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Systems

In the defense budget presented to Congress in March 1973, the fiscal year 1974 Ballistic Missile Defense program called for \$402 million to continue SAFEGUARD deployment at the Grand Forks, North Dakota, site and \$170 million for the Site Defense program. After considerable discussion during authorization and appropriation hearings, Congress appropriated \$340 million for SAFEGUARD and \$110 million for Site Defense.

As a result of the 1972 Anti-Ballistic Missile (ABM) Treaty and congressional action, American ballistic missile defense (BMD) programs have been limited to research and development and to deploying defensive missiles at one site. Meanwhile, the Soviets have demonstrated their intent to improve their offensive capabilities to the extent permitted under the Strategic Arms Limitation (SAL) agreement. Through development and testing, they have made major technological achievements, increasing their capability to threaten the survivability of U.S. strategic retaliatory forces.

To help offset Soviet advances, the Secretary of Defense, by memorandum of 3 April 1973, and as later changed by an Amended Program Decision Memorandum (APDM), dated 31 August 1973, directed the Army to continue SAFEGUARD deployment at the Grand Forks site essentially as planned, to investigate new or improved system concepts and applicable technology, to preserve options for deploying additional weapons in defense of U.S. retaliatory forces, and to continue planning for the application of Site Defense technology and components for the National Command Authority (NCA).

The Site Defense program continued to be the only existing development program that could protect the Minuteman force against Soviet weapons systems projected as early as 1979 or 1980. Stressing the importance of the program, the Secretary of Defense called it "a prudent and necessary hedge" in the event that "an acceptable permanent agreement on the limitation of strategic offensive arms cannot be achieved." Although congressional appropriations for the program were reduced, technical progress was made. Program activity-during the year turned from design to fabrication, selected components of the Sprint II missile and its radar were completed, and the basic target tracking software was coded and verified. Still, the program schedule had to be extended from sixty-six to seventy-two months and some systems tests and other activities deferred. Also, no funds were available for NCA defense design studies.

SAFEGUARD deployment at the Grand Forks site proceeded on schedule. Construction was essentially completed at both radar sites and at the four Remote Sprint launch sites. The installation of tactical hardware and the testing of components and subsystems

neared completion, and system testing proceeded as planned. Three of the six site-level acceptance tests were conducted.

At Kwajalein Missile Range the final phase of system tests to support software development was continued. A total of 52 system tests were completed as of 30 June 1974; of these, 45 were successful, two partially successful, and five unsuccessful.

A number of significant developments marked the ballistic missile defense advanced technology program during the past year. The Fly-Along Infra-Red (FAIR II) sensor vehicle was test-flown in August 1973. The vehicle and sensor performed as specified. The Army accepted delivery of the first Signature of Fragmented Tank (SOFT) sensor in January 1974, and calibration of the sensor was completed at the Advanced Sensor Evaluation and Test (ASET) facility in February 1974. The Optical Signatures Code was developed and distributed to fourteen military and industrial organizations. A number of specific techniques for optical discrimination against tanks, tank fragments, radar chaff, optical balloons, and replica and background sources were defined and evaluated. A multivariate algorithm for discrimination techniques was developed for the U.S. Army Advanced Ballistic Missile Development Agency (ABMDA) Research Center. The Hardened Optical Sensor Testbed (HOST) was fabricated and delivered to the ASET facility. The design of a hardened Portable Optical Sensor Tester (POST) was completed and fabrication started. Conceptual designs of mosaic sensors were developed and analyzed.

The Homing Interceptor Technology (HIT) vehicle was completely mechanized and underwent a highly successful non-flying operation test. A set of fuze concept formulation studies was completed, and two concepts were selected for development studies. Growth threats to missile silo defense were also analyzed. Based on this analysis, terminal interception systems were established, new concepts in high-performance terminal interceptors developed, and the basis for the evolution of interceptor technology established.

The Technology Applications Panel (TAP) visited a total of thirty industrial and university laboratories during fiscal year 1974. Several hundred concepts were discussed and fifty-six reviewed in detail. Of these, 17 promising new technology opportunities for BMD were identified, 11 of which will be funded in the fiscal year 1975 Advanced BMD program, and the remaining 6 will be studied further. These initiatives range from revolutionary BMD concepts to significant evolutionary improvements in component developments. Multistatic radar technology, consisting of a large number of low-cost transceivers controlled by a central battle management processor, showed a potential application for defense of Minuteman. Studies were also begun on several kill technologies that could revolutionize ballistic missile defense.

Flight testing of the Army Special Target Program was completed, and excellent data obtained on sixteen of the eighteen targets flown. The targets were carried on a series of Minuteman inter-continental ballistic missile (ICBM) flights, piggyback ICBM tests, and submarine-launched ballistic missile (SLBM) velocity tests launched by Athena boosters from Wake Island to Kwajalein. Significant information was obtained on performance of ICBM and SLBM velocities, traffic decoy capabilities, and bulk filtering possibilities for terminal defense.

In October 1973, a practical surface acoustic wave signal convolver was demonstrated, and development of an acoustic reflective array compressor was completed. Exoatmospheric designation techniques that employ radar and optical sensors were developed during the year. The analysis and field testing of a passive jammer location technique was completed in November 1973. Also in November, the operation of a 100-watt peak power S-Band Trapped Plasma Avalanche Transit-Time Diode (TRAPATT) power amplifier was demonstrated. Development of an S-Band low-noise figure and a medium-power output (25-watt) transistor amplifier suitable for solid state radar application was completed in January 1974. The Dome Antenna Phase III model was under construction with completion and experimental testing scheduled for fiscal year 1975. Also, a low-cost printed circuit Spiraphase antenna element was demonstrated and found to be feasible.

Major changes in the management structure of the Army's ballistic missile defense effort took place during the past year. The changes, which succeeded in placing all Army BMD activity under a single program manager, are set forth below.

From	To
Safeguard System Manager (SAFSM)	Ballistic Missile Defense Program Manager (BMDPM)
U.S. Army Safeguard System Office (SAFSO), Arlington, Virginia	Ballistic Missile Defense Program Office (BMDPO), Arlington, Virginia
U.S. Army Safeguard System Command (SAFSCOM), Huntsville, Alabama	Ballistic Missile Defense Systems Command (BMDSCOM), Huntsville, Alabama
U.S. Army Safeguard System Evaluation Agency (SAFSEA)	To be transferred to U.S. Army Training and Doctrine Command (TRADOC), but will continue to perform assigned tasks for the Ballistic Missile Defense Program Manager.

Advanced Ballistic Missile Defense Agency (ABMDA-H), Huntsville, Alabama. Discontinued; personnel and resources transferred to the Ballistic Missile Defense Advanced Technology Center (BMDATC).

Ballistic Missile Defense Advanced Technology Center (BMDATC), Huntsville, Alabama

Advanced Ballistic Missile Defense Agency, Washington, D.C.

Discontinued; personnel and resources transferred to the Ballistic Missile Defense Program Office pending further transfer of specific functions to the Ballistic Missile Defense Advanced Technology Center (BMDATC).

Name changes, the discontinuation of the Advanced Ballistic Missile Defense Agency in Washington, and transfer of control of the Kwajalein Missile Range from the Office of the Chief of Research and Development to the Ballistic Missile Defense Program Manager went into effect on 20 May 1974. The transfer and redesignation of the U.S. Army Safeguard System Evaluation Agency became effective on 1 July 1974. Revised tables of distribution and allowances and internal management realignments to carry out the above changes were to be accomplished during fiscal year 1975. This reorganization will enable the Army to maintain an effective technological program within constrained funding and will consolidate management for all ballistic missile defense programs.

On 4 May 1974, the Secretary of Defense submitted the Defense program and budget for fiscal year 1975. The request included \$60.8 million to complete deployment of the SAFEGUARD site at Grand Forks, North Dakota, for the defense of Minuteman, and \$160 million to continue work on the Site Defense prototype demonstration program. The Secretary stated that the Site Defense program would "be conducted on a very austere basis." He added, however, that "Site Defense must be developed with 'system' applications in mind if the demonstration of the development prototype is to be of any real value." To round out the fiscal year 1975 program, \$91.4 million was requested for an advanced technology effort to guard against technological surprise, provide a basis for improving existing ballistic missile defense systems, and assist in the design and evaluation of strategic offensive systems.

Program and Budget

The fiscal year 1974 research, development, testing, and evaluation (RDT&E) program, as contained in the President's budget request to Congress, was \$2,108.7 million. Later the program was amended: \$6.2 million was taken away from the utility tactical transport aircraft system (UTTAS), \$8.4 million withdrawn from the nuclear munitions program, and \$1.1 million added to cover the higher costs of petroleum products. The net

reduction of \$13.5 million cut the amount requested to \$2,095.2 million. Congress then appropriated \$1,912.1 million, and major reductions were made in the exploratory ballistic missile defense program, the advanced ballistic missile defense program, the advanced forward air defense system, Site Defense, and the SAFEGUARD defense system.

Missile Procurement

The fiscal year 1974 budget request for Army missile procurement amounted to \$599.9 million, from which Congress deleted \$42.8 million for the following: SAFEGUARD procurement, \$25.7 million; Lance adaption kits for allied countries, \$4.7 million; funds to maintain a production base for the Pershing missile system, \$4.5 million; and \$7.9 million which was saved in contract negotiations for Dragon missiles.