

FPS NEWSLETTER JANUARY 2003 ARTICLES

Russian Early-Warning System and Danger of Inadvertent Launch

Pavel Podvig

The status of the Russian early-warning system has always attracted considerable attention, especially after the end of the cold war, which brought into focus the dangers of accidental or inadvertent launch that could result from a human or technical error. Since consequences of an error of this kind would be truly catastrophic, it is understandable that the reports about the problems that Russia has been having in its attempts to operate the strategic forces in a safe manner are among the causes of serious concern.

The Soviet Union was one of the two countries (the other being the United States) that developed and deployed a system that would allow it to detect a missile attack before missiles hit their targets. According to the logic of the cold war, this effort was necessary to achieve the launch-on-warning capability which is the ability to promptly launch missiles to escape an attack. This, it was argued, was a way to strengthen deterrence, for it made a first nuclear strike virtually ineffective. Although this may have been true, the price for strengthening deterrence was rather high, since a launch-on-warning posture required keeping missiles on constant hair-trigger alert, ready to be launched on a moment notice.

Since the end of the cold war, neither Russia nor the United States has officially excluded launch-on-warning from their set of options. It is known that both countries have technical capability to launch their missiles within minutes. This certainly raises concerns about the status of all systems that could be involved in a decision to launch on warning.

Since an early-warning system is the key component of the launch-on-warning mechanism, reports about deterioration of the Russian early warning system, which have been appearing in recent years, quite naturally raise questions about dangers of inadvertent missile launch that may result from it. In this article I present a short overview of the Russian early warning network and argue that although the Russian early-warning system is in serious decline, it poses no serious threat of an inadvertent launch (although, certainly, no problem even remotely linked to nuclear forces is too small to discount).

The Soviet Union began its work on early-warning in the early 1960s. This work, however, was not in any way connected to attempts to acquire launch-on-warning capability. Rather, the first early-warning radars were supposed to support operations of the Moscow missile defense system, which was under development at that time. Besides, the Soviet Union did not have strategic forces that would allow to implement a launch-on-warning posture until well into the 1970s.

The decision to begin development of an integrated early-warning system came only after 1972. The plan, presented at that time, called for deployment of a two-layered network that would consist of satellites and over-the-horizon radars that would detect U.S. missiles shortly after launch and above-the-horizon radars deployed around the territory of the country that would see ballistic missiles and warheads as they approach their targets. The work on all components of the proposed system began shortly afterwards and had been largely completed by the end of the decade.

It may seem that the large-scale effort to deploy an early-warning system, initiated by the Soviet Union in the 1970s, indicated that the military had made their choice in favor of launch-on-warning as the primary option in Soviet strategic posture. This view has been

further reinforced by the fact that the Soviet Union in the 1970s invested a disproportionately large effort into deployment of land-based missiles with multiple warheads. These missiles were very vulnerable to an attack and it was therefore universally assumed that they would be used either in a first strike or in a launch-on-warning scenario. When in the late 1970s–early 1980s the Soviet Union completed deployment of its early warning system, almost all observers in the West concluded that launch-on-warning was one of the main, or even the primary, option in the Soviet arsenal of war scenarios.

This notion has persisted to the current day and it is fairly widely believed that the Russian strategic forces are kept on hair-trigger alert, ready to be launched within minutes from a signal from the early-warning system if it indicates that an attack against Russia is underway. It is therefore perfectly understandable that the status of the Russian early-warning system causes serious concerns, for a malfunction of this system, such as a false alarm, might have catastrophic consequences. The fact that the Russian early-warning system has seriously deteriorated since the Soviet times, only adds to these concerns.

In reality, the situation is not as serious as it may seem. Although the Russian early-warning system is indeed only a shadow of its former self, it is highly unlikely that its decline has increased probability of inadvertent launch of Russian strategic forces. The reason for that is that, contrary to the outward appearance, the Soviet Union never considered launch-on-warning as its primary war option. Besides, the Soviet early-warning system was never intended to provide genuine launch-on-warning capability.

The first Soviet early-warning system, developed in accordance with the 1972 plan and put in place by the end of the 1970s, consisted of two layers. The first one was formed by the radar network. Hen House-class radars were deployed at six sites around the periphery of the Soviet Union—in Olenegorsk (Kola Peninsula, Russia), Skrunda (Latvia), Mukachevo (Ukraine), Sevastopol (Ukraine), Balkhash (Kazakhstan), and Mishelevka (near Irkutsk, Russia). These radars were complemented by radars of the Moscow missile defense system. The second early-warning layer was provided by satellites of the US-KS system (also known as Oko), deployed on highly-elliptical orbits (known as Molniya orbits). Another proposed component of the early-warning system—a set of over-the-horizon radars that were supposed to detect launches from the U.S. territory, failed to materialize because of technical difficulties.

Although the Soviet Union had spent considerable effort building that system, it did not provide coverage necessary for launch-on-warning, since both its layers had significant gaps. The radar network did not cover approaches from north and north-west. The constellation of early-warning satellites was designed to detect launches of land-based missiles from the U.S. territory, but could not see launches of sea-based missiles from submarine patrol areas.

The limited capabilities of the early-warning system reflected the role that it played in operations of the strategic forces. The primary mission of the system was to detect a *massive* missile attack against the Soviet Union, which had to involve land-based missiles and could not have avoided detection by at least some of the radars. The system, therefore, could not deal with a small-scale attack or an isolated launch. This capability, however, was not considered necessary, for the Soviet military were apparently confident that the forces that would remain after a small-scale attack would be sufficient for retaliation and, therefore, for deterrence.

Another important feature of the Soviet military doctrine, which also contributed to the limited role of early-warning, was the concept of “period of tensions”, that was believed to precede any use of nuclear forces. The Soviet military firmly believed that in a case of a

crisis they would have enough time—from hours to days—to raise the alert level of the strategic forces and ensure their survivability. This did (and still does) contradict the approach taken by the United States, which relies on highly survivable basing of its strategic forces and see launch-on-warning as the only way to ensure survivability of its land-based missile forces. It is therefore no surprise that the Soviet strategic posture was very difficult to interpret and it may have appeared rather threatening.

Although the role of the early-warning system was limited, the Soviet Union constantly worked on expanding its capabilities. This was done by the introduction of new-generation radars and satellites to replace the ones deployed before the beginning of the 1980s, as well as by improving coverage and detection capabilities of the system. As part of this plan, the Soviet Union initiated a program of development of new-generation large-phased array radars, known as Daryal in Russia and Pechora-class in the West. The program called for construction of seven new radars of this type at sites at Pechora (Komi region, Russia), Gabala (Azerbaijan), Balkhash (Kazakhstan), Skrunda (Latvia), Mishelevka (near Irkutsk, Russia), Mukachevo (Ukraine), and Krasnoyarsk (Russia).

The program, however, did not go beyond construction of the first two radars in Pechora and Gabala, which were completed in 1985. Construction of a radar in Krasnoyarsk had to be stopped because of the U.S. protests about violation of the ABM Treaty. Construction at other sites was interrupted by the breakup of the Soviet Union in 1991. Radars in Mukachevo, Balkhash, and Mishelevka were left unfinished. The radar building in Skrunda was demolished shortly after Latvia took control over the site in 1994.

As a result, for early-warning coverage Russia still has to rely on the outdated Hen House radars, which were built in the 1970s and will soon reach the end of their operational lives. Another serious problem for the radar network emerged in 1998, after closure of the base in Skrunda, in Latvia, which hosted one of the Hen House radars. The closure opened a gap in radar coverage, which can not be closed by any of the existing radars.

If Russia would ever want to complete construction of the early-warning radar network, it will have to replace the aging Hen House radars and complete construction of Pechora radars in Mishelevka and Balkhash. In addition, Russia will have to find way to close the gap in radar coverage that was supposed to be filled by the Krasnoyarsk radar. A program of this kind would be prohibitively expensive and it is difficult to imagine the circumstances that would justify it. It is therefore safe to assume that Russia will never have a radar network that would provide it with early warning of an incoming missile attack.

The situation with the space-based early-warning system is hardly better. The constellation of early-warning satellites that the Soviet Union deployed in the late 1970s–early 1980s is in decline and Russia has not demonstrated the ability to keep it fully operational. As in the case of the radar network, the evolutionary upgrade of the system, which was supposed to improve its capabilities, was interrupted by the breakup of the Soviet Union.

As was noted above, the original constellation of early-warning satellites included satellites on highly-elliptical orbits (HEO). Later, the system was augmented by a satellite placed on geostationary orbit. When the constellation is complete, the system is capable of providing 24-hour coverage of launch sites on the U.S. territory. This requires as many as nine HEO satellites and one GEO satellite, although the system could provide some coverage with as few as four HEO satellite or with one or two HEO satellites augmented by a geostationary one.

The detectors of these satellites detect missiles against the background of space, so the coverage provided by the system is limited to the U.S. territory. To extend it, the system was supposed to be replaced by a new one, which would rely on satellites that can detect ballistic missiles against the Earth background and therefore could provide almost global coverage. In order to achieve that, satellites would be placed at points on geostationary orbits. The new system was supposed to be brought into operation in the early 1990s, but its development was delayed by the breakup of the Soviet Union and it still seems to be undergoing testing and has not reached operational status yet.

Russia had managed to keep the early-warning satellite systems in operation until 1996, maintaining the number of satellites in orbit at the level of eight or nine satellites. After that the system began to deteriorate and by the beginning of 2001 the constellation consisted of just four HEO satellites.

In May 2001 the whole system was damaged almost beyond repair when a fire at the control center near Moscow destroyed cables and other ground equipment. As a result of the fire, the control center lost communication with all four satellites that were operational at that time. Three of these satellites were eventually lost, and only one was brought back into operation in September 2001. This means that for almost four months of summer 2001 Russia had no space-based early-warning at all.

After the May 2001 fire, the Russian military space forces undertook efforts to restore the constellation. A new geostationary satellite was launched in August 2001 and a new HEO satellite in April 2002. The HEO satellite, however, failed to reach the operational orbit, so, as of the time of this writing (December 2002), Russia has only two operational early-warning satellites—Cosmos-2368 on highly-elliptical orbit and Cosmos-2379 on geostationary orbit.

The quality of the coverage provided by these two satellites is probably not very high as they cannot guarantee sufficiently high probability of detection all 24 hours a day. The future of the constellation is also very uncertain. Although the Russian military are very optimistic about the prospects for deployment of the new system, it is extremely unlikely that Russia could find the necessary recourses.

As we can see, the Russian early-warning network is indeed in a serious decline and cannot provide the Russian strategic forces with the support necessary to exercise the launch-on-warning option. In fact, there is virtually no chance that the system will ever recover to be of any use for launch-on-warning. What is important to note that the system has been constantly losing its capabilities for quite some time now and the Russian military are very well aware of this fact. Given that the Soviet and Russian military have never relied on the early warning system to begin with, it should not have been difficult for them to adjust operations of the strategic forces to completely exclude the deteriorating system from the decision-making process. Further degradation of the early-warning system will only diminish its role and is very unlikely to increase the danger of inadvertent launch.

Pavel Podvig

Center for Arms Control Studies, Moscow Institute of Physics and Technology

podvig@armscontrol.ru

(This article is based on the analysis presented in the following article: Pavel Podvig, "History and the current status of the Russian early warning system," *Science and Global Security*, Vol. 10, No. 1 (2002), pp. 21-60. The article can be found at <http://www.armscontrol.ru/Podvig/doc/sgs-ew2002/sgs-ew2002.shtml>)