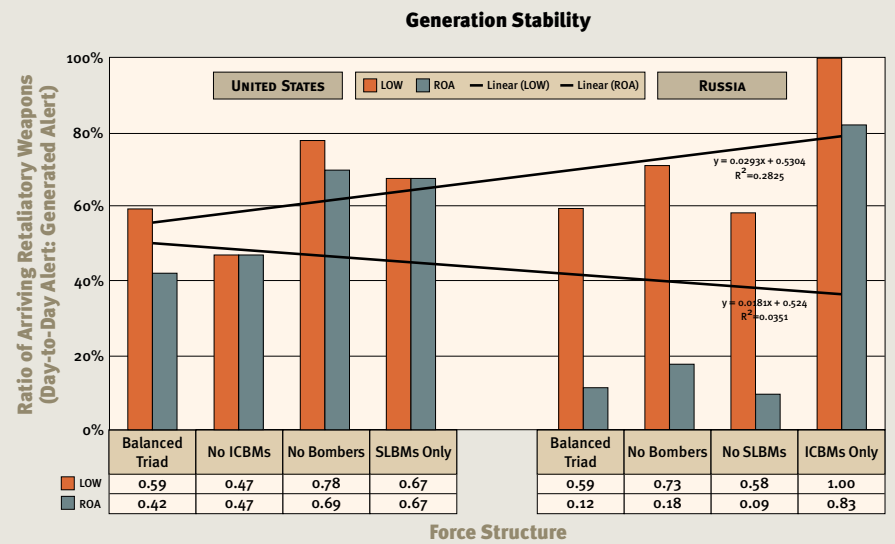
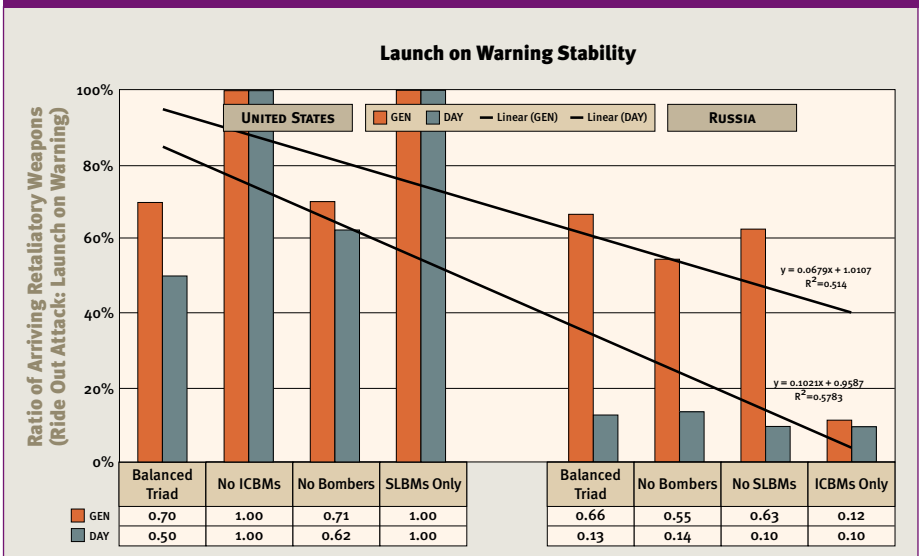


Figure 8. U.S.-Russia Launch on Warning Stability (1,000 limit)



Minimum Deterrent Forces Target Base: U.S.-Russia

- 250 infrastructure targets for each state, including those in urban-industrial areas
- 150 military force and command and control targets for each state, for prompt or delayed retaliation against opposed forces not used in the first strike
- 100 weapons kept in reserve, mostly ballistic and cruise missiles deployed on submarines, or mobile land-based ballistic missiles; this would serve as the unexpected contingency force (third parties jump into the war, for example); it would also serve as a support for negotiations to bring the war to a conclusion as soon as possible

Russia or China could provoke countermeasures, including an open-ended arms race. As General Kevin Chilton, USAF, commander of U.S. Strategic Command, warned in November 2009, "We have to be cautious with missile defense. Missile defense can be destabilizing, depending on how you array it."[13] But Chilton also supported the Obama missile defense plan and argued the case for missile defenses as necessary insurance against the possibility that some states, such as Iran and North Korea, might be undeterrable: "It's not clear that pure nuclear might or conventional might would deter them if they had the ability to [strike] the United States or an ally, a friend in the region, with a nuclear-capable missile."[14]

On the technology front, theater-wide and tactical missile defenses are already in place and improving, and they offer a possible arena for U.S.-Russian or NATO-Russian military and arms control cooperation.[15] A more problematical development for Russia would be a U.S. decision for the weaponization, as opposed to the militarization, of space, including the deployment of space-to-space or space-to-Earth strike weapons. The Outer Space Treaty does not prohibit the placement of nonnuclear weapons in space, and parts of the U.S. defense community regard space as the next "high ground" of warfare. A related uncertainty is the interest of China, among other states, in antisatellite warfare, including China's success in destroying one of its aging satellites in 2007 by means of a land-based ballistic missile launch.

Some American defense experts warn that the deployment of weapons in space could lead to an arms race in, or about, space, resulting in a deterioration of the U.S. ability to exploit space for military or other purposes.[16] However, the United States may not have the choice of abstinence in a military space race. The number of state "space powers" will grow in the present century, and some of them may seek status as U.S. military peer competitors. But space, as the negation of the negation that will make nuclear weapons obsolete, is more of a Hegelian construct than a technological reality.

The United States and Russia can modestly or even drastically reduce their numbers of deployed long-range nuclear weapons and launchers, while preserving the essential requirements for deterrence by credible threat of assured retaliation. This discovery may be small consolation. Greater risk comes not from the likelihood of a premeditated nuclear first strike by one state against another, but from the slippage of conventional warfare into a nuclear first use—whether in Europe or in Asia. In addition, some terrorists or other nonstate actors may acquire nuclear materials or technology and resist deterrence as a means of strategic communication.[17]

Continuing controversy can be expected about at least two issues. First, what is the value of excess weapons for "extended deterrence" provided to allies, compared to additional moon walks toward nuclear weapons status in the absence of a U.S. nuclear umbrella? And second, will missile defenses, if they improve and become more widespread as operational-tactical counterweights to short- and medium-range missiles, make deterrence stronger or weaker? The answers and outcomes for these questions will almost certainly be based, in part, on technology—but more on politics, including the perceptions of leaders and their motivating ideologies. **JFQ**

NOTES

[1] See remarks by Rose Gottemoeller, "The Long Road from Prague," Williamsburg, VA, August 14, 2009, available at <www.state.gov/t/vci/rls/127958.htm>.

[2] The White House, Fact Sheet: "The Joint Understanding for the START Follow-on Treaty," July 8, 2009, available at <www.whitehouse.gov/the_press_office/The-Joint-Understanding-for-The-Start-Follow-On-Treaty/>.

[3] Jennifer Loven, "Obama Outlines Sweeping Goal of Nuclear-Free World," Associated Press, April 5, 2009.

[4] Testimony of Celeste Wallander, Deputy Assistant Secretary of Defense for Russia, Ukraine, and Eurasia Policy, House Foreign Affairs Subcommittee on Europe, Washington, DC, July 28, 2009.

[5] Discouraging developments are noted in Joby Warrick, "Evidence of Iran's Nuclear Arms Expertise Mounts," *The Washington Post*, December 15, 2009.

[6] See Colin S. Gray, *War, Peace and International Relations: An Introduction to Strategic History* (London: Routledge, 2007), esp. 264–279.

[7] Ibid., 278.

[8] Ibid.

[9] Robert O. Keohane and Joseph S. Nye, *Power and Interdependence*, 3d ed. (New York: Longman, 2001), esp. 20–32.

[10] David Nowak, "Report: Russia to Allow Preemptive Nukes," Associated Press, October 14, 2009.

[11] As Colin Gray has argued, "It is possible that the human race survived the Cold War without suffering a nuclear cataclysm *despite*, rather than because of, the authoritative strategic theories and doctrines of the period." Gray, 217.

[12] Grateful acknowledgment is made to Dr. James Scouras for use of his AWSM@ model for drawing graphs and making calculations. He is not responsible for the analysis in this study, nor for any arguments or opinions. Force structures are the author's.

[13] General Kevin P. Chilton, USAF, quoted in Phil Stewart, "U.S. Missile Defenses May Backfire if Too Robust: General," Reuters, November 10, 2009, available at <www.reuters.com/articlePrint?article=USTRE5A94NH20091110>.

[14] Ibid.

[15] Dmitry Trenin, "Missile Defense Could Be the Silver Bullet," *Moscow Times*, November 3, 2009.

[16] Pertinent cautions appear in John Arquilla, *Worst Enemy: The Reluctant Transformation of the American Military* (Chicago: Ivan R. Dee, 2008), 93–99.

[17] See Graham Allison, *Nuclear Terrorism: The Ultimate Preventable Catastrophe* (New York: Times Books–Henry Holt, 2004), passim.