

## Soviet Military Power

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# Radar, space systems break ABM treaty

by Leo F. Scanlon

The 1987 issue of the Pentagon's yearly publication, *Soviet Military Power (SMP)*, devotes considerable attention to the technology of ABM and air defense systems employed by the Soviets. The ABM treaty permits the development of an early warning radar and satellite system which allows each country to spot missile launches by its opponent. These radars must be placed on the periphery of the nation, and hence *not* be so placed as to provide tracking information which would allow terminal defense against warheads in the final minutes of flight. Both the United States and the Soviets have built such systems—however, the Soviets have also constructed a radar at Krasnoyarsk which protects the western U.S.S.R. missile fields, a clear violation of the “rules.”

### What the treaty allows

The treaty also allows the installation of one ABM system to protect the target of choice in each country. The United States dismantled its systems, while the Soviets have built a very effective defense of Moscow. Finally, the treaty also allows the installation of one ground-based ABM system using “new physical principles”—the Soviets have built a laser of this type at Shary Shagan, and the United States will build one at White Sands. So far, so good: It would seem that the Soviets have stretched the treaty by building one radar in the wrong place.

In fact, the Soviets have finished the construction of the long lead-time items which are the base of their nationwide ABM system. As with other military systems they develop, the Soviets approached this task in a very methodical way. They knew that the ABM treaty would hold U.S. technology and R&D in check, while they built a system with great depth, and thus were assured that when they broke the limits of the treaty, they would be moving past the United States with the momentum of a freight train. Meanwhile, the United States is scrambling to reassemble the research capabilities which were mothballed when the treaty was signed.

### The radar systems

There has been much publicity about the construction of the Krasnoyarsk large phased array radar (PAR), and while this installation does prove that the Soviets have dropped any pretense of adherence to the treaty, it is a tocsin, indicating the completion of the frame of the Soviet ABM system, and warning that the rest of the apparatus could be in place overnight.

*Soviet Military Power* reports: “The current Soviet ICBM launch detection satellite network can provide as much as 30 minutes tactical warning and can determine the general origin of the missile. Additionally, two over the horizon radars that are directed at U.S. ICBM fields could give about 30 minutes warning.

“The next layer of ballistic missile detection consists of 11 large HEN HOUSE ballistic missile early warning radars at 6 locations on the periphery of the U.S.S.R. These radars can confirm the warning from the satellite and over the horizon radar systems, characterize the size of an attack, and provide target tracking data in support of anti-ballistic missile forces. . . .

“The addition of three radars in the western U.S.S.R. will form almost a complete circle of LPAR coverage around the U.S.S.R. These radars provide significantly improved target tracking and handling capabilities and add a redundancy in coverage over the existing HEN HOUSE network.”

These latest radars are huge structures, some of the largest man-made items ever built, and take many years to construct. *Soviet Military Power* reports, “Their existence could allow the Soviet Union to move quickly to deploy a nationwide ABM defense. The degree of redundancy being built into their LPAR network is not necessary for early warning. It is highly desirable, however, for ballistic missile defense.”

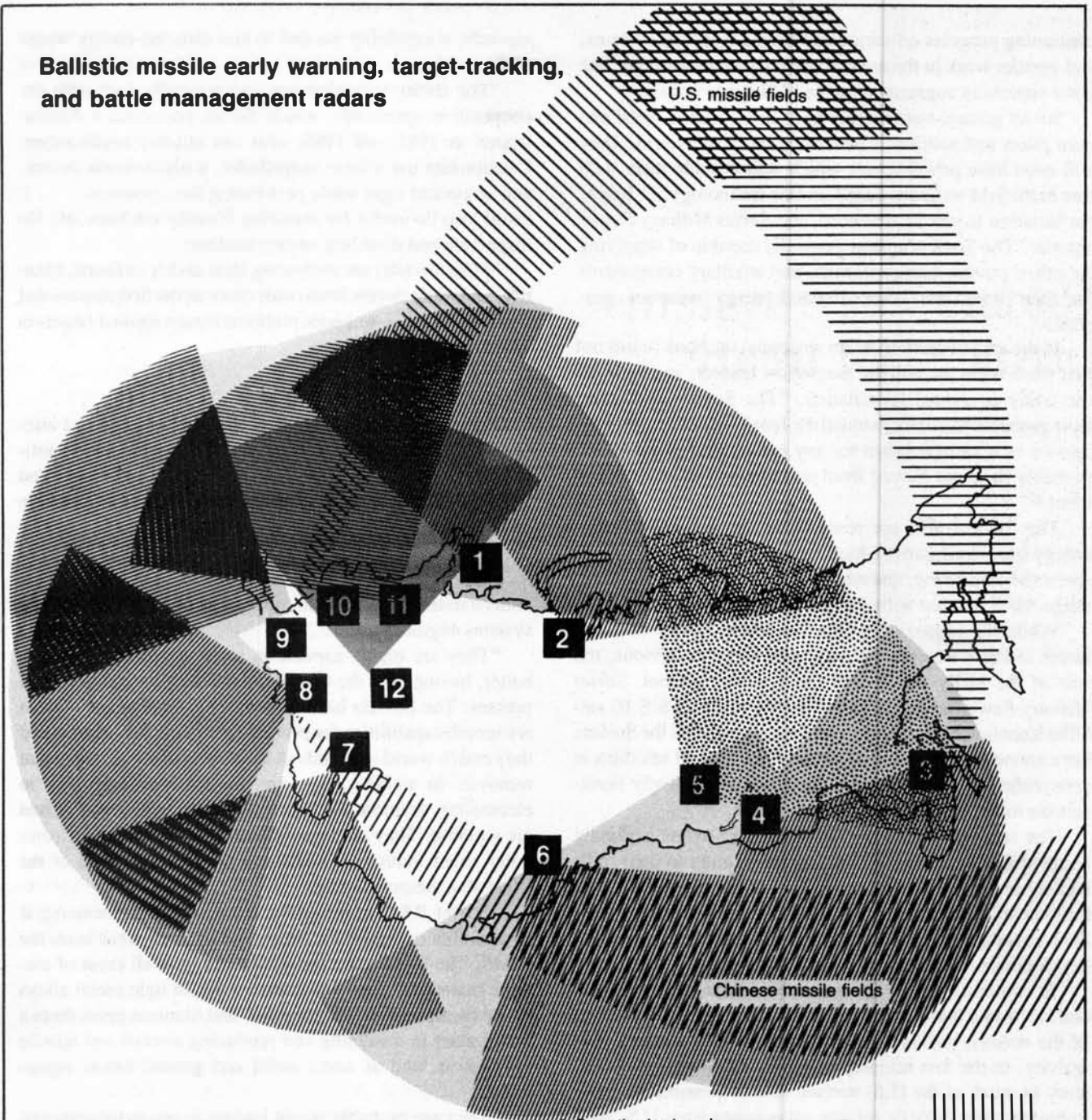
Moreover, these systems are “inter-netted” with other radar systems now deployed. “During the 1970s, the Soviets developed components that could be integrated into an ABM system that would allow them to construct individual ABM sites in months rather than the years required for more traditional ABM systems.” The map accompanying this article shows the comprehensive radar coverage achieved by these efforts.

The Soviets have continued to develop the GALOSH and GAZELLE interceptor rockets which are the base of the Moscow defense network, and in addition, have deployed the SA-10 and SA-X-12B/GIANT mobile systems, which have the capability to intercept strategic ballistic missiles. Currently, the Soviets have over 9,000 strategic SAM launchers (plus reloads) and over 5,000 tactical launchers, excluding hand helds. As Soviet radar battle management systems are assisted increasingly by space-based surveillance, the rapid deployment of these mobile ABM systems will provide a very effective terminal defense system.

### Space systems

Soviet developments in space-based systems include

**Ballistic missile early warning, target-tracking, and battle management radars**



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|----------------------------|--|-------------------------------|--|
| HEN HOUSE radars           |  | Over-the-horizon bac          |  |
| DOG HOUSE/CAT HOUSE radars |  | New large phased-array radars |  |
|                            |  | Krasnoyarsk                   |  |
- 
- |                           |                |              |            |
|---------------------------|----------------|--------------|------------|
| 1. Murmansk               | 4. Mischelevka | 7. Lyaki     | * 10. Ba   |
| 2. Pechora                | 5. Krasnoyarsk | * 8. Nikola  | 11. Skruna |
| * 3. Komsomol'sk-na-Amure | 6. Sary Shagan | 9. Mukachevo | 12. Moscow |

*The discovery by spy satellite of the new large phased array radars, confirmed by recent intelligence at Baranovichi (10), Mukachevo (9), and Skruna (11), strongly suggests the construction of a "triple-tiered" radar system to cover western approaches to Russia such as would be required only nationwide missile-defense system.*

continuing progress on various advanced weapons systems, and frontier work in the area of surveillance technology, the latter especially augmented by the MIR space station.

Soviet ground-based lasers have been used to blind and burn pilots and soldiers in several areas of the world. They will soon have power levels which will provide them with true battlefield weapons based on this technology. In space, the situation is just as advanced, the *Soviet Military Power* reports: "The Soviets appear generally capable of supplying the prime power, energy storage, and auxiliary components for their laser and other directed-energy weapons programs. . . ."

In the area of particle-beam weapons, the book points out that the Soviets are still the theoretical leaders, and includes the oddly equivocal formulation, "The Soviets, however, have probably not demonstrated the feasibility of actual propagation of a particle beam for any meaningful distance and probably have not moved from research to system development."

The Soviets also are researching space-based kinetic-energy guns (rail guns) which would be used for ASAT or space station defense, and which will be able to conduct long-range ABM defense within a few years.

While the military significance of the Soviet developments in these weapons technologies is rather obvious, the role of the MIR, and related space activity is not. *Soviet Military Power* now indicates that 90% of the U.S.S.R. satellite launches are military in nature, and says that the Soviets have announced their intention to place over 100 satellites in geosynchronous orbit, where they will be relatively invulnerable to ASAT attack.

The satellite system now used by the Soviets is rapidly being upgraded to give global communication to their military commanders. The recent establishment of relations with Kiribati will lead to a satellite Earth station which will close their coverage of the vast expanse of the Pacific—a major development for their expanding naval forces.

In addition, the Soviets possess nuclear-powered radar and electronic intelligence satellites which overlap coverage of the oceans, providing surveillance of U.S. surface fleet activity. In the first minutes of battle, the Soviets must destroy as much of the U.S. surface fleet as possible, in order to protect their ballistic missile submarines from U.S. anti-submarine warfare (ASW) systems. The United States has no satellites devoted to a similar mission.

The GLONASS system (similar to the U.S. NAVSTAR system) will significantly increase the accuracy of existing Soviet missiles and bombers.

Finally, the MIR station itself, is fundamentally a military facility. According to *Soviet Military Power*, "Even subjects such as astronomical observations, also performed by cosmonauts, have military uses. Such investigations, for example, can provide data useful for maintaining the orientation of certain equipment to an accuracy of a few arc-

seconds, a capability needed to aim directed-energy weapons.

"The ability to rendezvous and manually dock with uncooperative spacecraft, which Soviet cosmonauts demonstrated in 1985 and 1986, also has military applications. Cosmonauts use a laser rangefinder, a night vision device, and an optical sight while performing this operation. . . . It could also be useful for repairing friendly satellites and for inspecting and disabling enemy satellites. . . ."

"[The Soviets] are evaluating their ability to locate, identify, and track targets from outer space as the first step toward designing a space weapons platform for use against targets in space and on Earth."

### Technological capabilities

For those who console themselves with the alleged inferiority of Soviet equipment, or who believe that Soviet military forces are hopelessly crippled by their lack of home video games, *Soviet Military Power* has some chilling information and evaluations.

"The Soviets have demonstrated capabilities in electronics that are comparable to those of the West in their theoretical understanding as well as in most areas of circuit design and systems engineering. . . ."

"They are highly capable in areas where bigger means better, having built the world's largest forging and extrusion presses. The Soviets have excellent electroslag and plasma arc remelt capabilities for producing high-quality alloys, and they match world standards in sheet metal forming and metal removal. In welding, they are international innovators in electroslag, friction, electrogas, electron beam, and pulsed arc welding. They are knowledgeable in all aspects of computer aided industrial production and are the equal of the West on a theoretical basis. . . ."

"Soviet R&D in materials and associated processing is comparable to that of the West, and in some areas leads the world. The Soviets are especially strong in all areas of metallic materials. Their innovative work in light metal alloys based on aluminum, magnesium, and titanium gives them a major asset in designing and producing aircraft and missile systems as well as some naval and ground forces equipment. . . ."

"They are probably world leaders in magnetohydrodynamic power generation and have attained power levels of several tens of megawatts from their portable devices. . . ."

"Although many Soviet engines produce less power than state-of-the-art Western engines of equivalent weight and displacement, it is a result of Soviet preference for durability, reliability, and simplicity rather than a lack of capability."

The pace of similar developments in Western science and technology is inadequate by comparison, and will be manifest only if we commit ourselves to crash programs on a number of fronts, SDI included. *Soviet Military Power* should help to spur that realization.