

Documentation

'The Soviet Space Challenge'

Excerpts from the Pentagon's November 1987 report.

Most of the Soviet space program is not generally made public. As this publication documents, the greatest part of the Soviets' effort in space is dedicated to their military objectives. For the past three decades, since the inception of the space era, the Soviet Union has worked steadily to acquire a military capability in space. . . . The Soviets have methodically designed their space systems to fight a war in space. . . . For example:

- Today they maintain and operate over twice as many classes of launch vehicles and routinely have five times as many launches as the United States.
- The Soviets are the only nation that maintains a space station that is manned almost year round where personnel can conduct military experiments.
- They are in the process of developing their heavy-lift launch vehicle "Energiya." This system will provide them not only with a booster for their space shuttle but a booster that can lift over 100,000 kilogram payloads. By the turn of the century our conservative estimates indicate that their lift capability will be almost twice their lift requirement for an assumed expanded and ambitious space program.
- The Soviets already possess such a robust launch capability that they could, if their entire satellite network were destroyed, reconstitute it almost totally in two to three months if they had the replacement satellites.
- They are the only nation that maintains an operational ground-based orbital interceptor ASAT system that can destroy low-earth satellites. . . .

Many of the systems developed in the following programs will eventually be space based. These developments and the progress being made by the Soviets in other areas of their space program, such as their heavy-lift boosters, are a challenge for the near future.

Laser weapons

The U.S.S.R.'s laser program is larger than U.S. efforts and involves over 10,000 scientists and engineers as well as more than a half-dozen major R&D facilities and test ranges. Much of this research takes place at the Sary Shagan Missile Test Center, where ABM testing also is conducted. At Sary Shagan alone, the Soviets are estimated to have several lasers for air defense and two lasers probably capable of damaging

some components of satellites in orbit, one of which could be used in feasibility testing for ballistic missile defense applications. The Soviet laser weapons program would cost roughly \$1 billion a year in the U.S.

Scientists in the U.S.S.R. have been exploring three types of lasers that may prove useful for weapons applications—the gas-dynamic, the electric discharge, and the chemical. They have achieved impressive output power levels with these lasers. The Soviets are possibly exploring the potential of visible and very-short-wave-length lasers. They are investigating the excimer, free-electron, and x-ray lasers, and have been developing argon-ion lasers.

The Soviets appear generally capable of supplying the prime power, energy storage, and auxiliary components for their laser and other directed-energy weapons programs. They have probably been developing optical systems necessary for laser weapons to track and attack their targets. They produced a 1.2 meter segmented mirror for an astrophysical telescope in 1978 and claimed that this reflector was a prototype for a 25-meter mirror. A large mirror is considered necessary for a long-range space-based laser weapon system.

The U.S.S.R. has progressed in some cases beyond technology research. It has ground-based lasers that have some capability to attack U.S. satellites and could have a prototype space-based antisatellite laser weapon by the end of the decade. Additionally, the Soviets could have prototypes of ground-based lasers for defense against ballistic missiles in the near future and could begin testing components for a large-scale deployment system in the early 1990s.

Particle beam weapons

Since the late 1960s, the Soviets have been exploring the feasibility of using particle beams for a space-based weapon system. They may be able to test a prototype space-based particle beam weapon intended to disrupt the electronics of satellites in the 1990s. An operational system designed to destroy satellites could follow later; however, application of a particle beam weapon capable of destroying missile boosters or warheads may require several additional years of research and development.

Nevertheless, Soviet efforts in particle beams, particularly ion sources and radio-frequency accelerators for particle beams, are impressive. In fact, much of the U.S. understanding of how particle beams could be made into practical weapons is based on published Soviet research conducted in the late 1960s and early 1970s.

Radio-frequency weapons

The U.S.S.R. has conducted research in the use of strong radio-frequency (high-power microwave) signals that have the potential to interfere with or destroy critical electronic components of ballistic missile warheads or satellites. The Soviets could test a ground-based radio-frequency weapon capable of damaging satellites in the 1990s.