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Ballistic Missile Defense

In ballistic missile defense (BMD), the SAFEGUARD anti-ballistic missile (ABM) System was discontinued, and to meet the desires of Congress, the Perimeter Acquisition Radar (PAR) mission was changed to provide attack data to the North American Air Defense Command. Research and development was broadened to hedge against future uncertainties and avoid technological surprise. The Anti-Ballistic Missile Treaty was thoroughly reviewed in preparation for the bilateral review of the treaty with the Soviet Union in fiscal year 1978.

The U.S. Army Ballistic Missile Defense Systems Command in Huntsville, Alabama, and the U.S. Army Ballistic Missile Defense Program Office in Washington, D.C., were reorganized. Management of the program was shifted to Huntsville, and the strength of the Washington office was substantially reduced. Funding for fiscal year 1977 was as follows: advanced technology-$102.7 million; systems technology-$100.0 million; Kwajalein Missile Range-$82.9 million; and the SAFEGUARD Perimeter Acquisition Radar-$28.0 million.

Advanced automatic techniques for design, verification, and validation of large, complex BMD software processes were developed. These techniques may significantly reduce costs and manpower. The first tests of a BMD optical sensor in a nuclear radiation environment indicated that newly developed hardening techniques can overcome the adverse effects of nuclear radiation on sensitive optical detectors. A high quality beam source suitable for injection into a linear accelerator was designed, built, and tested. A small (fifteen-pound class) hit-to-kill interceptor underwent a ground captive test.

On 2 December 1976, two weeks ahead of schedule, a small advanced phased array radar installed at the Kwajalein Missile Range emitted its first signal. Capable of generating a variety of wave forms, it is used with a commercial (Control Data Corporation 7700) data processor and target tracking software to test BMD concepts and to evaluate technology for integrating subsystems and components into a missile defense system.

Throughout the year the Kwajalein Missile Range pioneered improvements in optical tracking of incoming vehicles with a digital-video camera system and a large optical telescope. The data is processed electronically and recorded on video tape, a method that permits instant replay and analysis by computer instead of the frame-by-frame analysis of the previously used film system. This Super Recording Automatic Digital Optic Tracker (RADOT) has increased the range at which reentry vehicles can be tracked and data recorded from the 50 nautical mile slant range of the old system to 500 nautical miles.