

**REPLACE
LAUNCH ON WARNING POLICY
with Retaliatory Launch Only After Detonation (RLOAD)**

by Alan Phillips and Steven Starr

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This is a revised version of "**Change Launch on Warning Policy**" which is posted online at the **Strategic Arms Reductions (STAR)** website of the **Moscow Institute of Physics and Technology**. See also <http://www.armscontrol.ru/start/>

REPLACE LAUNCH ON WARNING POLICY

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Introduction

- 1) We suggest a new approach to the problem of reducing the risk of accidental nuclear war, on which the military and governments of Russia and USA might be willing to take action now if they could be persuaded that it is safe, and not destabilizing. Our suggestion is to change the current policy of "Launch on Warning" (LoW) to one of "Retaliatory Launch Only After Detonation" (RLOAD). This would involve no change in the "Alert Status".
- 2) We believe that RLOAD is compatible with the current posture of nuclear deterrence, and that the military on both sides would be glad to accept it in order to reduce the risk inherent in LoW, of which they are well aware. The appalling danger is that a false warning might be accepted as true, and "retaliation" might be launched when there had been no attack.
- 3) We address only the nuclear confrontation between the U.S. and Russia. A war between those two countries would destroy both of those countries. It would cause serious harm to neighboring and even distant countries. We do not know of other nations having LoW capability.
- 4) The different sequences of events (as we understand they would be) under these two policies, if any warning were to be accepted as true and acted upon, are compared in the table on page 2:
Under LoW, whether the warning was true or false, there is war.
Under RLOAD, only a true warning ends in war.
- 5) The military on both sides seem to plan as if it is essential for retaliation to be actually launched. But the planning for retaliation should be designed for deterrence, not for revenge. As soon as the enemy attack is launched deterrence has failed and enormous destruction is inevitable. What is necessary for effective deterrence is that an aggressor who thinks of planning an attack foresees an unacceptable risk that unacceptable retaliation will follow. Certainty is not needed to deter a rational adversary.
- 6) It is not necessary for either side to know whether the other has or has not changed from LoW to RLOAD. There is no need for verification or symmetry, because deterrence is not lost by the proposed wait for the first detonation. If only one side changes its policy from LoW to RLOAD, the risk of accidental war due to a false warning is approximately halved, but the balance between the U.S. and Russia is not changed. There is no strategic advantage to either side.¹
- 7) A possible cause of an unintended nuclear war between Russia and the U.S., at this time, is a false warning misread as true. If both sides give up the policy of LoW then that particular risk goes to zero.
- 8) No other risks of unintended nuclear war are addressed in this paper. We believe a false warning (triggered by technical failure, human error or a deliberate act of terrorism) is a more likely cause of nuclear war between these two countries, than an intentional, authorized nuclear strike launched by one side against the other.

NOTE:

The "times" in the following table assume a flight time of about 30 minutes, i.e., that of ICBM's between Russia and the U.S. We do not know whether LoW is in effect in either country for a warning of a short-range SLBM attack. If it is in effect, then the sequence up to the moment of 'authorization' must be greatly compressed, with the time available for conferences much reduced. There is little scope for reducing the duration of the steps from then on, but the comparison between the LoW sequence and the RLOAD sequence is unchanged. The rest of this paper does not specifically address the case of a perceived short-range attack by offshore SLBM's. The argument for changing to RLOAD would, we believe, be essentially unchanged.

¹ This statement assumes that both sides have planned to use nuclear weapons only for deterrence, as they both allege. The point is discussed later (footnote #17). Our conclusion that RLOAD is compatible with deterrence is not altered even if the assumption is untrue.

LoW Sequence

(Times, starting from zero at the time of apparent launch of the attack, are given only as plausible examples.)

0 - 3 min: Evidence indicating hostile missile launch detected by satellite, radar, or both.

3 - 7 min: Series of military conferences culminating in the opinion that it may be an attack. President is warned.

7 - 8 min: Telephone briefing of President on the options available, and advice by the Chiefs of Staff.

8 - 25 min (at latest): At a final telephone conference, if the attack is still interpreted as real and the President authorizes retaliation, this is what follows:

8 - 26 min: Before the first warheads arrive, **retaliation is launched.**

30 -35 min:
If it was a real attack incoming warheads detonate, destroying many empty silos.

If it was a false warning there are no incoming warheads, **but there will certainly be retaliation** to the massive attack just launched. **Both countries will be destroyed within the hour.**

FINAL RESULT:

If it was a real attack:
War had already been started.

If it was a false warning:
War has been started by the false warning.

RLOAD Sequence

0 - 3 min: Evidence indicating hostile missile launch detected by satellite, radar, or both.

3 - 7 min: Series of military conferences culminating in the opinion that it may be an attack. President is warned

7 - 8 min: Telephone briefing of President on the options available, and advice by the Chiefs of Staff.

8 - 25 min: President may authorize retaliation to be launched, but only if a nuclear detonation is reported at a place and time consistent with the plotted trajectories. Codes etc. are transmitted to the launch crews. All preparations are made by them to launch immediately without further orders as soon as indication of a detonation is received. The order is automatically voided if no detonation is detected by a certain stated time.

30 min:
If it was a real attack, the first detonation is detected and the signal is transmitted direct to the launch crews as well as to the Command Centers.

If it was a false warning: **silence.**

30 min. + a few seconds:
If it was a real attack, retaliation is launched by the crews in all surviving silos
If it was a false warning: **silence.**

30 min. and the next few minutes:
If it was a real attack, there are a large number of detonations over the next few minutes, destroying a combination of empty and full silos.

If it was a false warning: **silence.**

FINAL RESULT:

If it was a real attack
War had already been started.

If it was a false warning:
There is still peace

PROPOSAL

Replace LoW with Retaliatory Launch Only After Detonation (RLOAD)

Preamble

AS LONG AS THE UNITED STATES AND RUSSIA retain their arsenals of nuclear-armed intercontinental ballistic missiles, some on high alert, the danger remains of a purely accidental nuclear war between the two countries. Neither side wants this: if it should happen, it would be an utter disaster for both countries and for the entire world – no matter which adversary started it.

One of the possible causes of an unintended nuclear war is "Launch on Warning" (LoW) – the policy of launching a retaliatory nuclear strike while the opponent's missiles or warheads are believed to be in flight, but before any detonation from the perceived attack has occurred.² Each side is believed to have more than 1000 strategic nuclear warheads ready to launch before the incoming warheads have arrived. Once launched, they cannot be recalled or neutralized. LoW has exposed the world, for at least 30 years, to the danger of a nuclear war caused by nothing but a coincidence of radar, satellite sensor, or computer glitches, and a temporary failure of human alertness to appreciate that the message signaling attack is false.

The danger inherent in LoW policy has been appreciated by all concerned since it was first considered in the early 1960's.³ Priority has been given to reducing this risk, and other risks of unintended or hastily started war, in UN Resolutions and in recommendations from prestigious bodies including the Canberra Commission, the Brookings Institution, the Center for Defense Information, and a recent large conference of Nobel Laureates in Rome, all calling for "lowering the alert status" or similar phrases. These recommendations have not drawn attention to the possibility of simply changing the policy of "Launch on Warning", without lowering alert status or giving up the concept of prompt retaliation.

The disaster of an accidental nuclear war has not happened yet, in spite of a large number of false warnings of which at least a few have had very dangerous features. This is a credit to the care and alertness of the military in both Russia and the U.S. It should not be taken as reassurance. A "retaliatory" launch of nuclear weapons on a false warning would result in nuclear war, and the most terrible destruction in both countries, just as surely as a nuclear war started by an actual attack. There would be no chance to review the system to make it safer after one failure of that kind.

Although the Cold War is considered over, both Russia and the United States have chosen to retain their LoW capabilities, and they are widely believed to be continuing their LoW policies. If this is the case, it is inexcusably dangerous.

Retaliatory Launch Only After Detonation (RLOAD)

The policy of LoW should be replaced by one of "Retaliatory Launch Only After Detonation" (RLOAD). We believe it should not be difficult to change the launch procedures so that in a situation in which, under LoW, *retaliation would be launched* before arrival of the attacking warheads, under RLOAD *the decision to retaliate*

² Launch on Warning and the related term "Launch under Attack" (LUA) are not always used consistently, and this has caused confusion. In the US Defense Department Dictionary of Military Terms (www.dtic.mil/doctrine/jel/doddict/), LUA has a definition exactly the equivalent of our use of LoW. Russian military experts (writing in English) use LUA to mean the delivery of a retaliatory nuclear strike "in response to an actually delivered strike", i.e. after nuclear detonations have been confirmed (see Valery Yarynich, *C3: Nuclear Command, Control, Cooperation*, Washington, D.C.: Center for Defense Information, 2003, pp. 28 -30.) Also, a retired British military officer explained that "launch on warning" can mean to him the launch of a preemptive strike when there is convincing evidence from human sources that an enemy nuclear attack is imminent, but no enemy missiles have yet been launched.

³ Alan Phillips: "No Launch on Warning" available at: <http://www.ploughshares.ca/libraries/WorkingPapers/wp021.html>.

could be made during flight of the warheads, but the launch sequence would be held at the final step. The actual launch would be started instantly after the first detonation of an incoming warhead.

Adoption of an RLOAD policy by both parties would immediately remove the danger of an accidental war caused by a false warning, simply because after a false warning there would be no nuclear detonation at the predicted time. No uncalled-for "retaliatory" launch would take place.

The "threat conference"⁴

When warning systems detect a possible ICBM attack, there is at most a total of 20 minutes for human operators and commanders to call and conduct a threat conference. If the warning were to be assessed as a nuclear attack, top U.S. or Russian military commanders (as the case might be) would contact their president to advise him, and the president would have only a few minutes to decide whether to retaliate. We believe he would be under great pressure to do so.⁵ The threat conferences require, and so far have achieved, the extraordinary standard of perfect accuracy.

It is clear that threat conferences have not been rare events.⁶ The US government has kept information about false warnings classified since 1985, and Russia has always kept that information secret. Most of the false warnings have probably been routine and easy to dismiss. However, some in the US have been serious enough that launch preparations have been started which would have been visible to Russian satellites.⁷ On the Russian side, we know of a 1983 event in which an officer decided, against standing orders, not to pass on a high-level warning because he judged, correctly, that it was false;⁸ and in January 1995 a false warning resulted from the launch of a Norwegian rocket whose mission was atmospheric research. It is reported that in the 1995 event the Russian nuclear forces went on full alert, and President Yeltsin was holding the activated nuclear briefcase with only a few minutes to decision time. The episode was the subject of a report to U.S. Congress. There is an article on it by experts von Hippel, Blair, and Feiveson, in *Scientific American*.⁹

It is very dangerous to allow a small risk of a great disaster to continue for a long time. To illustrate this, suppose that the risk of a wrong conclusion from just one of the many conferences in a year had been only 1% per year, then it is easy to calculate that the cumulative risk over 30 years would have been close to one in four

⁴ The following discussion is written as from the US point of view. No doubt the Russian nuclear forces have a comparable system with similar dangers and safety precautions.

⁵ "The bias in favor of launch on electronic warning is so powerful that it would take enormously more presidential will to withhold an attack than to authorize it." Bruce G. Blair, president, Center for Defense Information. *CDI Monitor* XXXIII no.2, March-April 2004.

⁶ According to the Center for Defense Information, from 1977 through 1984, early warning systems generated 20,784 false indications of missile attacks on the United States. More than 1,000 of these were serious enough to require "a second look". "Accidental Nuclear War: A Rising Risk?" *The Defense Monitor*, vol. 15 no. 7 (1986)

⁷ Alan Phillips: "20 Mishaps that might have started Accidental Nuclear War" available at: http://www.wagingpeace.org/articles/1998/01/00_phillips_20-mishaps.htm or by email from the author.

⁸ David Hoffman: *Washington Post*, Wednesday, February 10, 1999; Page A19

⁹ "Taking Nuclear Weapons Off Hair-Trigger Alert", Bruce Blair, Harold Feiveson and Frank N. von Hippel, *Scientific American* (November 1997). See also: David Hoffman, "Cold War Doctrines Refuse to Die," *Washington Post*, March 15, 1998, p.A1.

– greater than the risk of death from one pull of the trigger at Russian roulette.¹⁰ If it had been 2% per year the probability of surviving those 30 years would have been 55%.¹¹

It is essential to eliminate as soon as possible the risk of instant destruction of both these great countries, by a mere accident. RLOAD can be put into effect by executive decision and relatively small changes in standing orders and items such as re-routing the signals from the detonation detectors. To change from LoW to RLOAD does not reduce the alert status or readiness of the nuclear forces. It only removes the risk of responding to a false warning with a nuclear launch.

RLOAD does not need verification

The proposed change would not require symmetry, nor verification, nor an agreement (much less a treaty); nor would it undermine deterrence. RLOAD could be adopted quickly and unilaterally. If one side adopted it, the risk of accidental war would be immediately reduced by approximately one half. When the other side did the same the risk of war caused by a false warning would be zero.

From the point of view of preserving deterrence, verification of RLOAD is actually undesirable. If either side planning a preemptive attack had the idea that RLOAD would make the enemy vulnerable to a first strike, it would need to be certain that its opponent had changed to and remained under the policy of RLOAD. Without verification a potential attacker could not be certain, but if RLOAD were verified he might think there was a possibility of making a successful first strike, though we argue below that this would be irrational.

Replacing LoW with RLOAD would not eliminate any other retaliatory options (such as, for example, a decision how to react to an unauthorized launch or to an attack by a single missile). It would merely ensure that retaliation to a perceived attack would not take place unless there had been a nuclear detonation. It would delay the retaliatory strike by only a few minutes. But if the warning were false (as all the warnings of nuclear attack have been up to the present) that fact would be immediately revealed as soon as the predicted time had passed for the first missiles to arrive and no detonation had been detected; there would be no “retaliatory” launch.

RLOAD is compatible with deterrence

The purpose of deterrence is to prevent either side from launching a nuclear attack. This is achieved by each side convincing the other that any attack will bring unacceptable retaliation. The theory of deterrence relies on the assumption that the ultimate decision-makers on both sides act rationally, and can be persuaded that it would be folly to launch an attack. Deterrence fails if one side believes it can launch such a rapid and massive surprise nuclear strike that it will prevent the other side from retaliating.

Launch on Warning is a response to the concern that the aggressor's first salvo, or a devastating electromagnetic pulse (EMP), might prevent or significantly weaken a retaliatory strike. The military on both sides have planned as though it would be essential for retaliation with a full-scale salvo to be achieved after a first strike was actually launched. That is not so. Retaliation does nothing to stop the warheads that are already on the way to their targets, nor the second salvo which the aggressor may launch when he sees retaliatory warheads on their way. Once an attack has been launched irreparable damage to the attacked country is already inevitable.¹²

¹⁰ Per Dr. Martin Hellman of Stanford (see <http://nuclearrisk.org>): A coin that has a 1% chance of showing heads, if tossed 30 times has an "expected" number of occurrences of $0.01 \times 30 = 0.3$. If the tosses are independent, meaning that each has a 1% chance of showing heads regardless of what the other tosses show, then the probability of no heads in those 30 tosses is $0.99^{30} = 0.74$. That's because we need to get all 30 tails, so we multiply the probability of one toss showing tails (99%) 30 times. The probability of getting one or more heads is $1 - 0.74 = 0.26$, or 26%.; for a 2% chance, we use $0.98^{30} = 0.55$, and $1 - 0.55 = 0.45$, or 45%.

¹¹ This is not an attempt to estimate an actual probability. The probability of a threat conference coming to the wrong conclusion cannot be determined. The numbers here are simply to illustrate the danger of continuing to accept any very small risk for a long period of time.

¹² We intentionally take no account here of "Ballistic Missile Defense". No claim has been made that such defense could mitigate a full-scale attack by the US or Russia.

Retaliation should not be planned for revenge, but for deterrence. Deterrence is achieved if the potential attacker foresees *an unacceptable risk* that unacceptable retaliation would follow an attack. In order to risk making an attack, he would have to be *certain*, or almost certain, that his enemy's retaliation would fail. **A mere chance that retaliation might fail would not impair deterrence.**

The following considerations show that, as things are at present, neither side can be certain that retaliation would fail under the policy of RLOAD

First, as regards an EMP attack, it is known to both sides that great efforts have been made to screen military electrical equipment from the pulse.¹³ Therefore it is not possible to be sure that EMP will be effective against land-based missiles. Submerged submarines and the missiles they carry are known to be completely protected by sea water.¹⁴ Neither can an attacker be sure that a "disarming first strike" will be successful, as the following discussion will show.

The United States uses the space-based Nuclear Detonation Detection System (NUDET) to detect, locate, and report to the Strategic Command Centers, any nuclear explosion in the earth's atmosphere or nearby space. NUDET either supplements or replaces the hundreds of ground-based nuclear detonation detectors that were installed near military bases and big cities in 1974.¹⁵

Russia employs optical, radiation and seismic sensors to detect nuclear explosions.¹⁶ Their policy is believed to be Launch on Warning, which, as in the U.S. system, would only be ordered by the National Command Authority (NCA). Russia has a back-up system called "Perimetr" to ensure retaliation in the event of an attack that has disabled the NCA before it can order the retaliatory launch. Positive signals from the detonation detectors, as well as prior activation by the NCA, are a prerequisite to any launch ordered via the Perimetr system. Perimetr therefore cannot effect a "Launch on Warning". Its action is a partially automated 'retaliatory launch after detonation'. It would, if activated, do the same thing as RLOAD, but not so promptly.

A change from Launch on Warning to RLOAD would require, in the American system, feeding any positive signals from the detonation detectors directly to the launch crews as well as to the command centers, so that destruction of command centers would not prevent a retaliatory strike. Retaliation would be ensured (if already authorized) immediately upon a detonation, by having the launch crews carry out all steps toward launch except the final one, during the flight of incoming missiles, just as they do under LoW. On receipt of a detonation signal at the predicted time of arrival of attack retaliation would be launched immediately by all launch crews, except any who were already casualties. If no detonation was detected at the predicted time of arrival, the crews would revert to peacetime readiness.

In the Russian system, as far as we know, similar changes would be required.

The retaliatory launch, we presume, is 'countervalue' in order to have the greatest deterrent effect. Less than 5% of the 1000 plus warheads on high-alert should be enough to inflict "unacceptable" damage, on any reasonable criteria. No head of state or commander-in-chief could be certain that an initial salvo could put more than 95 percent of these weapons out of action within a few seconds of the first detonation.¹⁷ Thus a massive disarming first strike could not in fact be relied upon to prevent unacceptable retaliation.

¹³ Electromagnetic Pulse – From Chaos To A Manageable Solution by Major M. CaJohn, USMC, (1988) <http://www.globalsecurity.org/wmd/library/report/1988/CM2.htm>

¹⁴ Joe Buff: Transparent Seas? (Part II) (2005) http://www.military.com/Opinions/0,14790,Buff_061605-P3,00.html

¹⁵ Department of Defense Appropriations for 1974, Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, 93rd Congress, 1st sess., part 7, p. 1,057.

¹⁶ Yarynich, *C3: Nuclear Command, Control, Cooperation*, p. 158.

These arguments should be sufficient to persuade the military on both sides that the policy of LoW, which they know to be dangerous, is *not* essential and should be replaced by RLOAD – Retaliatory Launch Only After Detonation. If the military establishment on either side is not persuaded to abandon LoW, then the head of state must balance the elimination of a very definite risk of accidental war due to a false warning, against the hypothetical possibility of the enemy launching a first strike because he judged that RLOAD had weakened deterrence.

Conclusion

There is no logical reason to maintain Launch on Warning. It is to the equal advantage of both sides even if only one changes its policy to RLOAD from LoW. If both adopt RLOAD then one of the possible causes of an unintended nuclear war between Russia and the U.S. – an accidental war due to a false warning – will be eliminated.

¹⁷ We have been reminded by officers of both the U.S. and Russian nuclear forces that it would be possible in the case of an intentional attack, for the attacker to calculate and adjust the flight time of each missile, so that all the attacking warheads would detonate at very nearly the same moment. Only a first strike would be timed in that way and both sides claim that their weapons are only for deterrence. Be that as it may, we believe that an unintended launch, which would not be a timed attack, is more likely than an intentional start of a nuclear war, and a false warning is more likely than either. No commander-in-chief, allowing for incomplete knowledge of the location of every enemy missile, and for possible errors, delays and malfunctions of his attacking force, could be certain of destroying every retaliatory missile within the first few seconds of the first detonation. Each retaliatory missile that survived and was launched would be aimed to destroy one or more of the principal cities of his country.

The Authors:

Alan Phillips (1920 – 2008) graduated with honors in physics from Cambridge, did radar research for the British army during World War II, and then became a physician. He later emigrated to Canada and then the United States, where he did pioneering work as a radiation oncologist. In retirement, his main focus was upon the prevention of nuclear war.

Steven Starr trained in nuclear engineering, but pursued a career in medical technology. He is Senior Scientist with Physicians for Social Responsibility, and is the director and coordinator of the Clinical Laboratory Science Program at the University of Missouri in Columbia, Missouri.

Comments or questions to: ssarr@centurytel.net or starrst@health.missouri.edu

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