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De-alerting and De-activating Strategic Nuclear Weapons

Thomas H. Karas

Prepared by
Sandia National Laboratories
Albuquerque, New Mexico 87185 and Livermore, California 94550

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Thomas H. Karas
Advanced Concepts Group
Sandia National Laboratories
P.O. Box 5800
Albuquerque, NM 87185-0839

Abstract

Despite the end of the Cold War, the United States and Russia continue to maintain their ICBMs and many SLBMs in a highly alerted state—they are technically prepared to launch the missiles within minutes of a command decision to do so. Some analysts argue that, particularly in light of the distressed condition of the Russian military, these high alert conditions are tantamount to standing on the edge of a nuclear cliff from which we should now step back. They have proposed various bilateral “de-alerting” measures, to be taken prior to and outside the context of the formal strategic arms reduction treaty (START) process. This paper identifies several criteria for a stable de-alerting régime, but fails to find de-alerting measures that convincingly satisfy the criteria. However, some de-alerting measures have promise as *de-activation* measures for systems due for elimination under the START II and prospective START III treaties. Moreover, once these systems are deactivated, a considerable part of the perceived need to keep nuclear forces on high alert as a survivability hedge will be reduced. At the same time, the U.S. and Russia could consider building on their earlier cooperative actions to reduce the risk of inadvertent nuclear war by enhancing their communications links and possibly joining in efforts to improve early warning systems.

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PREFACE

The substantive final draft of this paper was completed in the fall of 1998. It is being issued as a SAND report at this time because of the interest since expressed by some external viewers of the draft that it be made more widely available.

De-alerting and De-Activating Strategic Nuclear Weapons

SUMMARY

This paper explores the following questions:

1. What is **the idea of “de-alerting”**?
 - How does de-alerting relate to the concept of “deactivating” strategic nuclear weapons scheduled for START II elimination, as agreed to by Presidents Clinton and Yeltsin at the March 1997 Helsinki summit meeting?
 - What problems is de-alerting meant to address? Deactivation?
 - Why do Russia and the U.S. maintain some forces on high alert status?
2. Theory vs. Practice: How can **specific de-alerting measures** be analyzed?
 - What are appropriate criteria for judging the effectiveness and risks of proposed de-alerting measures?
 - What de-alerting measures have been proposed to address the identified problems?
3. What **other measures** might be considered to address the identified problems?

Principal findings of this paper are as follows:

- As long as nations choose to maintain nuclear arsenals, it is in their interests to try to limit the risks and assure that nuclear warfare begins only after the most careful, high-level deliberation. **High alert levels could, in some circumstances, exacerbate any risks of unauthorized launch of strategic nuclear weapons; however, such risks could also persist even at low alert levels.**
- Continued (and expanded) Russian reliance on a “launch-on-warning” posture to assure its nuclear retaliatory capability is of some concern; on the other hand, **accidental initiation of nuclear war is most likely to occur after receipt of erroneous warning signals in circumstances of international crisis; such a crisis might well provoke the re-alerting of weapons that had been de-alerted in less tense circumstances.**
- **High alert levels persist not only because of cold war momentum, but because governments believe that they continue to serve useful purposes—most importantly to act as a survivability hedge for nuclear forces;** the U.S. and Russian governments could take some unilateral steps to reduce the vulnerability of their own nuclear forces, and perhaps those of each other as well.

- One proposed approach to risk management has been the de-alerting of U.S. and Russian strategic nuclear forces currently capable of launch within minutes of a decision to do so. **It is very difficult to identify specific de-alerting measures that appear practicable when the following criteria are applied rigorously: verifiability, expense, net effects on force survivability, equivalence in re-alerting capabilities, and non-interference with START negotiations.** However, the degree of rigor with which one will want to apply these criteria depends greatly on the relative importance one assigns to maintaining the role of nuclear deterrence in national policy as opposed to addressing the perceived risks of high alert levels.
- When considered as steps toward *deactivating* weapons scheduled for elimination either unilaterally or because of arms control obligations (and therefore seen as no longer militarily necessary), several “de-alerting” measures have reasonable promise. **If one considers de-alerted weapons to be unnecessary to maintaining nuclear deterrence, then the implications of having to keep them in re-alertable status recede in significance.**
- Finally, there may be **other measures, such as cooperation on missile attack warning systems, that could ameliorate the risks of keeping nuclear weapons on alert.**

THE IDEA OF DE-ALERTING

Despite the end of the Cold War, the United States and Russia continue to maintain their ICBMs and many SLBMs in a highly alerted state—they are technically prepared to launch the missiles within minutes of a command decision to do so. Some analysts argue that, particularly in light of the distressed condition of the Russian military, these high alert conditions are tantamount to standing on the edge of a nuclear cliff from which we should now step back.¹ They have proposed various bilateral “de-alerting” measures, to be taken prior to and outside the context of the formal strategic arms reduction treaty (START) process. In practical terms, “de-alerting” means lengthening the amount of time it would take to launch nuclear weapons after a decision had been made to do so.

Others argue that the current alert postures of the two sides do not carry undue risks and that therefore no de-alerting measures are necessary or desirable. On the contrary, they say, some forms of de-alerting might be destabilizing. First, measures that made nuclear warheads more vulnerable to attack might give an aggressor a tempting advantage. Second, in a crisis, a dangerous race to *re-alert* forces might occur.² Third, removing forces from active status, making them unavailable to fulfill strategic strike missions, may weaken the nuclear deterrent effect of owning the weapons and thereby undermine national security.

Another view of de-alerting, taken by this paper, is that the issues raised by de-alerting proponents are, at the very least, matters of legitimate concern. A situation of mutual nuclear deterrence entails at least some risks that unauthorized, accidental, desperate, or even well-deliberated launches of nuclear weapons might occur. As long as nations choose to maintain nuclear arsenals, it is in their interests to try to limit the risks and assure that nuclear warfare begins only after the most careful, high-level deliberation.

Nuclear forces on high alert (ready to launch on very short notice) can elevate the risks of unauthorized or accidental launches. However, it does not automatically follow that any de-alerting measure will reduce the risks. The U.S., and, especially, Russia, keep nuclear weapons high alert at least partly for the purpose of addressing some problem, not for the purpose of increasing the risk of inadvertent nuclear war. If the underlying problems did not exist, or were ameliorated, the reasons for having the forces on alert on the first place would be eliminated or reduced.

¹ Most notably, Bruce Blair of the Brookings Institution; recently joined by former Senator Sam Nunn, Frank von Hippel and Harold Feiveson of Princeton, and the National Academy of Sciences Committee on Science and International Security. See, for example, Sam Nunn and Bruce Blair, “From Nuclear Deterrence to Mutual Safety,” *Washington Post*, June 23, 1997, p. C1. See also Bruce G. Blair, Harold A. Feiveson and Frank N. von Hippel, “Taking Nuclear Weapons off Hair-Trigger Alert,” *Scientific American*, November 1997 (at <http://www.sciam.com/1197issue/1197vonhippel.html>). See also Bruce Blair, “Testimony Before the Subcommittee on Strategic Forces, Senate armed Services Committee, March 31, 1998 (at http://www.senate.gov/~armed_services/statemt/980331bb.htm).

² See Walter Slocombe (U.S. Under Secretary of Defense for Policy), “Is there still a role for nuclear deterrence?” *NATO Review*, November-December 1997, pp. 25-26.

Some proponents of de-alerting measures argue that in fact that underlying problems of nuclear deterrence that high alert levels were originally meant to address have all but dissolved with the end of the Cold War. In this view, current alert levels are partly the result of political and organizational momentum and partly the result of a coupling, or interaction, of the behaviors of the two sides: each side maintains its alert levels because that is what it has long done and because that is what the other side does.³ Whatever the causes and motivations, however, nuclear deterrence does continue to play a role, albeit smaller than before, in the U.S.-Russian relationship. That being the case, the problems of nuclear deterrence also persist. If the underlying problems, for one reason or another, cannot be solved in any other way, then the two governments will continue to see high alert levels as necessary, either in day-to-day or in crisis situations.

In that situation, de-alerting measures may even exacerbate, rather than remove, instabilities in the system of mutual nuclear deterrence between two (or among several) nuclear powers. It may then be useful to look for *other* means of managing the risks.

Succeeding sections of this paper look at:

- Possible relationships between high nuclear alert levels and inadvertent nuclear war;
- The underlying circumstances that lead nuclear powers to place their nuclear forces at high alert levels in the first place;
- Various measures that might address those underlying circumstances;
- Various de-alerting measures intended to address the risks of inadvertent nuclear war; and
- Other possible measures for addressing the risks.

³ Bruce Blair, personal communication, July 8, 1998.

Box 1: U.S. and Russian Strategic Nuclear Alert Postures

United States	Delivery vehicles [*]	Warheads
ICBMs	468 of 550	1700 of 2000 ¹
SLBMs	96 of 432	630 of 3456 ²
Bombers	0 of 71	0 of ~1300
Russia		
ICBMs	500 of 755 ¹	2380 of 3589
SLBMs	288 of 480 ²	1504 of 2272
Bombers	0 of 94 ³	0 of ~1088

^{*}Numbers adapted from William Arkin et. al., *Taking Stock: Worldwide Nuclear Deployments 1998* (Washington, Natural Resources Defense Council, March 1998)

¹ Drawn from 1997 U.S. Stratcom unclassified briefing chart. Assumes 66% (see quotation below) for Russia. Also includes Russian mobile ICBMs in garrison.

² Drawn from 1997 U.S. Stratcom unclassified briefing chart; warhead total shown implies 4 SSBNs on alert with fewer than START I-accountable permitted warhead loadings on missiles. For Russia, includes alert submarines in port, but probably extremely optimistic.

³Very optimistic assumption of Russian bombers and bomber payloads available for alerting.

Significant Issues

- U.S. and Russia have both unilaterally announced “detargeting” of missiles, but retargeting is feasible within minutes.
- Russians have traditionally kept bulk of submarines in port under day-to-day conditions, but recent reports indicate only 2 now regularly are at sea.
- Alert Russian submarines in port and mobile ICBMs in garrison must be considered vulnerable to attack, and therefore increase pressures to launch before they are lost.
- ICBMs in silos, though sheltered, are also considered vulnerable. Higher concentration of MIRVs on Russian ICBMs gives Russians further incentive to LOW/LUA.
- Russians have traditionally planned to place bombers under alert only under crisis conditions. U.S. formerly kept 30% of bombers on strip alert, prepared to fly to safety (but to deliver weapons only after additional commands).

Statements on Launch Policies by U.S. and Russian Officials

US: “The United States will not rely on a launch-on-warning nuclear retaliation strategy (although an adversary could never be sure the United States would not launch a counterattack before the adversary’s nuclear weapons arrived).” — William S. Cohen, Secretary of Defense, *Annual Report to the President and the Congress, 1998* (Washington, D.C.: U.S. Department of Defense, 1998).

Russia: “In the SMF two- thirds of the strategic forces' nuclear delivery systems are in constant combat readiness ...The readiness of the missile complexes to launch is a few tens of seconds. It is worth specifying that in a situation when an aggressor's missiles are still in flight, only the missile forces are capable of dealing a counter blow, to which more than 90 percent of missions in this form of combat operations are assigned.” — Interview with Defense Minister Designee Igor Sergeyev by Valeriy Borisenko: Moscow, *Moskovskaya Pravda* in Russian, 4 Jun 97 pp. 9-10 (FBIS-SOV-97-110).

Deactivation

Complicating the debate over de-alerting is another issue that arose from the Helsinki summit of March 1997: Presidents Clinton and Yeltsin agreed that, if the START II Treaty goes into effect, strategic nuclear delivery vehicles to be eliminated under the treaty will be placed in “deactivated status” by the end of 2003. The US-preferred deactivation measure is removal of warheads from missiles—one step some non-governmental analysts also propose as a de-alerting measure outside the START context.

Deactivation (and, for that matter, elimination) of delivery vehicles would have the same general effect as de-alerting—extending the time required to prepare missiles for launch. Various proposed de-alerting or deactivation measures overlap on a continuum that ranges from minimal steps (such as de-targeting missiles) to maximal steps (such as totally destroying the delivery vehicle, its launcher, and its warhead). There is no obvious technical line of demarcation that shows where de-alerting measures stop and deactivation measures begin.

De-alerting and deactivation overlap conceptually as well as technically. In the START context, deactivation is to be the first step toward elimination of the delivery systems in question. **De-alerting, on the other hand, does not imply an intent to eliminate; indeed, it implies that “re-alerting” is a legitimate option.**⁴ At the same time, one of the goals of deactivation is also a goal of de-alerting: making it more difficult to employ weapons that are not yet eliminated. The significant difference remains: forces to be de-alerted are thought to be essential to some potential nuclear war plan; forces to be deactivated are deemed dispensable and scheduled for elimination.

Russian views on START-related deactivations, however, suggest some ambiguity. Substituting deactivation for immediate elimination does save them some expense. But it may also serve another purpose: to bridge the gap in potentially usable nuclear weapons caused by the Russian inability to produce new, single-RV SS-27s at the rate they would like. They may also see preservation of the missiles as a hedge against future U.S. exploitation of the large advantage in delivery system upload capabilities that it will have under START II.⁵

⁴ However, for some advocates of de-alerting, this may not exactly be the case. Blair, et. al, op. cit. footnote 1, advocate initial unilateral de-alerting of certain forces as a means of inducing Russia to follow suit. They argue that the U.S. forces that remain should form an adequate nuclear deterrent, implying that there would be no need for the U.S. to re-alert the forces even if Russian forces remained on alert or if a crisis erupted. Elsewhere (see “Testimony,” op. cit. footnote 1) Blair also argues that “Far fewer U.S. strategic weapons than currently deployed would provide ample deterrence under any plausible conditions of U.S.-Russian tension.” However, he also states that “If a national emergency requires it, the weapons could be re-alerted in small or large numbers depending on the circumstances.”

⁵ A Russian journalist describes the Helsinki extension on START II eliminations as follows:

Also, the five additional years would allow Russia to destroy most of its multiple warhead intercontinental missiles only after they had served as long as technically possible.

Pavel Felgengauer, “Defense Dossier: Infighting by Other Means,” *Moscow Times* April 16, 1998.

For its part, the U.S. under START II will be achieving strategic warhead reductions by downloading missiles and bombers that it could, in principle, load up again later.

High Alert Levels and the Risks of Inadvertent Nuclear War

The risks of inadvertent nuclear war include the possibilities that:

1. Insubordinate officers, or officers responding to orders of rebellious regional political leaders, might carry out unauthorized launches.
2. Erroneous information (false or inaccurate alarm) leads one side to believe it must launch a nuclear attack before the other side destroys (or unacceptably weakens) its ability to do so ("accidental" nuclear war).

This section discusses these kinds of risk in turn, though each has the potential to compound the other. These risks will generally be much lower in a day-to-day situation of normal nuclear-power relations than in a crisis situation. The section examines for the two kinds of risk the role that high alert rates—in the sense of readiness to launch nuclear weapons on very short notice—might play.

Unauthorized Launches

The U.S. and Russia attempt to place multiple levels of control over strategic nuclear weapons to assure that none will be launched without orders from their respective national authorities. With sufficient illicit collaboration, rebellious officers might in some instances be able to override the control systems. For example, SSBN crews are technically able to launch SLBMs without having to overcome electronic or mechanical blocking devices from outside the submarine. In 1997, the U.S. Navy instituted a new dual-authorization system that further reduced the possibility of unauthorized SLBM launches.⁶ Blair relates that Russian SLBM control systems, at least several years ago, were very tightly centralized to make unauthorized launches difficult.⁷

Reports of poorly paid Russian soldiers, inadequate operating resources, and low morale exacerbate fears that rogue officers might launch nuclear missiles. At present, with Russian control systems and procedures as we understand them, the unauthorized launch seems an

⁶ The dual command and control path has been described as follows:

As required by the Nuclear Posture Review, control over the nuclear weapons in the Submarine Force will soon be more similar to the other legs of the Nuclear Triad. A dual command and control path will be adopted when 'Use Control' is implemented. In addition to the authentication procedures traditionally employed for sea-launched ballistic missiles, a parallel launch authorization requirement must also be satisfied in order to conduct a strategic launch. Although not technically the same as the Permissive Action Link (PAL) used in the remainder of the Nuclear Triad, 'Use Control' provides another level of security against the unauthorized launch of nuclear weapons.

Preparations for the implementation of 'Use Control' devices have been extensive. In addition to a wide variety of administrative and required physical changes, a thorough Table Top Review incorporating crew walk-throughs was completed in January 1997. An End-to-End test is scheduled for each Fleet in May 1997. The submarine force will implement these new controls beginning July 1, 1997, with full implementation by October 1, 1997.

Commander Submarine Force, *U.S. Atlantic Fleet Submarine Community Newsletter* 2-97, 1 April 1997 (at <http://www.norfolk.navy.mil/sublant/qnews972.htm#N87WebSite>).

⁷ Op. cit. footnote 8, pp. 97-100 and 154-163.

unlikely scenario.⁸ Perhaps slightly more plausible is a situation in which an international crisis has led Russian leaders to distribute more widely the ability to launch missiles as a hedge against wartime loss of communications with the forces. Should they do so, the opportunities for unauthorized launch would increase. Moreover, the target country is more likely during crisis to assume that an unauthorized launch was authorized, and therefore more likely to reply with a rapid nuclear counterattack.

Another scenario for unauthorized launch would be that a Russian region broke away from the central government and took control of locally based strategic weapons.⁹ Then some political blackmail scheme might lead a threatened or actual launch of weapons.

Insofar as unauthorized launches might be a risk, higher alert levels could increase the risk in two ways. First, the more command units there are in control of weapons, the higher the number of opportunities for someone to seize and to fire the weapons. Second, the less time it took to prepare weapons to fire, the less opportunity there would be for central authorities to retake control.

On the other hand, even at low alert levels, the risk of unauthorized seizure of control of nuclear weapons does not disappear. Indeed, if non-alerted weapons are “out of sight, out of mind” of central commanders, but still capable of being prepared on a local level for launch, they might pose an even greater risk than if they were still maintained within the active command-and-control system. Of even greater concern would be a major breakdown of Russian society and the military hierarchy to the point where they could no longer sustain the nuclear launch control systems.¹⁰ If the de-alerting measures in effect left the weapons and the means of re-alerting them still in the breakaway region, the political or military figures in regional control could still use them.

⁸ At a press conference (November 4, 1997) after a visit to Russia in late October 1997, CINCPAC, General Eugene Habiger, reported:

I was also exposed to their command centers, from the national-level command center down to the command center in a road-mobile missile and also a rail-mobile missile, and at all levels and saw the individuals on duty, talked to them, asked them questions, every question I asked was answered in depth, and the thing that struck me about going into their command centers, command-and-control centers is that they are very much geared to a fail-safe mode. And what I mean by that is that any one of the command centers, from the national level down to the unit level, can inhibit the launch of an intercontinental ballistic missile.

http://www.defenselink.mil/news/Nov1997/t11071997_thabiger.html

Bruce Blair concluded in 1993:

Under present and in all likelihood future conditions, that system [of nuclear control safeguards] should be able to deal effectively with aberrant behavior within the chain of command and with threats stemming from social upheaval in the former Soviet Union.

See Blair, *The Logic of Accidental Nuclear War* (Washington, DC: The Brookings Institution, 1993), p. 107.

⁹ General Alexander Lebed, governor of Krasnoyarsk Province, somewhat facetiously suggested this scenario in July, 1998. Pointing out that the soldiers of the Uzhur-4 missile unit (note: with 6 SS-18 ICBMs) had not been paid for 5 months, he proposed taking over the base and feeding the unit in exchange for nuclear power status for Krasnoyarsk. See Aleksey Tarasov: "Women Revolt Again. But This Time in a Nuclear Missile Division," *Izvestiya* July 25, 1998 (FBIS-UMA-98-205).

¹⁰ As suggested by Bruce Blair, *The Logic of Accidental Nuclear War*, op. cit. (footnote 8), pp. 108-109.

Another potential consequence of the breakdown of central military authority is that weapons security could decline and that the weapons could by theft or sale fall into the hands of criminals, terrorists, or proliferant states. De-alerting measures that led to the removal of nuclear warheads to central, better protected locations might alleviate this “loose nukes” problem.¹¹ On the other hand, measures that removed warheads from delivery systems, but kept them more readily available for re-mounting (or dispersed them for survivability purposes) might spread security forces more thinly and expose the warheads to even greater risk of illicit diversion. In the case of a regional breakdown of central authority, the weapons would be at least as vulnerable to seizure by those in local control as if they were still on alert status.

Accidental Launches

This paper defines “accidental” launch as a situation in which erroneous information (false or inaccurate alarm) leads one side to believe it must launch a nuclear attack before the other side destroys (or unacceptably weakens) its ability to do so.¹²

High alert status implies at least the ability, if not necessarily the intention, to take only a few minutes (at most) to interpret warning information and decide whether to engage in nuclear warfare. Decision-makers will also be influenced by the knowledge that the potential adversary as well has forces on high alert, and is therefore in principle capable of launching an attack at any moment. Short timelines make error more likely and harder to correct; therefore, false or incomplete indications of attack are more likely to lead to a rapid retaliatory response.

Nevertheless, interpretation of warning information will take place in the context of information about the general state of relations between the potential adversaries. If there is no reason to think that a state of conflict exists, decision-makers are more likely to question false alarms and delay a response until the situation can be sorted out. On January 25, 1995, a scientific rocket probe launched from Norway appeared on Russian radar screens. Within minutes, President Yeltsin was alerted that this might be a U.S. submarine-launched missile (no one having been told that the Norwegians had notified Russian authorities of the launch plan weeks earlier). A few minutes later the Russian military determined that the rocket posed no threat. We do not know how close the Russians came to erroneously concluding that the rocket was a missile, or whether President Yeltsin would have ordered a counterattack based

¹¹ Removing warheads to central locations, however, would increase potential force vulnerability problems, discussed below.

¹² Another, more remote, possibility might also be considered: that a command system might suffer a concatenation of electronic, mechanical, or human failures that led to accidental automated dissemination of launch orders. It would be worthwhile to analyze the workings of current command systems to see whether any plausible scenarios for this kind of accident can be found. On the other hand, there have been actual cases of false alarm signals having led to the need for high-level consideration of whether an enemy attack might be under way. This seems the likelier (if still not very likely) path to accidental nuclear exchange.

solely on the warning that a single missile was coming.¹³ Nevertheless, given the extreme improbability of a “bolt-from-the-blue” U.S. attack, a rapid nuclear response seems unlikely.

On the other hand, nuclear forces are kept on day-to-day alert precisely as a hedge against the remote possibility of a bolt from the blue. Insofar as the high alert posture includes “counterforce” (counterattack on nuclear forces) capability, it is externally indistinguishable from a capability to launch a preemptive surprise attack. Each side must then hedge against this possibility. In part, then, each maintains a high alert posture because the other does.¹⁴

The continuous ability to respond rapidly to perceived threats imposes a requirement for quick decision when a warning signal (or a set of warning signals) appears: nuclear command authorities must decide whether to: a) launch a counterattack, b) ride out the perceived incoming attack, or c) assume the alarm to be false and wait to see what happens next.

At least for some analysts, the risk that Russians with alerted forces might make the wrong decision is compounded by:

- gaps in the Russian early warning radar and satellite systems that reduce the amount and quality of information available to decision-makers;
- possible breakdown (mechanical or human) in those systems that might increase the rate of false alarms;
- Russian-perceived vulnerability of Russian command, control, and communications (C3) systems to U.S. conventional or nuclear attack;
- growing theoretical vulnerability of Russian strategic nuclear delivery systems to U.S. nuclear attack; and
- growing reliance of Russia on a declared “launch-on-warning” (LOW) policy to ensure the survival of those systems.

Nevertheless, one would expect that, under normal circumstances, Russian decision-makers would deem a bolt-from-the-blue to be highly unlikely. They are also more likely, therefore, if confronted by a false alarm, to wait for further information than to unleash a nuclear war. Under crisis conditions, however, the situation is less clear.

¹³ Theodore Postol has pointed out that the missile’s trajectory was not in the direction of Russia, but that it was along a path where a nuclear explosion could have blinded Russian early warning radars to land-based ICBMs coming from the U.S. Theodore A. Postol, “The Nuclear Danger from Shortfalls in the Capabilities of Russian Early Warning Satellites,” Presentation at the Carnegie Endowment for International Peace, Washington, DC, February 26, 1999.

¹⁴ Note, however, that with some constellations of opposing forces, a “bolt-from-the-blue” counterforce capability might be mustered with very little warning: a very low day-to-day alert rate on one side might do little to reassure the other that his forces were fully invulnerable to a disarming attack.

Crisis Escalation

With the Cold War over, it is easy to dismiss the possibility that Russia and the U.S. will have any reason to engage in confrontation leading to nuclear crisis. The principal Cold War scenario of a Russian invasion of Western Europe certainly seems out of the question. On the other hand, some scenarios of escalating tension are still imaginable. Suppose, for example, that Russia perceived ethnic Russians in one of the Baltic states to be badly mistreated and decided to threaten military intervention to protect them. It might be difficult for the U.S. to stand idly by and not attempt to deter Russian intervention—especially if the Baltic state in question had, over strenuous Russian objections, joined NATO. For their part, because of the disintegration of their conventional military capabilities, the Russians have announced an intention to place an increased reliance on nuclear deterrence to protect their interests.

Now combine such a scenario with the conditions outlined above: growing Russian reliance on a launch-on-warning posture; perceived vulnerabilities to a disarming attack; a weakened early warning system; the potential for false alarms emerging from that warning system. Add to these considerations the human tendencies for misperception and miscalculation that may be heightened in periods of tension. An unlucky confluence of more than one false alarm with a crisis-bred expectation that conflict was imminent could lead to nuclear disaster.

Before proceeding to a discussion of specific de-alerting and deactivation measures, it is important to consider the reasons that strategic nuclear forces are placed on alert status in the first place. This will lead to some understanding what military commanders hope to achieve by maintaining forces on alert and what they would be giving up by taking them off alert. It will also allow the development of some criteria for deciding what kinds of de-alerting or deactivation measures might help stabilize the interactions of the nuclear powers and what kinds might actually make matters worse. Finally, it will lay a basis for identifying additional measures that are not strictly in the categories of de-alerting or deactivation, but instead are directed at trying to *manage* some of the risks associated with continuing to have strategic nuclear weapons on alert.

Circumstances That Lead to High-Alert Conditions

The United States and the Soviet Union (and now Russia) have maintained high states of nuclear alert for at least three purposes. First, they wanted to guarantee the survival under attack of the alerted missiles (as well as survival of the ability to launch them—command and control) so that a nuclear retaliation could be assured. Second, they wanted to use many of those missiles to counterattack the other side's nuclear delivery capabilities in an attempt to limit the additional damage that the other side might inflict as the war progressed. The nuclear capabilities to be attacked would include C3 facilities, bomber bases, stationary ICBMs, and SLBM ports. Third, they wanted to offer concrete evidence of their readiness and willingness to use nuclear weapons in their national interests—i.e. to enhance the credibility of their nuclear deterrent threats.

Keeping these objectives in mind, it becomes clear that high alert states did not stem just from the political hostility between the Soviet Union and Russia, but also from the strategic

nuclear forces and postures that each side deployed over the years. There were strong incentives to maintain high alert rates when:

- Either or both sides depended for retaliation on weapons deployed in such a way that they were (or became) so vulnerable to attack that it appeared they would be lost if not used or at least dispersed promptly;¹⁵
- Either or both sides maintained a C3 system so vulnerable that it seemed necessary to use it to order a counter-attack, or at least to disperse some of its elements, before it was lost;
- Either or both sides deployed weapons that could exploit those vulnerabilities and appeared to threaten the survivability of the other side's retaliatory forces;
- Each side strongly emphasized nuclear deterrence as a central means of dissuading the other from impinging on its vital national interests (e.g., invading Western Europe).

Note that not all forms of high alert status imply a “use-it-or-lose-it” problem. Some alerting measures make forces *less* vulnerable and therefore better able to ride out a nuclear attack. For example, when 30% of U.S. bombers were on airstrip alert, they could have taken off quickly enough to evade a long-range ICBM attack. Russian land-mobile missiles can be sent out of their garrisons to survive by hiding. Missile-launching submarines in port can be sent to sea. Airborne strategic command posts can be sent aloft. In none of these cases does being placed on high alert have to imply a need or intent to launch weapons on warning.

At the same time, most visible forms of high-alert status are likely to have a *symbolic* effect, sending a message—intended or incidental—to one's possible adversaries about how likely one perceives conflict to be. Thus, when the U.S. took its bombers off day-to-day alert status, it presented the step as a symbol to the Soviet Union that cold war tensions had eased. If the bombers were now placed back on regular alert, they would convey the opposite message.

Nuclear alert states, then, indicate not just a degree of readiness, but a degree of *willingness* to use nuclear weapons.¹⁶ Various U.S. policy makers in recent years have said

¹⁵ Blair has argued in various works (e.g. in Blair, Feiveson, and von Hippel, op. cit.) that military commanders worried not just that a core retaliatory force would not survive, but that they would be unable to execute strikes on the full spectrum of targets deemed important to deterrence. This analysis is supported by the testimony of former commander of the U.S. Strategic Command, General Lee Butler:

...the dilemmas and blind alleys of concrete practice...mattered absolutely to the people who had to sit down and frame the detailed guidance to exact destruction of 80 percent of the adversary's nuclear forces. When they realized that they could not in fact assure those levels of damage if the president chose to ride out an attack, what did they do? They built a construct that powerfully biased the president's decision process toward launch *before* the arrival of the first enemy warhead.

Butler interviewed in Jonathan Schell, *The Gift of Time* (New York: Holt, 1998), p. 194.

¹⁶ The commander-in-chief of the Russian Strategic Missile Forces has indicated this role for bombers:

The strategic Air Force has its own tasks. The high flexibility and, if you will permit me the expression, returnability of the aircraft, i.e. a genuine demonstration of threat combined with the possibility to abort a mission after take-off and during the entire flight on the way to their targeted objectives, substantially enhances the SNF capability.

Continued next page

that nuclear weapons are playing a smaller—though still important—role in U.S. national security policy. In contrast, Russians, with their declining conventional military capabilities, have been declaring that nuclear weapons will be playing an increasingly important role for them.

Nuclear deterrence as a substitute for conventional deterrence of other nuclear powers depends, ultimately, on threat of escalation to central nuclear war. Introducing a time lag for possible response increases chances of *fait accompli*, with “defending” side deciding that the provocation does not justify mutual destruction. In general, de-alerting lowers the immediate risk of escalation, and therefore the credibility of nuclear threats as deterrents to conventional military action.

Today, the U.S. and Russia still maintain high alert conditions on parts of their nuclear forces. That is because, to some extent, the circumstances that led them to do so in the first place still exist. Changing these circumstances, either unilaterally or by mutual agreement, would in turn reduce the incentives to keep forces on high alert. The next two sections of this paper discuss, first, measures to change high alert incentives and, second, de-alerting measures themselves. Finally, the paper offers some suggestions for measures that might ameliorate the risks of continued high alert states.

Interview with “Gen. Vladimir Yakovlev on the Role of the SNF,” *Yaderny Kontrol Digest* No.7. Spring 1998.

The U.S. Joint Chiefs of Staff have also alluded to this function of alert status:

Certain types of delivery systems can be postured to send a clear warning. Alert posturing of nuclear delivery systems to dispersal locations can send a forceful message that demonstrates the national will to use nuclear weapons if necessary.

Joint Chiefs of Staff, *Joint Pub 3-12: Doctrine for Joint Nuclear Operations*, 15 December 1995, p. I-4 (available at http://www.dtic.mil/doctrine/new_pubs/jp3_12.pdf).

Another Russian analyst states the case in a slightly different way:

In fact it is difficult to deny a certain destabilizing role of a surprise retaliatory counterstrike, but this form of retaliatory operations also has a strong stabilizing side, the role of which has not been studied up to the present time. The risk of making an improper decision increases sharply as the situation exacerbates and in the course of waging a wide-scale conventional war. And this means that the threat of a surprise retaliatory counterstrike has to deter not only against nuclear aggression, but also against global exacerbation of the situation altogether, not to mention wide-scale war! And this of course is reason for reflections on the equivocal role of a surprise retaliatory counterstrike in nuclear deterrence strategy.

Vladimir Zinov'yevich Dvorkin, "Nuclear Deterrence and START II Treaty: Food for Thought for State Duma Deputies," *Nezavisimoye Voyennoye Obozreniye*, 5 February 1997 (FBIS-UMA-97-025-S). Dvorkin is an army Major-General, doctor of technical sciences, professor, and chief of the Russian Federation Ministry of Defense 4th Central Scientific Research Institute.

Changing the Incentives to Keep Forces on High Alert

Reducing the Role of Nuclear Deterrence in National Security Policy

As noted above, in recent years the United States has felt able to reduce its reliance on nuclear deterrence. Not only did the Soviet threat to Western Europe dissolve, but also U.S. forces have conventional military superiority against virtually any other state. Thus the U.S. has relegated nuclear forces, theater and strategic, to less prominent positions. The U.S. has removed several thousand theater nuclear weapons from Europe, leaving several hundred behind mainly for political-symbolic purposes; none of those remaining continue in “quick reaction alert” status. The U.S. has also withdrawn its sea-based theater nuclear weapons to shore.

Finally, it has taken all strategic bombers off alert, despite the resulting technical increase in vulnerability of that arm of its nuclear forces. In effect, the U.S. is saying that it can rely for deterrence on a smaller survivable nuclear force than it once believed it needed. Strategic arms reductions, as in START I—and in the so-far unimplemented START II agreement—convey the same message: the eliminated arms are, so to speak, permanently de-alerted.

Nevertheless, some critics of current U.S. policy argue that the U.S. has not gone nearly far enough toward adjusting to the end of the Cold War. In this view, the end of the threat of Soviet military power means that the U.S. needs to maintain only a core of a few hundred survivable nuclear weapons to deter any conceivable nuclear threat to the U.S. or its allies. Cold War concerns of relative advantages in nuclear combat of being able to launch weapons rapidly are no longer in tune with new realities. Since, in this view, the greatest threat to U.S. security comes Russian weakness, not strength, the higher U.S. priorities should be “...to reduce the “use or lose” pressure on the Russian strategic arsenal, and to prevent its accidental, unauthorized, or mistaken launch.”¹⁷

In contrast, a Presidential Decision Directive revising U.S. nuclear doctrine in 1997 reportedly declares that the U.S. will continue to rely on nuclear weapons as a “cornerstone” of national security for the “indefinite future.”¹⁸ While departing from a two-decade-old policy of preparing for “protracted” nuclear war, apparently the directive did not alter military requirements that would keep the U.S. strategic arsenal at around the 2,000-2,500 level projected for a START III agreement.¹⁹

Blair argues that the persistence in U.S. policy of placing deterrence concerns ahead of safety concerns is a product less of logic than of institutional momentum.²⁰ In this view,

¹⁷ See Blair, “Testimony,” op. cit. footnote 1

¹⁸ As reported by R. Jeffrey Smith, *Washington Post*, Dec. 7, 1997, p. A1.

¹⁹ According to Edward L. Warner, III, Assistant Secretary of Defense (Strategy and Threat Reduction), While the directive does not address arms control issues, per se, analysis undertaken in accordance with the new guidance shows that the U.S. strategic deterrent can be maintained at the 2000-2500 strategic weapon level envisioned for START III as agreed in the 1997 Helsinki accords.

Warner, “Statement” before the Strategic Forces Subcommittee, Senate Armed Services Committee, March 31, 1998 (at http://www.senate.gov/~armed_services/statemnt/980331ew.htm).

²⁰ Blair, loc. cit., footnote 3.

bureaucrats and political leaders find it easier to maintain old ways of thinking than to institute change. Further, military leaders fear the consequences of de-alerting measures, which could conflict with long-held beliefs in the importance of constant readiness and which may negatively affect the moral and skills of personnel. Meanwhile, in Russia (as noted below), the psychological incentives to rely on nuclear deterrence to guarantee national security are even greater.

Others argue that continued U.S. emphasis on nuclear deterrence is a fully logical response to the international environment. In this view, given continued and growing Russian reliance on nuclear deterrence, the U.S. must hedge against the rise of a more hostile government and against future improvements in Russian forces. The U.S. also needs to maintain nuclear deterrence against a potential Chinese threat, against proliferating nuclear states such as North Korea, Iraq, or India, and against possible threats from states possessing chemical or biological weapons.²¹ Keith Payne argues:

When U.S. operational practices and declaratory policies limit the flexibility of U.S. nuclear forces and the credibility of U.S. Nuclear threats, they undermine the prospects for effective deterrence and increase the likelihood of regional crises and wars...The quantity of nuclear forces also still matters for deterrence. It is far from obvious that a relatively small number of U.S. nuclear weapons could provide the coverage of targets necessary vis-à-vis Russia, China, and the variety of prospective regional challengers such as Iraq that we will need to be capable of deterring in the future.²²

In addition, he says,

...if the U.S. brought its nuclear stockpile down to the hundreds, nuclear weapons would likely become more attractive to regional aggressors. At that level, a would-be proliferator could “buy in” to near-superpower status in terms of nuclear weapons.²³

These analysts do not believe that a few hundred survivable nuclear weapons, such as recommended by Blair, Feiveson, and von Hippel, would provide adequate deterrence. However, the larger issue for those making such arguments is exactly that decreases in readiness to use nuclear forces (or actual deep reductions in forces) signify a decreased willingness to use the weapons, and a corresponding loss in needed deterrent effect.

The question of the importance of nuclear deterrence to U.S. security hinges greatly on matters of philosophy and judgment, and it is not resolvable by logic and analysis that everyone will agree are objective and correct. It will certainly not be resolved in this paper. Nevertheless, it does seem possible to conclude that the perceived need to keep nuclear forces on high alert correlates strongly importance attached to the role of nuclear deterrence.

²¹ See, for example, Kathleen C. Bailey, Statement Before the US Senate Armed Services Committee, Subcommittee on Strategic Forces,” March 31, 1998 (at http://www.senate.gov/~armed_services/statement/980331kb.htm.)

²² Keith B. Payne, “Why Nuclear Weapons Are Critical For U.S. Security,” Testimony before the U.S. Senate Arms Services Committee Subcommittee on Strategic Forces, March 31, 1998 (at http://www.senate.gov/~armed_services/statemnt/980331kp.htm)

²³ Moreover, he argues, Japan, Germany, and South Korea will be lose faith in the U.S. nuclear umbrella and “...will be motivated to go ‘nuclear themselves’ for deterrence purposes.” Payne, *ibid*.

Conversely, those arguing for very low alert levels attach less significance to that role and to the number of weapons needed to sustain it. In addition, one's view of nuclear deterrence will also affect the weight one will attach to each of the criteria proposed below (p. 29) for evaluating de-alerting measures

As noted above, Russia has begun increasing the importance it places on nuclear deterrence. Russia will also be living, by necessity, with a smaller strategic nuclear force than it once maintained. Having lost the Eastern European satellite states and several Soviet republics, it has withdrawn the theater nuclear weapons previously deployed in those regions. Its strategic nuclear forces show every sign of shrinking by attrition, with or without a START II or III agreement. Even so, Russian conventional military forces are in still worse condition, and the Russians have openly declared an increased reliance on nuclear weapons both as a "shield" protecting their core security interests and as a way of countering any potential military threats to their borders. Thus, visibly ready-to-use nuclear weapons continue to play a large, even growing, role in Russian national security policy.²⁴

With substantial portions of their strategic forces in principle vulnerable to a disarming attack, the Russians have taken a somewhat troubling route to enhancing force survivability: declaring frequently that their ICBMs and SLBMs missiles are prepared to launch on warning. On the other hand, they have not seen fit to use much of their scant military resources to improve the situation: most SSBNs are in port, most mobile ICBMs in garrison, and no bombers on alert. In addition, it is not clear that their degraded missile early system is even capable of supporting a launch on warning.²⁵ Thus it may be not just that they are using high alert status as a survivability measure, but that it is also a means of maintaining a nuclear presence, of subtly rattling the nuclear sword to warn off any who might think of trying to exploit their conventional military weaknesses.

It seems likely, therefore, that proposals for de-alerting nuclear forces will find a very resistant audience among Russian leaders.

²⁴One Russian analyst writes:

But, until nonviolence has become the norm in international relations, the Russian Federation's national interests demand the existence of sufficient military might. This is why the Armed Forces' most important task is deemed to be to ensure guaranteed nuclear deterrence as a most important mechanism for preventing nuclear and conventional large-scale wars, as a guarantee of resolving conflict situations on terms acceptable to Russia in the event of a regional war being unleashed, and also as a factor of stability in implementing Russia's obligations as an ally. One of the most important statements, which is contained in the National Security Blueprint and which attracted the greatest critical pressure, is that the Russian Federation reserves the right to use nuclear weapons if there is a danger of a regional war escalating into a large-scale war or in cases where the actions of aggressors cause irreparable harm to the country's security interests.

Ilya Maksakov, "Basic Security Document. Military Reform Is Impossible Without Defining Country's Interests and Chief Threats," *Nezavisimoye Voyennoye Obozreniye*, No. 7, 20-26 Feb, p. 4 (FBIS-UMA-98-056).

²⁵ Postol, op. cit.

Increasing One's Own Ability to Ride Out a Nuclear Attack

Reducing reliance on launch-on-warning capability as a force survivability measure reduces the need to keep the force on high alert status.

Survivable Basing Modes

The U.S. has placed an increasing portion of its nuclear retaliatory capabilities on ballistic missile submarines (SSBNs), thus far considered highly invulnerable to preemptive attack while hidden at sea. During the cold war, the U.S. also maintained a portion of its bomber forces on airstrip alert, ready to escape to safety from a sudden nuclear attack. In a crisis, however, this survivability measure could be adopted again.

At the same time, there have been limits to how much the U.S. has wanted to spend on force survivability. After prolonged debates in the 1980s, the U.S. rejected ideas either for multiple-shelter basing modes for the Peacekeeper (MX) ICBM or for a new, road-mobile, single-RV small ICBM. Russia has moved in the direction of more survivable ballistic missiles, and ratification of START II would take the process further. Unfortunately, because of financial distress, Russia has kept a high proportion of its SSBNs in port, where they would be vulnerable to even the least capable of U.S. strategic nuclear weapons, and perhaps to conventional strikes as well. The Russians have also declared these missiles to be in a "launch-on-warning" state of alert. Moving more submarines to sea would decrease the pressure to "use 'em or lose 'em."²⁶

Russia has also deployed land-based ballistic missiles (SS-24s and SS-25s) on mobile platforms, making them less vulnerable. The multiple-warhead SS-24 is slated for elimination under START II, but the single-RV SS-25s are to be augmented and eventually replaced by SS-27s (subject to financial limitations). Both systems are currently maintained mostly in garrison, where they would be more vulnerable, and from which they might be launched on warning of attack.

Making ICBMs Less Attractive Targets

If, as START II stipulates, the U.S. and Russia move to ICBMs with only single warheads, the advantages of using ICBMs to attack ICBMs will decline: it would likely take on average more than one RV to destroy an RV on the other side. If the two sides have approximately equal numbers of deliverable nuclear weapons, then such an attack would serve to disarm the attacker more than the victim. Thus, implicit in the notion of bilateral movement toward single-RV missiles is a degree of willingness to back away from earlier counterforce strategies that were intended to limit the potential damage the other side could inflict by destroying his missiles before they could be used.

²⁶ Russian SSBNs at sea also have to be concerned about U.S. attack submarines deployed in the Russian submarine patrol areas. With few SSBNs at sea, and with fewer counter ASW-resources to support them, these submarines are at risk of ASW attack before they can launch their missiles.

Early implementation of START II goals, perhaps by deactivation of multiple warhead missiles scheduled for elimination (SS-18 and Peacekeeper) would bring the benefits of decreasing target attractiveness even before the missiles were dismantled. However, this step would accentuate, not solve, the problem of the vulnerability of mobile-land based missiles held in garrison.

If, as some propose, the U.S. were to abandon land-based ICBMs altogether, then Russia would no longer be tempted to attack them. Under day-to-day conditions, U.S. bombers would still remain vulnerable, but SSBNs at sea would still be able to retaliate. (However, the U.S. would want to be confident that the C3 system for the submarines would survive long enough to disseminate attack orders.) In a crisis situation, the bombers would likely have been placed on alert and could be launched on warning of attack (as well as automatically turned around and returned to base later unless an actual attack had occurred).

Increasing C3 Survivability

Both the U.S. and Russia (and the Soviet Union) have in the past taken measures to improve the abilities of their strategic nuclear C2 systems to survive nuclear attack. Techniques include redundant channels (e.g. ELF, VLF, EHF, UHF, SHF) and nodes (e.g. from fixed, land-mobile, airborne, or satellite platforms) of communication as well as hardened and mobile command posts.

In the ideal situation, each side would be confident that it could still communicate orders to its forces to deliver a devastating retaliatory attack after riding out a first strike from the other side. This situation would decrease whatever temptations existed to launch a counterattack promptly, before one's C2 system was disabled. It would also decrease the temptation to the other side to believe that it could substantially limit damage to itself by destroying the other side's C2 system.

The chief drawback of increasing C3 survivability for both the U.S. and Russia has been the additional expense. When they had to choose between C3 enhancements and strike force enhancements, the tendency of military establishments on both sides has been to choose larger or more capable forces.

Unambiguous Second-Strike Policy

As noted in Box 1, current U.S. declaratory policy is to "...not rely on a launch-on-warning nuclear retaliation strategy (although an adversary could never be sure the United States would not launch a counterattack before the adversary's nuclear weapons arrived)." An advantage of this ambiguity is that it further decreases any confidence the Russians might have had that they could successfully execute a disarming first strike against the U.S. A disadvantage of this ambiguity is that it requires maintaining the technical capability to launch a nuclear strike on a few minutes' notice. Provided that one also has the capability to carry out the first part of the policy ("not to rely on launch-on-warning"), there is an alternative: simply to have a policy of not launching on warning.

Self-denial of the LOW option would relieve any potential pressures on the side adopting it to react prematurely to false warning signals. Such self-denial by itself would not necessarily be very reassuring to the potential adversary, since it would be more of a declaration of intent than a demonstration of a reduced capability to threaten a disarming first strike.

However, a delayed second-strike policy would relax the targeting requirements that tend to go with maintaining the LOW option: that is, there would be little point in retaining extensive counterforce capabilities in the hopes of significantly reducing damage in a nuclear war.²⁷ In turn, forces obviously structured purely for punitive retaliatory strikes would reduce the need for the other side to maintain its own forces on high alert for fear of a counterforce first strike. See the following section (“Decreasing the Threat”).

Military objections to a delayed second-strike policy include:

- 1) force and C3 vulnerabilities,
- 2) intentions to attempt to use counterforce to try to limit enemy-inflicted damage, and
- 3) possible associations of “delayed-first-strike” with “no-first-use.”

“No-first-use” means not using nuclear weapons at all unless the other side has used them first. Russia for many years maintained a declaratory “no-first-use” policy (generally disbelieved in the U.S. and later admitted by some Russians to be meaningless). With the decline of Russian conventional military power, Russia retracted its “no-first-use” declaration and adopted a policy more like that of the U.S. This change puts the shoe on the other foot: the U.S. policy originally was intended to indicate that the U.S. was prepared to counter Soviet conventional military superiority with nuclear escalation (More recently, U.S. policy has emphasized the option to use nuclear weapons in response to any attacks with chemical or biological weapons.)

Nevertheless, A “delayed-second-strike” policy need not be the same as a “no-first-use” policy. Although the United States never had a “no-first-use” policy, the circumstances under which it might have considered first use against the Soviet Union were generally thought to be those of “flexible response,” in which limited nuclear strikes, probably with theater nuclear weapons, would be used to stave off local conventional defeat or to indicate willingness to raise the stakes of an ongoing war. By the 1960s, it was difficult to conceive of a scenario in which the U.S. would launch a counterforce first strike against the Soviet Union without the provocation of nuclear attack against the U.S. or its allies.

²⁷ There is also little logical point in trying to retain such a capability for the LOW option, but the prospect of a high-tempo nuclear exchange seems to lead some military planners to hope that some of their retaliatory weapons would reach the adversary’s vulnerable reserve weapons before those were launched in a follow-on strike.

Decreasing the Threat to the Other Side's Forces

An emphasis on strategic nuclear counterforce capabilities affects the interaction of alert forces in two ways. First, it increases the incentive to the adversary to keep its own forces on alert as a survivability measure. A force that could carry out meaningful counterforce missions in a retaliatory strike could do much more damage to the opponent's nuclear forces in a first strike. (For example, this is why the United States saw the SS-18 missile as so "destabilizing" and why it insisted in the START II agreement on the elimination of MIRVed ICBMs.) Second, when meeting counterforce objectives is a primary criterion for military performance, the pressures on military and civilian leaders to launch weapons promptly if war appears certain are increased. In terms of those objectives, the calculated differences between launching promptly and waiting are substantial. (Note, however, that this is not to assert that a launch on warning would be the most probable event; some analysts argue that there would be stronger political incentives to ride out an enemy first strike.)

U.S. Option

Russia retains SS-18 and SS-19 ICBMs in fixed silos. Under START II it would eliminate the SS-18s, but replace some 90 of them with silo-based, Single-RV SS-27s. It would also retain some 105 SS-19s downloaded to single RV each. The greatest threats to these missiles are in the 500 W-87 Peacekeeper warheads (on 50 missiles) and around 400 W-88 warheads on Trident missiles. Trident I missiles with W-76 warheads may also have significant counterforce capabilities. The Trident missiles may be of particular concern to the Russians, because they combine hard-target kill capability with potentially short warning time.²⁸

The U.S. is scheduled to eliminate the Peacekeepers under START II, although it could move the large, accurate warheads to single-RV Minuteman III missiles. Deactivation of the W-87 and W-88 warheads would remove a significant part—but by no means all—of the U.S. ballistic missile threat against Russian fixed-based missiles, and thus lessen the Russian incentive to launch those missiles rapidly.²⁹ However, this step would not lessen the vulnerability of garrisoned mobile ICBMs or of the SLBMs in port. Moreover, if the U.S.

²⁸ T. Postol has carried out unclassified analysis showing possible counterforce potentials for Trident I and II missiles. He has also shown that Russian early warning radars and satellites have gaps in coverage that might not allow them to see Trident strikes coming. See footnote 13. At the same forum, Geoffrey Forden of the Congressional Budget Office stated that Russians had told him that they did not worry too much about poor warning of Trident strikes because they did not believe the U.S. would conduct strategic strikes without also launching ICBMs.

²⁹ Blair, Feiveson, and von Hippel propose that the U.S. unilaterally announce the withdrawal of its W-87 and W-88 warheads, the immobilization of its Minuteman ICBMs, halving the number of normally deployed Trident submarines, reducing to 4 the number of warheads remaining on each SLBM, and alter submarine practices to require about a day to ready missiles for launching. They argue that the remaining force of weapons invulnerable at sea would provide "ample capacity to deter any nuclear aggressor." They say:

Such a dramatic shift by the U.S. would fully establish its intention not to pose a first-strike threat to Russia. We believe this change in policy would persuade Russia to follow suit and take most of its missiles off hair-trigger alert. (op.cit.)

were to decide to take this step, it would be much more prudent to do so in the START III context, in which the step could be traded for further stabilizing measures on the Russian side.

Once Russia had only single-RV missiles left in silos, those would be theoretically vulnerable to attacks from W-87s or W-88s, or even the W-76s that remained on SLBMs. At the same time, the U.S. would need to use something more than one warhead (probably more like two) to destroy each Russian warhead. If the two sides were under START ceilings with approximately equal numbers of warheads, the counterforce payoff for the U.S. attack would be low. Russians might decide that the U.S. projected warhead expenditure would make launch on warning unnecessary and that drawing down U.S. destructive potential in this way would justify the sacrifice of the fixed-based missiles.

Russians may also be concerned about the vulnerability of their command-and-control system to U.S. short-warning hard-target killers. It is difficult to estimate how much the substitution of lower accuracy and yield weapons would reduce the threat they perceive.

Russian Option

Russian SLBMs do not constitute a significant “hard-target-kill” capability against U.S. ICBMs. If START II is implemented, the single-warhead SS-25s/27s and SS-19s may be able to destroy U.S. Minuteman silos. However, as noted above, the ratio of attacking to destroyed weapons will not be attractive. In the meantime, if the Russians were to deactivate their remaining 10-RV SS-18s, they would considerably reduce the theoretical threat to U.S. ICBMs. The U.S. has already agreed (subject to Senate ratification) to modify START II to allow Russia to postpone SS-18 elimination until 2007 and to complete deactivation (“or other jointly agreed steps) by the end of 2003. A Russian decision, unilateral or negotiated, to accelerate that schedule seems difficult to obtain.

Reducing C3 Vulnerabilities

For understandable reasons, neither Russia nor the U.S. can be expected to reveal much about possible vulnerabilities in their C3 systems. However, some Russians have professed a fear that U.S. forward-based systems in an expanded NATO, or U.S. nuclear sea-launched cruise missiles (SLCMs) off Russian coasts, could threaten Russian C3 facilities. The U.S. has stated that it has no plans to deploy nuclear weapons in the proposed new NATO states and no plans to return its nuclear SLCMs to sea.

Otherwise, it is largely up to each side to assure the robustness of its own C3 system. The greater the confidence that the system would survive a first strike, the less each side will need to rely on a rapid response to perceived threats, and the more it should find de-alerting measures acceptable.

As discussed further below, there may be ways that the U.S. and Russia can help increase the reliability of the warning segments of one another’s C3 systems, thus reducing the probability that false alarms would lead to unnecessary escalation of tensions or to premature launch of weapons.

PROPOSED DE-ALERTING MEASURES

Critics of the current high-alert states of Russian and U.S. nuclear forces have proposed that the U.S. lead the way for both sides to move away from that posture and toward policies of riding out the first wave of a nuclear strike, delaying potential retaliation for hours or days. To assure such a delay, the two sides would reciprocally carry out physical de-alerting procedures that would make impossible prompt launches of most (but, in the first stages, not all) long-range nuclear ballistic missiles. As noted above, the two sides' willingness to move in that direction will depend in part on each one's judgment of how much it must rely on early launch to compensate for the vulnerabilities of its forces.

In a day-to-day situation, commanders with forces at low alert levels would by necessity wait to see whether an alarm were true or false. The perceived likelihood of its being false could be increased if one reliably knew that the forces on the other side with theoretical bolt-from-the-blue capability were off alert and unusable in the short term. On the other hand, if some forces on both sides were still on alert, and if those remaining alert forces were relatively more vulnerable to attack than the more fully alerted forces had been, the stability of the situation would be worsened, not improved.

A crisis situation would be an escalating competition in tacit or explicit nuclear threat. Forces on lower levels of alert would likely be elevated to higher levels. On the face of it, then, de-alerting measures would seem to have little to contribute to reducing the risk of crisis escalating into nuclear war. Indeed, as suggested above, one can imagine two ways in which such measures could *increase* the risk. First, if the remaining alerted forces as well as the de-alerted forces were seen as vulnerable to near-elimination by the still-alert forces of the other side, then the fear of (and temptation to launch) a preemptive attack would be greater. Second, if it appeared that the side that re-alerted its forces first could gain a significant advantage by doing so, there might be a race to re-alert that exacerbated the tensions of the crisis.

On the other hand, it seems possible *in principle* that some de-alerting measures could help dampen crisis escalation by enforcing an additional period of time between the initial quarrel and the use of nuclear weapons. If two gunslingers sit across a poker table with their holsters on, each may feel he needs to be ready to beat the other to the draw in case a dispute arises. If they have both checked their guns with the barkeep, they can still go retrieve the guns and step outside for a showdown. In the meantime, however, they will have had a chance to think about how angry they really are and whether the dispute is worth risking death. For two nuclear powers, an extended period of launch preparation would permit further gathering of information, correction of misperceptions, and negotiations. It would not necessarily prevent the escalation of threats and tension, but it might slow the pace.³⁰

³⁰ Extending the time required to escalate to nuclear exchange could also reduce the pressure stemming from the nuclear danger that might otherwise induce the parties to disengage before disaster struck. This might make a clash of conventional arms seem safer; or, it might encourage one side to move quickly to present a *fait accompli* not easily reduced by subsequent nuclear threats. These risks would have to be weighed against the risk of unintended nuclear warfare.

In sum, on the question of whether de-alerting would reduce the risk of accidental nuclear war, the devil would be very much in the details.

Some Criteria for Evaluating De-alerting Measures

Considering both the potential risks stemming from highly alerted nuclear forces and the circumstances that have caused the U.S. and Russia to keep nuclear forces on alert, one can formulate a set of criteria by which to evaluate proposed measures for mutually lowering the alert status of those forces. However, as noted below, the weight each side gives to each of the criteria may vary, depending on that side's circumstances.

Visibility. De-alerting measures that are meant to lead to a reciprocal standing-down of forces should be readily visible: the point is to increase the confidence of the other side that one is not capable of carrying out a sudden attack that could significantly undermine that side's nuclear retaliatory capability. For some measures, visibility could require very intrusive verification procedures.³¹

Expense. The expense and technical complexity of de-alerting measures and associated monitoring methods should not be so great as to discourage Russian (or, for that matter, U.S.) participation.

Survivability Balance. As noted above, one motive for retaining nuclear forces on alert is to assure their survivability against a disarming attack. The effect of proposed de-alerting measures on force survivability under either nuclear or conventional attack calls for careful consideration.

The most attractive de-alerting measure would be one that lengthens the time between decision and use without affecting survivability. Still, this is not the same as saying that any measure that decreases the survivability of the affected set of forces in a bolt-from-the-blue scenario is unquestionably bad. Context is important:

- For example, removing U.S. bombers from day-to-day alert certainly made them more vulnerable. At the same time, the U.S. retains sufficient relatively invulnerable forces that no one seriously doubts the U.S. nuclear retaliatory capability. Thus measures that leave both sides with substantial survivable forces need not be destabilizing.

³¹ Blair says that one criterion any blueprint for taking weapons off alert should meet is that it "provide for adequate verification." In particular, argues:

De-alerting by removing warheads from missiles and aircraft imposes new requirements for verifying the status of the warhead stockpiles. The location and numbers of warheads in the inventories must become more transparent in order to ensure that any re-alerting of forces would be detected in a timely fashion. Although the missiles and bombers themselves can be checked to verify that they remain off alert and devoid of warheads, additional confidence would accrue if the warheads themselves can be monitored. ("Testimony," op. cit. footnote 1.)

If de-alerting requires such a rigorous warhead monitoring régime, then achieving a de-alerting agreement could be very difficult indeed. Such a régime seems unlikely without a very complex and lengthy negotiating process, not to mention enormous changes in current Russian and U.S. practices. See discussion of warhead removal visibility below, p. 33.

- If the results of de-alerting reduce the day-to-day offensive threat to force survivability, then there may be no net increase in vulnerability on the other side. The risk would be in the possibility that re-alerting of forces on both sides would produce an imbalance (i.e., re-alerting of counterforce capabilities could be achieved faster than re-alerting of launch-on-warning capabilities.)

Timing Equivalence. Re-alerting on the two sides should take about the same amount of time: neither side should appear to have a chance to acquire the ability strike first (with either nuclear *or conventional* forces) in a way that prevents the other side from re-alerting its own forces. Mutual re-alerting should not result in a race that would be more crisis-destabilizing than if they had both already been on alert. The risk of such a race should be balanced against the benefit of the time allowed both sides to assess the situation more fully than would have been possible in an initial high-alert condition. In sum, any de-alerting scheme should also have a well-considered *re*-alerting scheme.

Relationship to START Reductions. De-alerting measures should foster, not delay the progress of START II ratification and START III negotiation. For example, there is the possibility that unilateral (or reciprocal, but non-binding) reductions in nuclear capabilities will reduce the incentives for Russia to commit itself to the legally binding reductions envisaged in those treaties. There is also the possibility that the negotiation of mutually verifiable de-alerting measures could be at least as lengthy and difficult as the negotiation of deactivation and elimination provisions for START II and III. If that were the case, it seems preferable to make the first order of business deactivation of systems scheduled for elimination, as opposed to de-alerting of systems intended for retention.

One additional criterion would apply primarily to measures involving the separation of nuclear warheads from their deliver vehicles. Many U.S. analysts worry about the risks that Russian lapses in physical control over nuclear weapons could lead to theft or illicit transfer to criminal groups, possibly for export to terrorist groups or rogue states. Proponents of de-alerting measures do not offer them as answers to the “loose nukes” problem.³² Nevertheless, de-alerting measures should not worsen that problem. For example, nuclear warheads moved to storage sites or put into mobile storage for survivability reasons might be less well-protected than they were when still sitting atop their missiles.

Weighting the Criteria

Those with different views on the status and probable future of the U.S.-Russian strategic nuclear relationship will likely see various of the above criteria as more or less important. The division is roughly along the lines described above: those who see the role of nuclear deterrence fading and the requirements for adequate deterrence minimal as opposed to those who see nuclear deterrence as a cornerstone of national security and the requirements of deterrence to still be fairly rigorous. Russian analysts may bring still other perspectives to the criteria for de-alerting.

³² Blair, however, argues that if nuclear warheads were removed from delivery systems to internationally monitored storage sites, they would be more secure from theft. See “Testimony,” *op. cit.* footnote 1.

Declining Role of Nuclear Deterrence

The thinking of those seeing the role of nuclear deterrence to be declining sharply might be summed up as follows. A few hundred survivable nuclear weapons pose a sufficient retaliatory threat to deter any plausible aggressor just as well as a few thousand could. Therefore, threats to the survivability of de-alerted forces are not especially significant. Nor would there be much strategic benefit in re-alerting even some hundreds of nuclear weapons before the other side could: the threat of unacceptable retaliation would still remain.

Thus, Russian re-alerting would offer no significant advantage to Russia nor would it create strong pressures or incentives for the U.S. to bring its forces to a launch-ready configuration.³³

If this were the case, then, the chances of an unstable re-alerting race would be small. In addition, at least the U.S. need not give great weight to visibility concerns. Incomplete Russian de-alerting, or clandestine re-alerting, would not have a great impact on the credibility of U.S. deterrence. Nevertheless, Blair does stipulate that any plan for de-alerting should not only “preserve the invulnerability of a core deterrent force,” but also “provide for adequate verification.”³⁴

Taking the view that a survivable core strategic force would provide adequate deterrence, one could look at de-alerting as deactivation in anticipation of later, more formal, force reductions. Blair, Feiveson, and von Hippel argue that the U.S. de-alerting initiative they propose would not only persuade Russia to follow suit, but

...would also help accelerate the implementation of agreements for disarmament already negotiated under START II and START III.³⁵

Persisting Role of Nuclear Deterrence

For those with a different view of the role of nuclear deterrence, this feature of de-alerting would be a drawback, not an advantage:

³³ Blair, “Testimony,” op. cit. footnote 1. Blair adds that Russia will be in a poorer position to reconstitute forces than the U.S. anyway. The continuing decay of Russian delivery systems, combined with the scarcity of resources, would probably make rapid re-alerting of forces more difficult for Russia than for the U.S. However, one might speculate that that fact would be a disincentive for Russia to follow the U.S. de-alerting example.

³⁴ Ibid.

³⁵ For the elements of the proposed initiative see footnote 29. On the question of disarmament, Blair has gone further elsewhere:

It would project, over the long run, the ultimate elimination of nuclear weapons, which in turn would strengthen American diplomacy in the area of non-proliferation. Standing down the weapons and lengthening the fuse on their possible use takes a long stride not only toward downgrading their importance, but also toward demonstrating our nation's interest in their eventual abolition. De-alerting measures could be devised that would take months to reverse. This timetable is fairly close to the several months needed to build a nuclear bomb from scratch on a crash basis in the absence of an existing nuclear weapons complex. (“Testimony,” op. cit. footnote 1).

...de-alerting would circumvent the arms control process. This is, of course, what some advocates want because they believe that disarmament is not moving quickly in the post-Cold War era. For example, some advocates have suggested that START III is likely to eliminate 4 more US submarines and reduce the number of warheads on each missile to 4. They argue that these steps should be taken immediately as a de-alerting measure. Such steps are dangerous because they are unilateral, unverifiable actions that affect force structure. No such measures should be undertaken without extensive, thorough review of their impact, and without the negotiation processes with Russia, and perhaps others, to assure that the United States' security is not compromised.³⁶

In Bailey's view, then, the relative risks of Russian unauthorized or accidental launch are lower than the risks that de-alerting would weaken the deterrent effects of the U.S. arsenal on Russia and other nations and that the Russians might gain a significant strategic advantage through clandestine re-alerting.

Thus far, we have considered how differing U.S. analysts might weight the proposed criteria for de-alerting measures. It is also worthwhile to think about what Russian perspectives might be. The sections that follow on specific measures attempt to bring possible Russian considerations to bear in applying the criteria. At this point, however, a few general observations may be helpful in setting the context.

Possible Russian Considerations

Russian considerations in judging de-alerting proposals must be mixed.

Russian military leaders do not admit to any potential command-and-control problems that would lead to unauthorized or accidental launches of strategic nuclear weapons. They admit that there are gaps in their early warning radars and satellite systems, but insist that these can be bridged adequately. Far from expressing worries about the implications of a launch-on-warning policy, they openly proclaim it as a measure that assures the credibility of the Russian nuclear deterrent. Therefore, insofar as de-alerting is promoted primarily as a means of ameliorating risks posed by the decline of Russian strategic forces, it is not likely to meet with an enthusiastic Russian response.

On the other hand, since the Russian early warning system is also in decay, even launch on warning becomes a less promising way of trying to maintain force survivability.³⁷ Combine that factor with the declining condition of the forces themselves, and it is at least plausible that the Russians would like to reduce the potential threat to the survivability of their declining forces by reducing the capacity of the U.S. to execute a short-warning counterforce attack.

Russian weaknesses could, however, lead them to be glad of U.S. unilateral initiatives, but to see such measures as means of moderating the growing imbalance between U.S. and

³⁶ Kathleen Bailey, op. cit. footnote 21.

³⁷ Blair predicts that the Russians are going to be forced into a de facto "ride-out" posture because their warning system will no longer support launch on warning. For this reason, he argues, they should have a strong interest in getting the U.S. to adopt a parallel policy. Blair, loc. cit., footnote 3. Postol has also offered analysis showing that the Russian warning system might not support launch on warning, loc. cit. footnote 13.

Russian forces. If the measures were reciprocal, the Russians would also have to consider another factor that emerges in the specific discussions below: potential problems of “survivability balance” and “timing equivalence” are likely to be greater for them than for the U.S.. The Russians might argue that while unilateral U.S. de-alerting measures help stabilize the situation, reciprocation by Russia would just re-widen the gap between the two sides.

Measures Analyzed

Removal of Warheads from ICBMs

Removing warheads from ICBMs could add hours to days to the time needed to launch any given missile, and weeks to months for a substantial number (tens to hundreds) of missiles. In addition, the U.S. has declared that warhead removal is its preferred option for the deactivation by the end of 2003 of missiles designated for elimination under START II.

Visibility. The re-entry vehicle inspections (RVOSIs) provided for in the START I treaty would allow statistical sampling to verify that the missiles were without warheads. The number and timing of inspections needed would depend on what numbers of secretly reloaded missiles one wanted to be able to detect, within what period of time and with what level of confidence.³⁸ To supplement (or even largely replace) RVOSIs, the U.S. and Russia might consider a remote system of silo-door monitoring so that they would receive prompt notice of large-scale activity at the missiles. In addition, in a period of rising tension, they could intensify their overhead observation of missile silos and bases to look for signs of unusual operations.

If Russian mobile land-based ICBM warheads were removed, the main means of verification would probably have to continue to be RVOSIs. Attempting to monitor continuously access to mobile missiles in their garrison shelters would probably require an elaborate and costly portal-perimeter monitoring system at each shelter.

One variation of the warhead-removal proposal has the warheads removed to a monitored storage site to prevent secret reconstitution. Such a scheme would probably require a monitored chain of custody from each missile to the storage site, a formidable (though technically not impossible) verification régime. It could not guarantee, however, that spare warheads from some other location could not be moved back to the missiles, so some form of missile monitoring would still be necessary. At first look, there would seem to be little or no advantage (with respect to verifying alert status) to adding warhead storage monitoring.

Another second variation of warhead removal is to disperse the warheads, perhaps on vehicles, to reduce their vulnerability to preemptive attack. Moving warheads around this way would entail costly security measures that still would risk diversion and theft in a way that

³⁸ If one were concerned that a relatively rapid reloading program (perhaps one or more missiles per day) could lead to an exploitable advantage within a span of weeks or months, then a large number of inspections would be necessary. On the other hand, if the main concern were in long-term compliance with the de-alerting agreement from year to year, then numbers closer to those now permitted under START I might be acceptable.

storage on the missile or at central depots does not. It would also considerably complicate the design of a monitoring system intended to track warheads.

A third way to store removed warheads would be to place them in empty missile silos.³⁹ The storage silos could be periodically opened and sampled to provide evidence that the warheads were still there. However, in the absence of high confidence that spare warheads did not exist elsewhere, it would still be necessary to inspect the downloaded missiles themselves (or to monitor silo doors) to see that they still lacked warheads.

Expense. The expense of monitoring warheads after removal would be considerable. Even without this step, however, Russians have complained that warhead removal (in the context of START II deactivations) would be too expensive for them. One Russian analyst has cited the following costs:

- "...to implement continuous verification of the technical condition of the missiles it is necessary to fit a simulator device (a complex piece of electronics that is a kind of model warhead) to them in place of the warhead. This replacement allows operators to continuously monitor the condition of the missile and all its components and units, and to keep them in working order. A similar warhead simulator is fitted to the missile during test firings. The manufacture and installation of electronic warhead equivalents requires considerable financial expenditure..."
- The removed warheads will have to be stored in special facilities equipped with automated security systems, systems to monitor the technical parameters of the warheads, and systems to maintain the ideal temperature and moisture conditions... Preliminary calculations show that if there are around 3,600 warheads in service with the existing 19 missile divisions, then on average each storage facility would have to contain around 180-200 units. The cost of each installation meeting the requirements of nuclear safety would run into several million dollars—money that Russia does not have. Sending the removed warheads to centralized Defense Ministry storage bases hundreds or thousands of kilometers away would be not only costly but risky."⁴⁰

Russian complaints about the cost of warhead removal are not entirely persuasive. The bulk of Russian ICBM warheads is on SS-18, SS-19, and SS-24 missiles, all scheduled for elimination under START II (except for 105 SS-19 that would download 5 of their 6 warheads). The U.S. has agreed to deactivation by the end of 2003 of the missiles to be eliminated by the end of 2007. Therefore, warhead removal is an expense they have already agreed to bear, and a smaller one than earlier elimination of the missiles and their launchers. It is not clear why the warheads would have to be stored at the missile bases, particularly if a

³⁹ Blair, loc. cit., footnote 3.

⁴⁰ Vladimir Semenovitch Belous, "Premature Initiatives: Removal of Missile Warheads Not In Russia's Interests," Moscow Nezavisimoye Voennoye Obozreniye, No. 35, 19-25 September 1997 pp. 1, 6. (FBIS-TAC-97-267).

large-scale re-alerting would in any case take weeks to months. The bottleneck in re-alerting would not be in transportation, but in reinstallation.

In the deactivation (as opposed to de-alerting) scenario, the fact that warhead simulators might be needed to keep missiles in working order should not be an obstacle. Indeed, the absence of such simulators would be a further guarantee of deactivation and of lack of intent to re-activate. In the de-alerting scenario, one might ask whether (and why) there needs to be a simulator to replace all the removed warheads. Presumably the downloaded SS-19 will not require 5 simulators in addition to its single remaining live warhead.

Blair identifies another potential expense:

One of the major drawbacks of separating warheads from U.S. missiles is that the capacity of the support infrastructure is so limited that the emergency reconstitution of the ICBM force would take years to complete. The air force could load Minuteman III warheads only at a snail's pace because of limited transport equipment, warheads bays, installation equipment, and trained crews. A substantial investment would be required to eliminate the logistics shortcoming.⁴¹

Further, classified, research might help establish whether the Russians would face similar obstacles to reconstitution.

Survivability Balance. With warheads removed Russian silo-based based ICBMs would be in principle as vulnerable as today to nuclear attack (how vulnerable that is, however, can be only roughly calculated by either side). They would also lack the option of launching on warning to escape an incoming attack. Even if the warheads had also been removed from U.S. ICBMs, both those Trident II missiles armed with 396 W-88 warheads as well those armed with the somewhat less capable W-76 warheads would still be immediately available to attack the Russian ICBMs.

If the removed warheads were stored at a site known to the U.S., those would likely be vulnerable to a small nuclear attack or a large conventional attack. However, if they were stored at a very deeply sheltered site, almost any plausible U.S. attack might be unable to destroy them. If the warheads were dispersed to empty missile silos, they would be about as vulnerable as they already were (unless they were concentrated in a smaller number of silos.) However, an attacker would probably still want to attack the downloaded missiles themselves, to assure that they could not be reloaded from some clandestine source of additional warheads. If the missiles were destroyed, it would be unnecessary to attack the silos containing the downloaded warheads.

If the Russians were to remove the warheads only from their MIRVed ICBMs (mostly silo-based, but some rail-mobile) they would retain a substantial nuclear retaliatory force in their road-mobile SS-25s and SS-27s. These would be vulnerable to attack while in garrison, but in any realistic conflict scenario would have had time to disperse to safety in the field (as is the case today).

⁴¹ *Global Zero Alert for Nuclear Forces*, op. cit., p. 99.

U.S. ICBMs would remain as vulnerable as today, but the primary means of attacking them, the SS-18, would be without warheads. However, the U.S. would have a more difficult time hiding or deeply sheltering its removed warheads unless it built costly new facilities. Thus a few warheads (e.g. from SS-25s or SS-27s) would probably suffice to prevent reactivation of U.S. Minuteman and Peacekeeper missiles.

Much of the above discussion is scheduled to become obsolete by the end of 2007, when START II projects the MIRVed ICBMs to be eliminated. At that time, the U.S. would have a few hundred relatively vulnerable, but single-RV Minuteman ICBMs. Russia would have a few hundred single-RV SS-25s and SS-27s in mobile and fixed basing modes, and possibly 105 SS-19s with single RVs. Attacks by either of these sets of systems on the other would require using a warhead to kill a warhead, accordingly reducing punitive retaliatory capability. A hundred or so U.S. MIRVed SLBMs with W-88 warheads might be able to destroy the silo-based Russian ICBMs, but not the mobile ones. A START III agreement would lead to about the same situation, with smaller numbers on both sides.

Whatever the merits of ICBM warhead removal as a de-alerting measure, under the revised START II Treaty the Russians will be scheduled to “deactivate” their MIRVed ICBMs by the end of 2003. The issue is what the means of deactivation will be, not whether the Russians will have to accept the potential vulnerabilities that come with de-alerting the missiles.

Whether or not there is any agreement to de-alert or deactivate ICBMs, the United States is likely for some time to maintain an advantage over Russia in survivable strategic nuclear warheads. On the U.S. side, a larger proportion of its forces will be on fairly invulnerable submarines, with more than half of those at safely at sea. The ability of Russia to put a comparable number of missiles at sea is unlikely to come in the next ten years.

In the absence of de-alerting of both U.S. ICBMs and SLBMs, Russian fixed land-based missiles will be vulnerable to U.S. 500 Peacekeeper warheads (W-87) and 396 Trident warheads (W-88), and, to a lesser but still significant extent, from the Trident W-76 warheads. However, obsolescence will very probably lead to the attrition of the Russian MIRVed ICBMs by around 2007 anyway.

In sum, Russia’s best hope to maintain a number of survivable strategic nuclear warheads comparable to that of the U.S. is not to keep many MIRVed ICBMs on alert, but to conclude a START III agreement that reduces deployable U.S. forces to levels comparable to those Russia can sustain.

On the U.S. side, when the U.S. retained 550 silo-based ICBMs in the face of a threat from at least three times as many silo-busting SS-18 warheads, it implicitly decided that it could live with an ICBM force that was theoretically vulnerable on a day-to-day basis. In declaring a policy of “not relying” on a launch-on-warning policy, it said that it was at least prepared (if not actually determined) to allow the ICBMs to be destroyed in their silos. A de-alerting arrangement that removed the immediate threat from the SS-18s in return for relinquishing the launch-on-warning option would not appear to be a large sacrifice in force survivability.

Note that this section has discussed “survivability equivalence” issues on the assumption that only ICBMs are de-alerted by mutual agreement. A scenario in which all strategic nuclear forces were to be de-alerted would be more complex. Some of those complexities will be discussed further below, after the range of proposed de-alerting measures for various systems has been surveyed.

Timing Equivalence. If both sides had removed warheads from similar percentages of missiles, Russia would be placing a larger number of its ICBMs and warheads at risk. On the other hand, with SS-18s carrying 10 warheads each, SS-24s 10, and SS-19s 6, re-alerting the same number of missiles in the same period of time would give Russia a larger number of deliverable warheads. As pointed out above, U.S. ICBM reconstitution time might be measured in years unless substantial infrastructure investments were made; it is more difficult to estimate Russian reconstitution times. Nevertheless, depending on what de-alerting measures might also have been applied to submarines and bombers, the U.S. would have alternatives for rapidly matching or exceeding Russian deliverable warhead numbers: they could place bombers back on alert or send more submarines to sea.

In addition, Russian missile facilities would be vulnerable to attack from U.S. nuclear, and perhaps conventional, bombers. The bombers could be re-alerted (and perhaps “conventionalized” heavy bombers renuclearized) faster than warheads could be restored to the Russian ICBMs.⁴² However, unless all types of Russian strategic weapons had been de-alerted as well, Russia would retain a retaliatory capability. As in the past, an attempt at a disarming strike could be deterred by the threat of unacceptable damage in response.

The U.S. would also have to be concerned that an attack by remaining Russian SLBMs, or perhaps SS-25s or SS-27s if these were still armed, could disable the U.S. ability to reconstitute its ICBM forces. However, with some SLBMs safely at sea, and with strategic bombers re-alertable in days rather than weeks or months, the Russians would have little to gain by attacking what the U.S. has long treated as the most dispensable leg of its triad.

Relationship to START Reductions.

From the point of view of the risk reduction sought through de-alerting, the U.S. should be most strongly interested in warhead removal from the Russian and U.S. ICBMs whose primary means of survivability would be prompt launch. Of particular interest should be the more highly MIRVed ICBMs, each of which might in principle destroy several ICBMs on the other side, and each of which would represent the loss of several warheads if attacked first by one or two warheads from the other side.

If, in addition, the U.S. were to seek the de-alerting of the Russian road-mobile ICBMs, the relative vulnerability of the whole complex of Russian strategic nuclear forces would compare unfavorably with that of the U.S. The abilities of the their broader strategic nuclear complexes to reconstitute in crisis or war would also look asymmetrical in favor of the United

⁴² This scenario drawn by Belous, op. cit., footnote 40.

States. The chances of persuading Russia to de-alert its road-mobile ICBMs in the near term seem very small.

On the other hand, Russia has already agreed in principle to “deactivation” by the end of 2003 of the systems that are to be eliminated under START II. These are, as it happens, the systems that it would be most desirable to de-alert for stability reasons. Here, the Russian problem is in part the disparity between the projected U.S. and Russian abilities to reverse START reductions by moving downloaded warheads back onto SLBMs, ICBMs, and bombers. If a START III agreement should make the disparity more tolerable to Russia, then the U.S. proposal of deactivating ICBMs by warhead removal seems reasonable. The goal of START reductions would be advanced, and the goals of de-alerting would also be partly served. Since the deactivated systems are in any case destined for elimination, the two sides have already practically declared that they would not be essential tools of confrontation in a future crisis. Concerns about their survivability or about re-alerting them should not be important.

Disable Power or Guidance Systems on ICBMs

Cutting power to, or otherwise disabling, critical ICBM components (e.g. launch ignition or guidance systems) would introduce shorter delays in launch preparation than would removing warheads, but it would also be less troublesome and costly.⁴³ Such disablement would bar the LOW option and seriously delay, if not forestall, unauthorized launches. It would, however, leave only hours or at most days, not weeks or months, for the two sides to work back from a crisis.

Visibility. In principle, sampling inspections could show that missiles remained in the disabled condition. In practice, it may be difficult to identify comparable disabling measures for both U.S. and Russian ICBMs. In addition, short of the provision of detailed missile design information, it might be difficult for either side to have high confidence that the removed or disabled component was not redundant or backed up by some other component.

Quick replacement of removed parts could be a concern, but it would be possible to address this concern by the same method suggested for RV removal: remote silo-door monitoring. Provided that the component could not be replaced (or enabled) without opening the silo door, a large scale clandestine re-alerting would not be feasible. The same concept could conceivably be applied to garrisoned mobile missiles, but again it would require a robust portal-perimeter monitoring system. And, with smaller components (or merely men with

⁴³ Another measure with similar reconstitution timelines would be to remove the missile nosecone, replacing it only with some kind of protective cover that would not permit stable missile flight out of the atmosphere. It would be useful to have engineering studies establish whether the relevant kinds of ICBMs might be able to fly safely out of the atmosphere without their normal nose shrouds.

Blair points out that actual removal of other critical components (such as guidance sets) might introduce delays comparable to those resulting from warhead removal. Thus, except for the issue of the survivability of removed warheads, the considerations applying to such measures are about the same as those applying to warhead removal.

tools) involved, clandestine entry through walls, floors, or ceilings would be a greater concern than it would with warhead removal.

Expense. Disabling key missile components would not be as costly as removing and storing warheads. Inspections would be more intrusive than today's RVOSIs, and an access (to silo or environmental shelter) monitoring system seems likely to be at least as costly.

Survivability Balance. In this case, the warheads would not have been concentrated in vulnerable storage sites. Disabled components would be as well (or poorly) protected as their missiles. To the degree that Russian fixed ICBMs were vulnerable not just to U.S. ICBM attack, but also to SLBM attack, this method of ICBM de-alerting, would unevenly decrease Russian overall force survivability. Thus, this de-alerting measure, like the others, might appear inequitable in the absence of comparable de-alerting of U.S. SLBMs.

Timing Equivalence. Re-enabling missile components would take much less time than replacing removed warheads. Provided some warning of re-alerting, neither side need fear that the other could obtain an exploitable advantage before it could react. It would also be more difficult to mount a bomber or cruise missile attack (nuclear or conventional) that would have a good chance of disabling reconstitution abilities.

Relationship to START Reductions. Some Russians have apparently proposed missile component modification as an alternative to warhead removal to meet the START II deactivation requirements. In that context, then, negotiations of such measures should not be too difficult (but see the questions raised under "visibility.") At the same time, getting Russian agreement to disable their road-based ICBMs could be just as difficult as getting them to take the warheads off.

Immobilize Fixed-ICBM Silo Doors

This would be a low-tech method of preventing LOW or delaying unauthorized launches. A variation on this proposal is to pile rocks on top of the doors, requiring a bulldozer to move them. The method obviously does not apply to mobile ICBMs.

Visibility. Sampling inspections would be needed to establish that the door-opening mechanisms continued to be disabled. One would also want to be confident that enabling the mechanisms would take at least hours for each silo.

Overhead inspection of materials such as rocks covering silo doors would not suffice: simulations would be a possibility. In addition, the mounds of material would have to be large enough to assure that the door-opening mechanism could not simply pull them aside.

START-related RVOSIs, intended to verify the numbers of warheads deployed on missiles, would be more difficult to carry out. One solution would be to examine each missile before its silo door was covered. Under current procedures, in which the missile front-end is removed to a maintenance facility for inspection, the inspection and covering process could be a very long one. An alternative would be to cover the silos first, then, when an inspection is requested, uncover only the selected silo.

Expense. The door-blocking procedure would have to be reversed each time missile maintenance of any kind—or a START RVOSI inspection—was necessary. Depending on the frequency of maintenance, this could be costly. Since the large Russian liquid-fueled ICBMs are serving beyond their warranted lifetimes, it is reasonable to assume that they will require increasing amounts of maintenance before they are finally removed. If so, the expense to the Russians of silo-blocking measures would be disproportionately large.

Survivability Balance. The considerations here are comparable to those for *in situ* missile component disablement. In addition, the cranes or bulldozers needed to open the missile silos might themselves be vulnerable to attack. Thus, in principle, a conventionally-armed attack could introduce serious delays in reconstitution—more of a potential problem for Russia than for the U.S.

As with warhead removal, the question of ICBM vulnerability would have to be considered in the larger context of overall force survivability in the face of the remaining alerted offensive threat.

Timing Equivalence. If door-opening mechanisms were being disabled, the two sides would have to pay attention to possible asymmetries in reactivation times. Whatever the method, while MIRVed ICBMs persist the Russians could reconstitute a larger force of warheads by uncovering a smaller number of silos. Again, the larger context would be crucial.

Relationship to START Reductions. START II calls for downloading MIRVed ICBMs, a process complicated by silo door obstruction. Under START II and the projected START III, single-RV ICBMs (most mobile, some in silos) will form an increasingly important segment of Russian strategic nuclear forces. It would be difficult to persuade them that these should be even temporarily disabled unless compensating limits on U.S. SLBM and bomber forces can be found. On the other hand, as with the other forms of de-alerting, applying this measure primarily to systems already destined for elimination under START logically should be acceptable.

Reduce Readiness of Russian Mobile Missiles to Launch from Garrison

Day-to-day survivability of Russian mobile ICBMs depends on an LOW capability, since most are usually kept in garrison. Some have suggested blocking shelter roofs (which can open for rapid launch) or disabling launchers in a way that would take hours to restore.⁴⁴

Visibility. Frequent inspections at mobile missile bases could give considerable confidence that disabling measures were still in place. Disabling missiles in the field would require still more extensive monitoring—possibly by periodic sampling of dispersed missiles.

Since the U.S. has no comparable missiles, reciprocity in inspections would be a challenge.

⁴⁴ See Blair, Feiveson, and von Hippel, op. cit. footnote 1.

Expense. The expenses of disablement need not be great. If disabling measures could be reversed in hours, the needed continuous or frequently repeated inspections would be costly.

Survivability Balance. Mobile missiles in garrison would be vulnerable even to conventional attacks (e.g. Conventional Air-Launched Cruise Missiles or SLCMs⁴⁵). Disabling measures should be designed to permit rapid dispersal of the missiles to survivable locations. Therefore, although they might delay launch capability, they should not delay movement. The disabling procedures should be reversible in the field.

The U.S. has no missiles on which to apply comparable de-alerting measures. It would also be difficult to imagine reductions in U.S. day-to-day offensive conventional and nuclear capabilities that would remove the risks to Russian mobile missiles in garrison.

Timing Equivalence. Since there are no comparable measures for the U.S., once again the issue of symmetry in force reconstitution would have to be considered in the larger context of all strategic nuclear forces on both sides.

Relationship to START Reductions. As START reductions proceed, Russian reliance on SS-25s and SS-27s as the core of their strategic nuclear deterrent will increase. It is questionable whether, in the meantime, they will be interested in negotiating unilateral de-alerting measures involving new, more intrusive inspection requirements.

Remove Warheads from SLBMs

Blair argues that the “severe first-strike threat” of U.S. SLBMs is the most compelling reason that the Russians maintain a posture of LOW for their ICBMs. Therefore, finding a way to minimize that threat would make it easier to induce Russia to de-alert its missiles.⁴⁶ If Russia could also be induced to de-alert SLBMs, then the potential for unauthorized or accidental launch of those missiles would be reduced.

One means of de-alerting applicable to SLBMs as well as ICBMs could be warhead removal.⁴⁷ As proposed, this measure would be applied to submarines in port. The main effect, therefore, would be on the Russian submarines in port relying on a launch-on-warning capability as a substitute for survivability by hiding at sea.

Visibility. Verification of this measure could be done as an extension of the RVOSIs already conducted under START I terms. Alternatively, if the missile nosecones were not replaced, it might be possible to see the absence of warheads in missile tubes opened on request to overhead imagery.

⁴⁵ However, most Russian road-mobile ICBM bases would probably be out of range of conventionally-armed U.S. SLCMs.

⁴⁶ See Blair, op. cit. footnote 41, p. 93.

⁴⁷ Nunn and Blair cite this measure, op. cit., footnote 1

Expense. Russians might balk at the additional expense of removing warheads from all their in-port missiles. Over time, however, removing the warheads will be necessary anyway for several submarines, since these will have to be taken out of service.

Currently, U.S. SLBMs in port are not only off alert, but are out of range of their targets. It is conceivable, however, that, as Trident missiles are downloaded to comply with START II and III ceilings, the lightened payloads could be delivered to greater range (but possibly with significantly less accuracy). The Russians may, in any case, insist that any measures (such as SLBM RV removal) be imposed equally on both sides, whatever the actual impact. Warhead removal from submarines in port would probably be a major and expensive inconvenience for the U.S. Navy, but need not affect the normal numbers of warheads deployed at sea.

Survivability Balance. Russian analyst Vladimir Belous has argued:

Submarine cruisers at bases with their missile warheads removed would lose their viability and their effectiveness would virtually fall to zero, rendering them useless and turning them into a highly vulnerable target for not only nuclear but conventional forces as well. This situation makes it tempting to use one or two nuclear warheads or precision guided missiles to destroy submarines kept at base and incapable even in the event of an obvious threat of launching their missiles before being destroyed.⁴⁸

On a day-to-day basis, the U.S. maintains SLBM survivability by keeping submarines at sea; Russia does it by keeping one or two at sea and keeping some additional submarines in port on alert.⁴⁹ (In a crisis situation, Russians could increase SLBM survivability by sending more boats to sea.) With RVs removed, the Russians would then have no means of maintaining SLBM survivability for the in-port missiles, nor would they be able to move the submarines safely to sea in a crisis. The U.S., on the other hand, would still have its usual number at sea. Only if Russia could afford to keep more SLBMs at sea—an unlikely prospect—would the impact of warhead removal be roughly equivalent for the two sides.⁵⁰

Timing Equivalence. Again, with more SSBNs in port, the Russians would have to remove warheads from more missiles than would the U.S. Re-alerting the Russian SLBMs, therefore, would take a proportionately longer time.

Relationship to START Reductions. Removal of warheads from in-port SLBMs would affect Russian nuclear delivery capabilities more than those of the U.S. If the U.S. pressed the Russians for this measure, they might reasonably ask what concessions the U.S. could offer in return. This bargaining might take place in the context of “de-alerting” talks, or it might be

⁴⁸ Op. cit. footnote 40.

⁴⁹ It is questionable, though, whether a launch-on-warning posture actually adds much to the survivability of in-port SLBMs. An attack by submarine-launched SLCMs, for example, could come with virtually no warning at all. Given the weaknesses of the Russian early warning system, an SLBM attack could also come with little or no notice. It could be argued, however, that the in-port submarines give the Russians a sort of “dyad” benefit: their destruction would confirm other indicators of incoming attack on the land-based ICBMs and permit an earlier decision to launch them out from under the attack. (This assumes that decision makers received trusted information that the submarines had been destroyed.)

⁵⁰ Even then, the Russians would have to factor in their estimates of U.S. ASW capabilities against the SSBNs on patrol.

interjected into the START III negotiations. There would then be some risk that the U.S. would face a decision to trade some temporary force reductions (de-alerting) for more permanent arms limitations within a START III treaty.

Introduce Readiness Delays in SLBMs at Sea

Besides warhead removal, other measures proposed for de-alerting SLBMs include: delaying alert preparation procedures for submarines on patrol or (in the Russian case, on in-port alert); removing guidance sets from missiles (storing the sets on SSNs for survivability); reducing the number of U.S. SSBNs on patrol.

Until the Russians can bring more of their new Borey class SSBNs into service, the Russian SSBN fleet will almost certainly continue to decline. Even with an LOW posture, the contribution of SLBMs to Russian deterrent threats will decline accordingly. START II and III will not solve this problem for Russia.

Modified Alert

Blair and his co-authors point out that U.S. submarines travelling to their patrol stations are on a modified alert status, and that they could simply prolong this status. No information is available on Russian SSBN procedures. However, Russian submarines do deploy much closer to their own ports than do U.S. ones.

Visibility. This form of de-alerting would not be visible to the other side. It would amount to each side adopting (for submarines) the delayed launch policy described in the “Changing the Incentives” section of this paper. This step might increase the confidence of each that its own forces would not respond prematurely to false attack warnings. It would not provide any additional incentive to the other side to de-alert its own forces.

Expense. The expense of the step would be small.

Survivability Balance. The survivability of U.S. SSBNs would not be compromised (unless one believed in unlikely improvements in Russian ASW capabilities and resources). If the Russians continued to deploy only a couple of submarines, their vulnerability to U.S. ASW would increase, since the U.S. would have fewer submarines to find and more time in which to disable them.

Timing Equivalence. Neither side would have evidence that the other had placed its submarines at sea on full alert. If either chose to do so, in each case the process would probably be a matter of hours rather than days. Since SSBNs are not direct threats to one another’s survivability, the differences there would not be significant. However, if the main purpose were to affect the U.S. SLBM strike capability against Russian installations on land, the comparison would be between the re-alert time of the land forces and the re-alert time of the submarines. Again, since the Russians would be relying on U.S. declarations about submarine alert status, they would be unlikely to de-alert any land-based forces on the basis of unverified declarations.

Relationship to START Reductions. If negotiable, this measure would be relatively simply and probably not interfere with START negotiations or implementation.

Out-of-Range SSBN Deployments

If the U.S. wished to assure Russia that its SLBMs could not engage in a surprise counterforce attack, it could deploy them one or more days' submarine transit time out of range of Russian targets.⁵¹ It does not appear practical for the Russians to reciprocate: they keep few SSBNs on patrol, they do not deploy them at great distances from their home ports, the range of the missiles is long, and the missiles do not appear to have significant counterforce capabilities.

Visibility. Verification methods could be developed to show that SSBNs were deployed outside of specified areas. For example, the challenging side could request that a specific submarine of those on patrol come to the surface within a few hours. Observers could then be flown to the site and allowed to verify the location. After a further agreed period of time, they could report the location to their government. In this way, the positions of the other submarines would remain secret, while the position of the surfaced submarine would only be known to within some hundreds of kilometers.⁵²

If temporary compromise of exact location were not a problem, the requested submarine could be instructed to surface at a particular place and time for satellite observation. The place and time would be chosen so as to be within travelling time from the boundaries of the restricted patrol zone, but beyond the travel time from the prohibited zones. This would require a reasonable understanding of the submarine's (usually classified) top cruising speed. Overestimating the speed would not allow the submarine enough time to reach the designated point; underestimating might make it possible for the submarine to get there from the prohibited zone.

An alternative method of general position location would be for the requested submarine to release a radio buoy that would begin broadcasting a unique signature within a few hours. The signal would have to be receivable and locatable from a satellite (commercial or belonging to the observing party) and the message recognizable as authentic and coming from the specified submarine. At first glance, these seem like extremely difficult criteria to meet.

Expense. Assuring short-notice, rapid transportation of observers to directly observe the submarine's surfacing could be costly. Submarines are already capable of launching communications buoys, but developing unique, authenticated identifiers would be difficult (how to assure that the buoy had not been transferred to another submarine?). If that problem

⁵¹ As noted above, Trident D-5 missiles might be able to trade range for payload if they had been downloaded from 8 to 5 or 4 warheads each. However, they might also lose counterforce accuracy at longer ranges. If the U.S. did not test any missiles at these longer ranges, it probably could not have much confidence in exactly what the accuracy changes would be. These considerations might or might not persuade the Russians that U.S. SSBNs deployed in far southern oceans were not a surprise attack threat.

⁵² Or it would be known accurately for a short period of time if, by luck, the other side's ASW or national technical means had happened to be in a position to observe the surfaced boat.

could be solved, then the buoy could identify its own location by GPS and transmit that data within its authenticated message. A more trustworthy, but costly, approach would be for the receiving satellite to be able to determine the direction of the buoy.

Survivability Balance. This measure would preserve the survivability of the patrolling U.S. submarines (except, temporarily, one at a time). It would lessen the ability of the U.S. SLBMs to attack Russian land-based missiles.

Timing Equivalence. If the Russians had reciprocated U.S. submarine relocation by de-alerting land-based missiles, it might be difficult for them to re-alert the missiles as rapidly as the submarines could move back into range. However, they might be able to respond to the submarine movements by putting more of their own submarines at sea and moving road-mobile missiles out of garrison.

Relationship to START Reductions. Negotiating the details of the monitoring régime for submarine relocation would be technically difficult. Moreover, since relocation is not a real option for Russian SSBNs, the U.S. would want a compensating set of Russian de-alerting measures. Trying negotiate an equitable package could be difficult enough to complicate other negotiations on START II deactivations and START III eliminations.

MEASURES TO REDUCE RISKS OF HIGH ALERT STATES

Finally, there may be cooperative measures between the U.S. and Russia that do not constitute de-alerting, but that do reduce the risks of escalating threat between alerted forces.

Review of Existing Crisis Management Agreements

The United States and Russia already have a series of agreements intended to reduce the risks of nuclear crises between them. The first of these was the Moscow-Washington Hotline (formally known as the “Direct Communications Link”), established as a teletype link between U.S. and Soviet heads of government in 1963 and expanded to high-speed facsimile service in 1984. In 1971, the two governments agreed on “Measures to Reduce the Risk of Outbreak of Nuclear War” between them. Article 3 of that agreement calls for the parties to:

...to notify each other immediately in the event of detection by missile warning systems of unidentified objects, or in the event of signs of interference with these systems or with related communications facilities, if such occurrences could create a risk of outbreak of nuclear war between the two countries. (See Appendix I.)

As far as is known publicly, President Yeltsin did not use the Hotline (as specified in the “Measures” agreement) to notify President Clinton of the alarm caused by the Norwegian research rocket incident in 1995 (see above, p. 33). The two sides might consider a detailed

review of agreement to see whether the Hotline can be used more consistently and effectively in the future.⁵³

Warning System Cooperation

The break-up of the Soviet Union as well as economic decline have left the Russian early warning system with considerable gaps in both satellite and radar coverage.⁵⁴ It is in U.S. interests that Russia does not move to higher states of alert, or actually launch forces, on the basis of inaccurate or incomplete information. Thus it may make sense to sharing early-warning information that would help the two sides not only assess suspected threats from one another, but those from third-party ballistic missiles as well. In this way, even though some forces on one side or both continued to rely in part for their survivability on prompt launch, at least the chances of such a launch based on a false alarm would be reduced. The U.S might also want to consider joining in the mutual development of new, joint warning centers that would identify and characterize third-party threats.

At their Moscow summit in September 1998, Presidents Clinton and Yeltsin agreed “...on a cooperative initiative between the United States and Russia regarding the exchange of information on missile launches and early warning.”⁵⁵ This agreement envisaged the continuous exchange of data on missile and space launch vehicle launches from the early warning centers of the two sides, possibly including a joint center just for such information exchange. They also opened the possibility of a multilateral launch pre-notification scheme.

U.S. and Russian officials have formed two expert working groups to develop these two concepts. One is examining the creation of a joint warning center that might begin operation sometime in the year 2000. At the center the two sides would continuously exchange data on the launches of ballistic missiles and space launch vehicles derived from their respective early

⁵³ Such a review has been legislatively mandated. See the *Strom Thurmond National Defense Authorization Act For Fiscal Year 1999*:

SEC. 1503. REPORT ON ADEQUACY OF EMERGENCY COMMUNICATIONS CAPABILITIES BETWEEN UNITED STATES AND RUSSIA.

Not later than three months after the date of the enactment of this Act, the Secretary of Defense shall submit to the Committee on Armed Services of the Senate and the Committee on National Security of the House of Representatives a report on the status and adequacy of current direct communications capabilities between the governments of the United States and Russia. The report shall identify each existing direct communications link between those governments and each such link that is designed to be used, or is available to be used, in an emergency situation. The Secretary shall describe in the report any shortcomings with the existing communications capabilities and shall include such proposals as the Secretary considers appropriate to improve those capabilities. In considering improvements to propose, the Secretary shall assess the feasibility and desirability of establishing a direct communications link between the commanders of appropriate United States unified and specified commands, including the United States Space Command and the United States Strategic Command, and their Russian counterparts.

⁵⁴ See Postol, loc. cit. footnote 13.

⁵⁵ See Appendix II.

warning systems.⁵⁶ Note that while this center would reduce the chances of false warnings being misinterpreted, it would not give the Russians a high-confidence alternative to a robust warning system of their own.

The Defense Department also proposed to the Russians an idea for an interim “Center for Year 2000 Strategic Stability,” to be located in Colorado Springs, Colorado, near the North American Air Defense Command. Russian observers would be given enough data to see that the U.S. was not launching unannounced missiles in December 1999-January 2000.⁵⁷

Others have suggested additional cooperative measures on early warning. In September 1998, at the request of Senator Tom Daschle, the Congressional Budget Office offered some options beyond the sharing of early warning data:

- Waive U.S. export controls and allow the sale of sensor and data processor equipment to Russia.
- Implement Option 2 and also fund the salaries for personnel at Russian space institutes that develop and fabricate the early-warning satellites.
- Fund development, hardware, and other costs, including launch services using Russian space launch vehicles.
- Fully fund a joint research venture between the United States and Russia to explore the technology needed for the next generation of satellites.⁵⁸

The first of these measures would help restore the Russian early warning system in the relatively near term. The last would not, but could help establish a longer-term pattern of U.S.-Russian cooperation to maintain crisis stability.

National Ballistic Missile Defense

Proponents of deploying a national ballistic missile defense system in the near term frequently point out that a limited system could offer protection against unauthorized or accidental launches of a limited number of Russian ICBMs or SLBMs. If both sides deployed thin defenses, they would still retain nuclear retaliatory capabilities because such defenses could not handle a full-scale attack of hundreds of warheads.

All other things being equal, this is a logical argument. The problem is to find the level of BMD deployment that does not look to the other side like an attempt to build an offense-defense combination that might dramatically reduce his nuclear retaliatory capability. A thin system could form the technical and logistical basis for rapid deployment of a thicker system. The Russian response to a U.S. BMD system that appeared threatening in this way could be to

⁵⁶ OSD official Philip Jamison, presentation at the Carnegie Endowment for International Peace, Washington, DC, February 26, 1999. At the same forum, Geoffrey Forden of the Congressional Budget Office pointed out that since the U.S. data would not come directly from sensors, but would be processed first, Russians might suspect tampering.

⁵⁷ See Robert Burns, “Russia Invited to Missile Facility,” Associated Press, February 26, 1999.

⁵⁸ For additional details and some discussion of pros and cons of these options, see “Improving Russia's Access To Early-Warning Information: Preliminary Results,” report transmitted by letter from Congressional Budget Office Director June E. O'Neill to Senator Daschle, September 3, 1998 (available at <http://www.cbo.gov/otherdoc.html>). Theodore Postol of MIT has made similar proposals: see footnote 13.

devote resources to offensive countermeasures rather than to defensive systems. Whether it is bluffing or not, the Russian government has repeatedly stated that preservation of the ABM Treaty is essential to START II acceptance and to any further negotiated reductions. Russian near-term options for countering BMD include maintaining SS-18s on alert for as long as possible and testing and deploying the new SS-27 missiles with three warheads rather than one.

Enhanced Use Control

Russian military officials insist that their nuclear weapons use-control procedures are completely adequate.⁵⁹ They seem unlikely to be open to suggestions for improvement, particularly if the prerequisite were detailed revelation of information about their current mechanisms and procedures. However, recently Russian military officials have made some efforts to assure their U.S. counterparts that their nuclear weapons were under strong central control. Further exchanges along these lines could lead to friendly suggestions about additional improvements.

Further unilateral enhancement of use control would be consistent with Article 1 of the 1971 Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War (see Appendix I).

Command-Destruct Capabilities

Both the U.S. and Russia generally equip test ballistic missiles with command-destruct mechanisms: on radioed orders, explosives break the missiles apart if they should go off course. In principle, they could install similar mechanisms on deployed missiles. With a few minutes of warning, officials could destroy missiles that had been launched without authorization (or change their minds about authorized launches).⁶⁰

Traditionally, the military have resisted installing such mechanisms and taking the chance that the adversary could break the necessary codes to disable the missiles. In addition, installation of the mechanisms on all missiles, plus establishment of a communications network able to convey the destruct command to them, would be costly (particularly for Russian missiles whose service lives are nearing an end). In exchange for these risks and costs, commanders would win only a few minutes of decision time. Moreover, when the other side detected the original missile launches, it might launch its own missiles on warning;

⁵⁹ In an interview responding to an article in the New England Journal of Medicine urging de-alerting of strategic nuclear forces, the commander-in-chief of the Russian Navy, Admiral Vladimir Kuroydev, said "unauthorized launch of nuclear-tipped missiles from Russian submarines is impossible in principle and absolutely ruled out". He stated that all the elements of control of Russia's strategic nuclear forces "are in complete order, in good repair and functioning absolutely reliably." "As a military specialist I assure you that there are no grounds for concern about an accidental launch of nuclear missiles from our submarines, wherever they may be. Such a threat just does not exist." Transcription of interview by RIA Novosti correspondent Aleksandr Konovalov, Moscow RIA in English 1314 GMT 30 Apr 98 (FBIS-TAC-98-120).

⁶⁰ Establishing such mechanisms would be consistent with Article 2 of the 1971 agreement on "Measures to Reduce the Risk of Outbreak of Nuclear War" (see Appendix I).

confirmation of the mid-course destruction of the originally launched missiles could easily come too late for a reciprocal destruct command.

CONCLUSIONS

It is difficult to find de-alerting measures that convincingly satisfy the criteria identified in this paper for a stable de-alerting régime. However, some de-alerting measures have promise as *de-activation* measures for systems due for elimination under the START II and prospective START III treaties. Moreover, once these systems are deactivated, a considerable part of the perceived need to keep nuclear forces on high alert as a survivability hedge will be reduced.

At the same time, the U.S. and Russia could consider building on their earlier cooperative actions to reduce the risk of inadvertent nuclear war by enhancing their communications links and possibly joining in efforts to improve early warning systems.

APPENDIX I: AGREEMENT ON MEASURES TO REDUCE THE RISK OF OUTBREAK OF NUCLEAR WAR BETWEEN THE UNITED STATES OF AMERICA AND THE UNION OF SOVIET SOCIALIST REPUBLICS

Signed at Washington September 30, 1971

Entered into force September 30, 1971

The United States of America and the Union of Soviet Socialist Republics, hereinafter referred to as the Parties:

Taking into account the devastating consequences that nuclear war would have for all mankind, and recognizing the need to exert every effort to avert the risk of outbreak of such a war, including measures to guard against accidental or unauthorized use of nuclear weapons,

Believing that agreement on measures for reducing the risk of outbreak of nuclear war serves the interests of strengthening international peace and security, and is in no way contrary to the interests of any other country,

Bearing in mind that continued efforts are also needed in the future to seek ways of reducing the risk of outbreak of nuclear war,

Have agreed as follows:

Article 1

Each Party undertakes to maintain and to improve, as it deems necessary, its existing organizational and technical arrangements to guard against the accidental or unauthorized use of nuclear weapons under its control.

Article 2

The Parties undertake to notify each other immediately in the event of an accidental, unauthorized or any other unexplained incident involving a possible detonation of a nuclear weapon which could create a risk of outbreak of nuclear war. In the event of such an incident, the Party whose nuclear weapon is involved will immediately make every effort to take necessary measures to render harmless or destroy such weapon without its causing damage.

Article 3

The Parties undertake to notify each other immediately in the event of detection by missile warning systems of unidentified objects, or in the event of signs of interference with these systems or with related communications facilities, if such occurrences could create a risk of outbreak of nuclear war between the two countries.

Article 4

Each Party undertakes to notify the other Party in advance of any planned missile launches if such launches will extend beyond its national territory in the direction of the other Party.

Article 5

Each Party, in other situations involving unexplained nuclear incidents, undertakes to act in such a manner as to reduce the possibility of its actions being misinterpreted by the other Party. In any such situation, each Party may inform the other Party or request information when in its view, this is warranted by the interests of averting the risk of outbreak of nuclear war.

Article 6

For transmission of urgent information, notifications and requests for information in situations requiring prompt clarification, the Parties shall make primary use of the Direct Communications Link between the Governments of the United States of America and the Union of Soviet Socialist Republics.

For transmission of other information, notification and requests for information, the Parties, at their own discretion, may use any communications facilities, including diplomatic channels, depending on the degree of urgency.

Article 7

The Parties undertake to hold consultations, as mutually agreed, to consider questions relating to implementation of the provisions of this Agreement, as well as to discuss possible amendments thereto aimed at further implementation of the purposes of this Agreement.

Article 8

This Agreement shall be of unlimited duration.

Article 9

This Agreement shall enter into force upon signature.

DONE at Washington on September 30, 1971, in two copies, each in the English and Russian languages, both texts being equally authentic.

FOR THE UNITED STATES OF AMERICA:

WILLIAM P. ROGERS

FOR THE UNION OF SOVIET SOCIALIST REPUBLICS:

A. GROMYKO

APPENDIX II: TEXT: CLINTON/YELTSIN ON EXCHANGE OF INFORMATION ON MISSILE LAUNCHES

JOINT STATEMENT ON THE EXCHANGE OF INFORMATION ON MISSILE LAUNCHES AND EARLY WARNING

Taking into account the continuing worldwide proliferation of ballistic missiles and of missile technologies, the need to minimize even further the consequences of a false missile attack warning and above all, to prevent the possibility of a missile launch caused by such false warning, the President of the United States and the President of the Russian Federation have reached agreement on a cooperative initiative between the United States and Russia regarding the exchange of information on missile launches and early warning.

The objective of the initiative is the continuous exchange of information on the launches of ballistic missiles and space launch vehicles derived from each side's missile launch warning system, including the possible establishment of a center for the exchange of missile launch data operated by the United States and Russia and separate from their respective national centers. As part of this initiative, the United States and Russia will also examine the possibility of establishing a multilateral ballistic missile and space launch vehicle pre-launch notification regime in which other states could voluntarily participate.

The Presidents have directed their experts to develop as quickly as possible for approval in their respective countries a plan for advancing this initiative toward implementation as soon as practicable.

Russia, proceeding from its international obligations relating to information derived from missile attack warning systems, will reach agreement regarding necessary issues relating to the implementation of this initiative.

THE PRESIDENT OF THE
UNITED STATES OF AMERICA:

THE PRESIDENT
OF RUSSIAN FEDERATION:

Moscow
September 2, 1998

APPENDIX III: DE-ALERTING AND SMALLER NUCLEAR POWERS

Recent interest in the idea of de-alerting nuclear forces has centered on the U.S.-Russian strategic nuclear relationship. Could the idea have relevance to relationships between smaller nuclear powers and either of the two superpowers, or between any smaller nuclear powers? Today, the other pairs of imaginable nuclear adversaries are:

U.K.-Russia
France-Russia
China-Russia
China-U.S.
China-India
India-Pakistan.

(Other pairings are imaginable if a nuclear adversary to Israel arose in the Middle East, or if North Korea developed a credible nuclear arsenal.)

In general, the risks of high alert status discussed in the early sections of this paper do not seem to apply currently to any of these pairs. The U.S.-Russian dyad is distinguished by the geographical distance of the two from each other and by the force structures they have deployed against one another.

Neither France, the U.K., nor China poses a substantial counterforce threat to Russian strategic nuclear forces. Whether their forces are or are not on a high-alert (i.e., launch-on-warning capability) status seems unlikely to affect Russian incentives to maintain strategic forces on high alert.⁶¹

It is doubtful whether France, U.K., or China is relying at all on a launch-on-warning capability as a force survivability measure. Not only do France and the U.K. keep one or two submarines at sea for survivability, but it seems unlikely that they have warning systems that would allow them to respond rapidly to a surprise Russian attack, which even with the best warning system would come on very short notice.

China's few ICBMs may well be vulnerable to even a small Russian attack. There is no reliable information that they maintain a warning and C3 system capable of launching these missiles on warning. It does seem unlikely that China could be interested in divulging the alert status of its missiles or in agreeing visibly to de-alert them. These forces pose no serious threat

⁶¹ A reasonable question to pose is, if the U.S. and Russia had taken all strategic nuclear forces off alert, would Russia be concerned that a preemptive strike by a smaller nuclear power could prevent Russian re-activation of retaliatory forces. First, Russia would still have considerable non-strategic, aircraft-deliverable forces that might deliver substantial retaliatory blows to countries far closer to it than the U.S. is. Second, even without this threat, Britain and France in particular would have little ability to exploit any geopolitical "advantage" to be gained by such a strike. China, however, might seek territorial aggrandizement at Russian expense. Here, again, Russian theater nuclear weapons could come into play. Moreover, if China and Russia were in a territorial confrontation, it seems unlikely that Russia would be willing to keep its strategic forces in a de-alerted status anyway.

to Russian force survivability, and it is difficult to think of a reciprocal measure the Russians could offer that would make China feel more secure. The same would be true for the United States: if Chinese ICBMs are in fact vulnerable to attack, then only a few clandestinely activated U.S. SLBMs would suffice to take them out.

The current nuclear postures of India and Pakistan are sometimes referred to as “virtual” or “opaque.” Both admit to an ability to make nuclear weapons, neither admits to having assembled any. Survivability of these virtual forces depends on secrecy about the locations of their potential parts, not on launch alert status. If and when the two decide to deploy nuclear forces overtly, they will probably be deliverable by combinations of mobile missiles and dual-use fighter-bomber aircraft. They will likely rely on mobility and secrecy for survivability. Warning times would be so short, and the numbers of weapons so small, that launch-on-warning would not be a credible survivability measure. On the other hand, arsenals would also be so small that nuclear counterforce targeting is unlikely to be preferred over either “tactical” use against conventional forces or retaliatory countervalue as a deterrent threat.

All of this is not to say that command-and-control, particularly use-control, would not be of serious concern in the cases of small nuclear powers. However, de-alerting measures are likely to be irrelevant to such problem.

APPENDIX IV: CRITERIA APPLIED TO MEASURES

Measure	Visibility	Expense	Survivability Balance	Timing Equivalence	START Effects
Warhead Removal	Sampling possible provided long time-lines acceptable Remote silo door monitoring could improve confidence Mobiles hard to monitor	Russians claim high expense; depends on storage locations Reconstitution infrastructure costly High-confidence RVOSIs would be costly	Centrally stored warheads would be more vulnerable Russian missiles could be vulnerable to U.S. SLBMs Storage in missile-less silos could reduce vulnerability	Russians could restore more warheads to ICBMs, U.S. could re-alert bombers Russian strategic facilities may be vulnerable to U.S. conventional attacks	De-alerting negotiations could become complex, given U.S.-Russian asymmetries Measure more promising as START II deactivation step
Power, Guidance, or Other Missile Part Removal	Sampling inspections possible provided long time-lines acceptable Remote silo door monitoring could improve confidence Mobiles hard to monitor	Less costly than warhead removal High-confidence RVOSIs would be costly	Disabled Russian missiles could be vulnerable to U.S. SLBMs	With warning of opponent re-alerting times, short re-alerting times would reduce chance of asymmetries Prolonged conventional attacks would be less feasible than for warhead removal	At least for deactivation, such measures apparently more acceptable to Russians than warhead removal
Immobilize Fixed ICBM Silo Doors	Sampling probably still needed to inspect door-sealing mechanisms Overhead surveillance insufficient; remote silo door monitoring could improve confidence	Missile maintenance and inspection procedures would become more costly Russian aging liquid-fueled missiles probably need more maintenance than US ICBMs	Russian missiles could be vulnerable to U.S. SLBMs Conventional attacks on equipment might delay reconstitution	Russia could reconstitute larger number of warheads with smaller number of door-openings U.S. might re-alert bombers to match warhead numbers	START II MIRV downloadings would be complicated by door obstruction Measure more promising as START II deactivation step
Reduce Mobile ICBM Launch-Readiness	Would require frequent inspections at mobile ICBM bases Field-deployed missiles harder to monitor	Disablement expenses need not be great, but frequent inspections would be costly	Missiles in garrison vulnerable to limited nuclear or to conventional attacks De-alerted missiles might be field mobilized in crisis to reduce vulnerability	No comparable U.S. measure would be possible; asymmetries in force reconstitution would have to be considered in larger context of strategic force postures on both sides	Russian reliance on SS-25s and SS-27s will grow under START II/III. That, and reliance on LOW for survivability makes their interest improbable.
Remove SLBM warheads	RVOSIs might confirm removals. If missile shrouds not replaced, overhead imagery might show absence of warheads No plausible visibility measures	Moderately costly RVOSIs less costly than for ICBMs because of concentration of SSBN Little cost	Insofar as Russians rely on launch-on-warning for SLBM survivability, SLBM vulnerability is increased No effect on US, barring dramatic Russian ASW improvements Smaller number and patrol regions of Russian SSBNs would make them more vulnerable to US ASW	With more SSBNs in port at a given time, Russia would have more SLBMs to reload than U.S. would Russians would be unlikely to de-alert threatened land-based ICBMs on basis of U.S. claims to have de-alerted at-sea SSBNs	Unequal burden borne by Russia may cause them to seek compensation in START negotiations Probably no effect
Suspend alert status of at-sea SSBNs					
Deploy SSBNs out of target range	Somewhat complex verification measures appear feasible (e.g., randomly selected SSBNs surface on demand for observation) Measure does not appear feasible for Russian SSBNs	Verification measures appear costly	Would preserve US SSBN survivability, reduce US threat to Russian ICBMs	Any Russian de-alerting measure would have been asymmetrical Details depend on Russian de-alerting measures taken	Would add complex negotiations to US-Russian arms control bargaining agenda

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