A Dispute Over Soviet ABM Plans

The Defense Department wants to charge the Soviets with preparing a nationwide ballistic missile defense; others say the evidence does not justify such a charge

LAST year, American reconnaissance satellites detected tell-tale signs that three massive radars are being constructed in the western Soviet Union. Huge installations about the size of the U.S. Capitol, they will eventually dominate their local landscapes. If the U.S. Department of Defense has its way, the radars could also loom large in U.S.-Soviet relations.

Officials in DOD are pointing to the facilities as new evidence that the Soviet Union is developing a nationwide network of defenses against intercontinental ballistic missiles (ICBMs). Such defenses are outlawed by the 1972 Antiballistic Missile (ABM) Treaty, which permits each side to deploy only a limited ABM system designed to defend a relatively small region. DOD is consequently urging the Administration to assert that the Soviet Union is preparing to "break out" from the treaty's restraints.

This interpretation is not widely shared outside DOD, however. Officials in the State Department and the Central Intelligence Agency (CIA), backed by many observers in the arms control community, argue that the evidence does not support such a serious charge. They are urging the White House to resist DOD's advice.

The dispute is taking place in the context of an annual report detailing the Administration's allegations of Soviet noncompliance with weapons treaties. The report is in the final stages of preparation, and the National Security Council is currently refereeing interagency disputes over the precise wording. Last year, the report stated that the Soviet Union "may be preparing an ABM defense of its national territory." This year, DOD wants to change "may be" to "is"—a much more serious accusation.

These arguments over Soviet intentions are occurring amid signs that the Reagan Administration itself is considering breaking out of the ABM Treaty by testing and deploying some elements of the Strategic Defense Initiative as soon as the early 1990s (*Science*, 16 January, p. 277). Some observers therefore contend that, by accusing the Soviet Union of preparing a nationwide ABM defense, DOD officials are hoping to justify U.S. abrogation of the treaty. James Rubin, assistant director for research at the Arms Control Association, suggests that DOD's arguments should be viewed in that light, and he characterizes the evidence for hardening the language of the noncompliance report as "a very thin reed—about as thin as they come."

According to several sources, the only fresh evidence to support upgrading the charge is the discovery of the three new radars. Nobody is arguing that the radars themselves are illegal—on the contrary, they are being constructed in locations that are clearly permitted by the treaty—but DOD is claiming that they should be seen in conjunction with other Soviet activities as critical elements in a future nationwide ABM defense.

U.S. deployment of SDI systems would also breach the ABM Treaty.

The contention is that the radars form part of a network that will provide the backbone of a nationwide ABM system. According to this line of argument, the radars would provide early warning of nuclear attack and give critical information on the trajectories of incoming warheads to other radars, which would guide and control ground-based, nuclear-tipped interceptors.

DOD officials acknowledge that such a system would not be able to withstand a concerted attack. But they argue that it would be more effective against a ragged, poorly coordinated U.S. response to a Soviet first strike against the United States.

A much more benign interpretation, which is supported by the State Department and most arms control groups, is that the new radars constitute nothing more than a permitted upgrading of the Soviet Union's early warning system. "It is absolutely disingenuous to use those radars to assert that an infrastructure is being put in place for a nationwide ABM system," says Peter D. Zimmerman, a senior associate at the Carnegie Endowment for International Peace. Zimmerman notes that they operate at a frequency that would make them easy to disable in a nuclear attack and they are not optimized for ABM tracking.

Radars like those the Soviets are now deploying occupy a central place in the ABM Treaty for two chief reasons. Called large phased-array radars, or LPARs, they are powerful enough to track small warheads over long distances, a capability that would be essential for ground-based ballistic missile defenses. However, they are so huge and take so long to build that they can be observed at very early stages of construction; this makes it relatively easy to determine well in advance whether either country is building a nationwide ABM system.

Because LPARs have legitimate uses other than tracking warheads for ABM defenses, the treaty does not ban them outright. Instead, it places strict limits on where thay can be built. It allows each country to construct LPARs on the edge of their territories as part of an early-warning system. It also permits their location at the one ABM site in the interior of each country allowed by the treaty, and at one designated ABM test range. The only other permitted LPARs are facilities specifically designed to track spacecraft or to monitor the other side's compliance with weapons treaties.

When the ABM Treaty was signed, the Soviet Union had a network of early-warning radars on its periphery, code named "hen houses" by the U.S. intelligence community. In the late 1970s, construction began on a new network of more capable LPARs, apparently designed to provide earlier detection of incoming warheads and more precise information on their trajectories and likely points of impact. Six such facilities had been detected by the United States before 1986. The three new LPARs spotted last year brings the total to nine.

All but one of these radars are located close to the edge of Soviet territory, as permitted by the ABM Treaty. The one

Trading Charges Over Radars

In the past few years, both the United States and the Soviet Union have been undertaking major upgrades of their early-warning radar systems—and each has accused the other of violating the 1972 Antiballistic Missile (ABM) Treaty in the process.

When the upgrades are completed, each side will be able to detect a missile attack from virtually any direction, and to see incoming warheads at greater distances and track them more accurately. The most important and conspicuous features of the new systems are large phased-array radars (LPARs), behemoths that scan the sky electronically rather than at the slow mechanical speeds of previous generations of radars, a feature that enables them to keep track of many objects simultaneously.

The Soviet Union has nine early-warning LPARs in various stages of construction, including three new ones that were detected last year. The ABM Treaty permits such facilities to be built only on the edge of each country and they must face outward, a condition satisfied by all but one of the Soviet radars. The exception is a facility in central Siberia near the town of Krasnoyarsk, which faces northeast but is 4000 kilometers from the Soviet coast. The Reagan Administration has charged that the Krasnoyarsk radar is a clear violation of the treaty, a charge that has now acquired virtually unanimous support in the United States—even from arms control advocates who rarely see eye to eye with the Administration. The Soviets have claimed that the radar will be used to track spacecraft—a permitted function under the treaty—but U.S. experts say it is not optimized for such a role.

There is, however, no unanimity on the military significance of Krasnoyarsk. Administration spokesmen have claimed that the radar's location provides additional evidence that the Soviet Union is contemplating building a nationwide ABM defense. They argue that the radar will be able to provide far more accurate information on the trajectories and likely impact points of incoming warheads than if it were situated on the coast. Such information would be needed by inland ABM radars to track warheads and guide interceptors toward them.

Others offer a more benign explanation: locating the radar at Krasnoyarsk enabled the Soviets to plug a gap in their early-warning network quickly and cheaply. Putting the radar on the coast would have required constructing it in an extremely inhospitable area and on permafrost, which would have greatly complicated the construction. Moreover, two radars would probably have been required to provide adequate coverage. Nevertheless, even this explanation does not hide the fact that Krasnoyarsk is a clear violation of the treaty.

More recently, the Soviets have accused the United States of violating the ABM Treaty with its plans for two early-warning LPARs, one of which is almost completed at Thule in Greenland and the other is planned for Fylingdales Moor in England. Both locations were sites of 30-year-old mechanically steered radars. The Soviets have argued that although the treaty permits the radars to be modernized and components replaced, it does not permit the construction of new LPARs at those sites. The treaty allows early-warning LPARs to be situated only on the edge of each country's territory, they note, and Thule and Fylingdales are not part of the United States.

The Soviet charge initially received little support within the United States, but several arms control experts are becoming increasingly troubled by the Thule and Fylingdales radars. Perhaps the most high-level concern was expressed in a report last year by a group of defense experts including former national security adviser Brent Scowcroft, William Perry, former head of research and engineering in the Pentagon, and Joseph Nye ,Jr., a former State Department official. "The ABM Treaty does not provide a strong legal base for replacing the existing radar stations at Thule and Fylingdales with new large phased-array radars," the group stated.

Administration spokesmen have claimed that the new radars are legal because the old radars at those sites were in place when the ABM Treaty was signed; replacing them with LPARs simply represents a permitted modernization. Critics call that a weak argument, however, because the LPARs are fundamentally new facilities and can in no way be called a modernization of the old radars. "An LPAR is to a mechanically steered radar as a chain saw is to an ax," says Peter D. Zimmerman, associate director of the Carnegie Endowment for International Peace. "If the Soviets were to put up such a facility outside their territory we would scream," he says. James P. Rubin, assistant director for research at the Arms Control Association calls the Administration's case "only marginally better than the cover story for Krasnoyarsk."

Critics of the Administration's position point to two pieces of evidence that suggest earlier administrations believed construction of LPARs at those sites would contravene the treaty. The first is a classified report of a National Security Council committee, dated 20 October 1971, that is said to state specifically that LPARs could not legally be built there. The second is a written answer by Air Force General Kelly Burke to the Senate Armed Services Committee on 18 April 1980, in which it is stated that LPARs were not then being considered for Thule and Fylingdales because of their cost, long construction times, and "potential ABM Treaty conflicts."

John D. Rhinelander, an attorney who served as legal adviser to the U.S. delegation that negotiated the ABM Treaty says "it now seems pretty clear to me that the U.S. government loked at this specifically in 1971 and decided we had no intention of putting in phased arrays, so we put strong language into the treaty that would prohibit these deployments. I think the case is pretty strong against us."

Nobody is arguing that the Thule LPAR could have any purpose other than as an early-warning facility. The planned Fylingdales radar could, however, be militarily more significant because it would be able to detect and track short- and medium-range missiles fired from the Soviet Union toward western Europe. It could therefore provide a key element in any potential defense against these missiles.

The Soviet Union has offered to decommission Krasnoyarsk if the United States will do the same with the Thule radar and forego plans to build an LPAR at Fylingdales. Administration spokesmen have said this would trade two legal radars for one illegal facility, and have refused to discuss the offer.

Zimmerman suggests that a compromise might be to permit all three radars to go ahead, but ban any further LPAR construction. Rhinelander offers another suggestion: "I want to see Krasnoyarsk taken down," he says. "It is a clear violation of the treaty." In return, he says the United States should agree not to upgrade Fylingdales. ■ **C.N.**

exception is the now infamous Krasnoyarsk radar in central Siberia, which faces northeast but is situated some 4000 kilometers from the Soviet coastline. There is near-unanimous agreement in the United States that the Krasnoyarsk radar violates the ABM Treaty (see box).

The first public report of the three new LPARs came last November in a speech by Robert M. Gates, deputy director of the Central Intelligence Agency. He noted that together they "cover almost all approaches to the Soviet Union; the Soviets will undoubtedly build one or two more to complete the coverage." The new facilities lie directly in the approach path of missiles fired from Europe and the continental United States.

The United States also has a network of LPARs in various stages of construction and planning. These include four around the U.S. coast, one in the Aleutian islands, one at a mothballed ABM site in North Dakota, and possibly three at old early-warning sites in Alaska, Fylingdales in England, and Thule in Greenland. (The Thule and Fylingdales radars have also raised concerns about treaty compliance—see box.) The stated justification for most of these radars is the same as that claimed by the Soviets for their system—to provide early warning of missile attack. "In terms of overt activity," says John Pike of the Federation of American Scientists, "they are not doing anything we are not doing."

DOD officials argue, however, that the Soviet LPARs should be viewed differently. "The strategic significance is the network that is being built," says one official who declines to be identified. "It is one of the required elements of a nationwide ABM system," he says.

The radar network, the DOD official argues, "fits like a hand in a glove" with other Soviet ABM developments. These are a major upgrading of the 20-year-old ballistic missile defenses around Moscow, which the Soviets chose to retain as their one permitted ABM system, and a system, dubbed the ABM-X-3, which was tested in the 1970s and consists of high-acceleration rocket interceptors coupled with a small phased-array radar.

The Moscow system originally consisted of two LPARs—imaginatively code-named dog house and cat house by U.S. intelligence—and 64 large nuclear-tipped rockets, called Galosh missiles, guided by dish radars. The hen house early-warning radars were designed to feed data on incoming warhead trajectories to the Moscow LPARs, which would take over the tracking as the warheads approached Moscow. Data from dog house and cat house would be transferred to the Galosh radars, which would track individual targets and guide the interceptors toward them. The Galosh missiles—each about the size of a U.S. Minuteman ICBM—are believed to carry a multimegaton nuclear explosive, which would detonate in space near an incoming warhead.

In the late 1970s, work was begun on a more powerful new LPAR that is expected to take over the battle-management role of dog house and cat house. In addition, the Galosh interceptors are being replaced with what are expected to be two types of missiles. One, a modified Galosh, will be a long-range missile designed to intercept warheads in space. The second is a new high-acceleration rocket that would be used to attack warheads after they enter the atmosphere—a capability that is considered important because decoys and chaff that may accompany the incoming warheads would burn up during reentry, leaving only "live" targets. A total of 100 missiles are expected to be deployed in the new system. This is the maximum permitted by the ABM Treaty.

"Any system that depends on the survival of a handful of LPARs is a dead duck as a ballistic missile defense," says Ashton Carter.

The Moscow ABM upgrade is expected to be finished by the end of the decade. Although the new system will be a great improvement, with only 100 interceptors it could easily be saturated by a major attack. Some observers argue that it would be no more capable than the U.S. "Safeguard" system that was constructed to defend a Minuteman missile site in North Dakota in the 1970s. The Safeguard system was abandoned in 1976 because it was considered to be too vulnerable and not cost effective.

The new high-acceleration interceptor that is expected to be installed in the Moscow defenses was originally developed as part of a prototype system, the ABM-X-3, that was tested in the 1970s at Sary Shagan, the Soviet Union's designated ABM test range. A key feature of this system is a relatively small phased-array radar that would be used to track targets and guide the interceptors toward them.

DOD officials argue that these radars could be relocated within a matter of months. Moreover, since new missiles are being built for the Moscow system, the production lines are already in place to construct additional missiles if necessary. CIA deputy director Gates said last November that "We estimate that . . . the Soviets could undertake rapidly paced ABM deployments to strengthen the defense of Moscow and defend key targets in the Western U.S.S.R. and East of the Urals by the early 1990s." A DOD official claims up to 100 sites could be defended "within 2 years" of a decision to go ahead.

Sources say that the Soviet Union is not known to have tested components of the ABM-X-3 system since the late 1970s, however, which may suggest that it is not on the point of deploying them. Moreover, only a handful of the radars are believed to exist; hundreds would be required for a nationwide ABM system. The United States also tested a modular radar similar to that of the ABM-X-3 in the 1970s, but did not carry the development any further. "Both sides found them wanting and put them on the shelf," suggests Pike.

The effectiveness of nationwide ballistic missile defenses would depend critically on tracking data fed from the network of LPARs on the periphery of the Soviet Union. Indeed, DOD officials argue that this is the primary reason for replacing the old hen houses with the new radars.

Critics contend, however, that such a system would be of only marginal effectiveness, even to defend against a poorly coordinated U.S. retaliatory strike. "Any system that depends on the survival of a handful of LPARs is a dead duck as a ballistic missile defense," says Ashton Carter, a physicist and defense specialist at Harvard's Kennedy School of Government. The radars are highly vulnerable to direct attack, and can easily be blacked out by high-altitude nuclear bursts, rendering them ineffective for considerable periods of time.

Moreover, the system could easily be defeated by a variety of countermeasures, critics claim. These include the use of dummy warheads and chaff, arranging for incoming warheads to arrive in specific patterns, saturating the system by targeting several warheads on particular sites, and putting fins on the warheads so that they maneuver when they reenter the atmosphere.

"Anyone worried about [Soviet ABM developments[should be proposing ways to defeat the system if the Soviets were unwise enough to deploy it," says Carter. Instead, DOD's countermeasure efforts have been allowed to lapse in recent years. That, suggests Carter, is "a true measure of military concern about Soviet ballistic missile defense." ■ **COLIN NORMAN**