REDUCING THE LAUNCH-READINESS OF NUCLEAR FORCES

The Problem

Despite the end of the Cold War, the United States and Russia continue to maintain thousands of nuclear weapons on alert, ready to be launched within a few minutes. During the Cold War, both sides believed that maintaining the capability to launch nuclear forces quickly was a necessary and appropriate hedge against the possibility of a surprise attack against its nuclear forces. Although both sides maintained—and still maintain—substantial forces that are invulnerable to surprise attack, they nevertheless believed that the ability to launch vulnerable forces quickly improved their ability to deter or respond to a nuclear attack.

The practice of maintaining nuclear forces at high states of alert was a response to the fear of a premeditated nuclear attack. Political and military leaders accepted the increased risk of accidents that inevitably accompanied this posture. In the United States, several nuclear-armed bombers crashed or caught fire, and one time a missile exploded, sending its 9-megaton warhead into the countryside. On several occasions warning systems incorrectly indicated that the United States was under attack, giving decision-makers minutes to decide whether the attack was real and, if so, how to respond. Enormous amounts of time and money were spent to minimize the probability of accidental or erroneous launch of these highly alert forces.

Regardless of what one believed about the wisdom of placing a hair-trigger on nuclear forces during the Cold War, the balance of risks in the post-cold-war era has shifted decisively against such a posture. The fear of calculated attack by the Soviet Union has been largely superceded by a fear of accidental, unauthorized, or erroneous attack by Russia. The nuclear policies of the United States and Russia should be adjusted to respond to this new reality, in part by decreasing the readiness of nuclear forces for use.

The Goal

The goal is to decrease the probability of accidental, unauthorized, or erroneous use of nuclear weapons by decreasing the readiness of nuclear forces for use, but without decreasing significantly the capacity of the force to deter deliberate nuclear attack. The readiness of U.S. and Russian forces should be reduced in parallel and in ways that are transparent to the other side. In addition, reductions in launch-readiness should be achieved in such a manner that neither side would believe that

either side could obtain an important advantage by quickly realerting its forces, nor should such reductions create incentives for either to strike first during crisis.

These goals suggest the following criteria for evaluating options for decreasing the launch-readiness of nuclear forces, in rough order of importance:

- Survivability: reductions in launch readiness must be not threaten the survivability of the force or its ability to perform the core deterrent function.
- Stability: the inability of either side to obtain an advantage, real or perceived, by realerting its forces or striking first, in peacetime or during a crisis.
- Security: the reduction in the probability of accidental, unauthorized, or erroneous use of nuclear weapons. (The possibility of theft of nuclear weapons might be included with unauthorized use.)
- Safety: measures taken to reduce the launch-readiness of nuclear forces should not increase significantly the public health and occupational safety risks associated with nuclear weapon systems.
- Transparency: the ability of the other side to verify that the reductions in launch-readiness have taken place and remain in force.
- Irreversibility: stability, security, and transparency depend in part on the time required to realert and make all or part of the force ready for use.
- Timeliness: the time required to achieve the reductions in readiness, including associated transparency or verification measures.
- Cost: the net cost of implementing the measures to reduce readiness.

The Options

Options for decreasing the launch-readiness of nuclear forces can be organized by category of delivery vehicle.

Silo-based ICBMs are vulnerable to attacks by accurate missiles, particularly attacks by the silo-based ICBMs of the other side (and, in the case of Russia, by U.S. Trident D5 missiles). Both sides have compensated for this vulnerability by maintaining the ability to launch silo-based ICBMs on warning of an attack. This is particularly true for Russia, which maintains a large proportion of its

nuclear force in silos, and it underscores the importance of achieving effective, stable, and transparent reductions in the launch-readiness of silo-based ICBMs.

The launch-readiness of silo-based ICBMs could be reduced in one or more of the following ways:

- Preliminary deactivation procedures (e.g., disconnect missiles from launch control facilities, disconnect power to certain subsystems in silos and launch control facilities, insert safing pin in missile engines, etc.).
- Obstruct the silo door (e.g., pile gravel on top, weld the door shut, remove mechanism that opens the door, etc.).
- Remove and store separately a vital component of the missile (e.g., the shroud, guidance system, batteries, etc.).
- Remove and store the warheads.
- Remove and store the missiles.
- Destroy warheads, silos, and/or missiles.

Road-mobile ICBMs are not vulnerable to attack when they are deployed in the field, but they are extremely vulnerable when they are in garrison. Russia currently keeps most of its road-mobile ICBMs in garrison, and maintains the capacity to launch missiles from garrison on warning of attack. Although it is important to remove the incentive for prompt launch of garrisoned missiles, the ability of out-of-garrison missiles to survive attack is a stabilizing factor. Thus, measures to reduce the readiness of road-mobile missiles for use should not interfere with the capacity of some portion of this force to survive an attack.

The launch-readiness of garrisoned mobile missiles could be reduced in the following ways:

- Reduce the number of missiles in garrison.
- Preliminary deactivation procedures (e.g., disconnect missiles from launch control facilities, disconnect power to missile launcher or launch control facilities, insert safing pin in missile engines, etc.).
- Obstruct launch in or near garrison (e.g., weld closed the sliding roof, install heavy but movable concrete barriers in from of the launchers, etc.)

- Remove and store separately a vital component of the missile (e.g., the shroud, guidance system, etc.).
- Remove and store the warheads.
- Remove and store the missiles.

A portion of the road-mobile force should be survivable, but ideally should not be capable of prompt launch. The readiness of out-of-garrison missiles could be reduced in a number of possible ways:

- Remove warheads or other vital missile components which could be reinstalled in the field. Warheads or other components could accompany the launcher, or could be deployed on separate mobile platforms for later rendezvous.
- Install a timing device to delay launch.

Rail-mobile ICBMs, of which Russia's SS-24 is the only example, will be eliminated under START II. If we wish to include this category in the interest of completeness, options for reducing launch-readiness would parallel those for road-mobile missiles.

Bombers, like garrisoned mobile missiles, are vulnerable unless they are launched on warning of attack. Unlike missiles, however, bombers can be recalled after they launched, and bombers have roles in conventional combat that would require their retention even if their nuclear role was eliminated. In addition, the United States and Russia have effective defenses against aircraft, which makes it possible to neutralize a small unauthorized or erroneous attack.

The readiness of bombers was reduced as part of the package of reciprocal, unilateral initiatives undertaken by Presidents Bush and Gorbachev in 1991, under which both pledged not to deploy nuclear weapons on bombers during peacetime. The readiness of bombers for nuclear attack could be reduced further by one of the following means:

- Store nuclear bombs and cruise-missile warheads at bases other than those at which nuclear-capable bombers are based.
- Convert nuclear-capable bombers to conventional roles according to START rules.
- Destroy nuclear bombs and cruise-missile warheads.

SLBMs, like road-mobile missiles, are largely invulnerable attack when deployed at sea, but are extremely vulnerable when they are in port. As in the case of mobile missiles, there is evidence that Russia maintains the capability to launch some fraction of its in-port SLBMs on warning of an attack. As with road-mobile missiles, measures to reduce launch-readiness should not interfere with the ability of a portion of this force to survive an attack.

Possible measures to reduce the launch-readiness of in-port SLBMs include:

- Preliminary deactivation procedures (e.g., disconnect missiles from launch control facilities, insert safing pin in missile engines, etc.).
- Remove and store separately a vital component of the missile (e.g., the shroud, guidance system, etc.).
- Remove and store the warheads.
- Remove and store the missiles.

It also would be desirable to reduce the launch-readiness of at-sea SLBMs, but without making SSBNs more vulnerable to attack. This might be accomplished in one or more of the following ways:

- Limit the number of SSBNs at sea to the minimum required for the core deterrent function.
- Restrict SSBNs to patrol areas out of range of potential targets.
- Measures that could be reversed at sea without requiring a rendezvous with another vessel (e.g., disconnect missiles from launch control equipment, insert safing pin in missile engines, remove vital missile components, etc.).
- Remove and deploy on another vessel warheads or other vital missile components which could be installed at sea.
- Install a timing device to delay launch.

Other nuclear weapons. Thought also should be given to the desirability and feasibility of verifiably reducing the readiness of nuclear strategic missile- and air-defense weapons and nonstrategic offensive weapons.

Analysis and Synthesis

At this point, we would analyze these options (and any others that were missed here) according to the criteria outlined above. The result could be a list of preferred dealerting methods for each category (or possibly each type) of delivery vehicle, ranked according to the reduction in launch-readiness that would be achieved.

The preferred methods could then be combined into a set of scenarios for the overall U.S. and Russian nuclear forces. For example, the first phase might concentrate on reducing or eliminating the launch-readiness of inherently vulnerable systems that are now capable of prompt launch, such as silo-based ICBMs, garrisoned road-mobile ICBMs, and certain in-port SLBMs. The second phase would reduce the launch-readiness of survivable systems, such as out-of-garrison ICBMs and at-sea SLBMs, in a manner that would be verifiable to the other side. The third phase, which would be a prelude to disarmament, would further increase the time required to ready forces for attack by removing all warheads from missiles and all missiles from launchers, and storing each under multilateral or international monitoring. Some thought also should be given to when and how the other nuclear powers—the United Kingdom, France, and China—would join this process.