

The Sprint is a shorter range, high-acceleration interceptor missile designed to make intercepts at lower altitudes.

The technical principles involved in the radars are now fairly well established. One research and development MAR-type has been constructed at the White Sands Missile Range. A contract has been let for the power plant of a second MAR-type radar, which is to be constructed on Kwajalein Atoll. The missile site radar is well along in development and the construction of one of these radars on Kwajalein Atoll has also begun.

Testing of the Sprint missile was started at White Sands in November 1965 and the tempo of testing will steadily increase during the current year. The Spartan is still on the drawing boards. It represents a very substantial redesign of the original Zeus and we will not know until it is flight tested how well it will perform.

Facilities for testing both the Sprint and the Spartan will be constructed on Kwajalein Atoll. These, together with the TACMAR and MSR and the programs for the computers, will give us all of the major elements of the Nike-X system which are essential to test its overall performance against reentry vehicles fired from Vandenberg AFB, Calif. (We feel we know enough about the PAR technology to be able to use the mechanically steered radars already on Kwajalein as simulators.) The system will be tested in stages, starting with the MSR and Sprint, then the Spartan missile and the TACMAR radar. A large number of test shots will be launched from the west coast of the United States to Kwajalein to test the system thoroughly as a whole. The most important objective of this effort is to determine proper system integration and computer programing, since the individual components of the system will have already been tested.

But even after this elaborate test program is completed, some technical uncertainties will still remain unresolved; this is to be expected in a system designed for such a highly complex mission. Moreover, we have learned from bitter experience that even when the development problems have been solved, a system can run into trouble in production or when it is put into operation. All too often the development prototype cannot be produced in quantity without extensive reengineering. Production delays are encountered and costs begin to spiral. Sometimes these problems are not discovered until the new system actually enters the inventory and has to function in an operational environment.

In this connection, it is worth noting that had we produced and deployed the Nike-Zeus system proposed by the Army in 1959 at an estimated cost of \$13 to \$14 billion, most of it would have had to be torn out and replaced, almost before it became operational, by the new missiles and radars of the Nike-X system. By the same token, other technological developments in offensive forces over the next 7 years may make obsolete or drastically degrade the Nike-X system as presently envisioned. We can predict with certainty that there will be substantial additional costs for updating any system we might consider installing at this time against the Soviet missile threat.

The deployment of a Nike-X system would also require some improvement in our defense against manned bomber attack in order to preclude the Soviets from undercutting the Nike-X defense; and we would want to expand and accelerate the fallout shelter program. The investment cost (including research and development) of the former is