

Edited Extract from: *Department of Defense Annual Report [FY 1960], July 1, 1959, to June 30, 1960*, (Washington, D.C.: USGPO, 1961)

Annual Report of the Secretary of Defense, The Armed Forces, pp. 14-15:

Continental Air Defense

The responsibility for the air defense of the northern half of the Western Hemisphere has been assigned to the North American Air Defense Command (NORAD), a joint United States-Canadian headquarters, of which the Continental Air Defense Command (CONAD) constitutes the U.S. component. CONAD is a unified command, including Army, Navy and Air Force units, and exercises operational control over some of the Navy's early warning ships and aircraft in the Atlantic and Pacific.

The imminent shift in the air threat to our security from aircraft alone to ballistic missiles and aircraft led to a comprehensive review of our air defense programs in fiscal year 1960. As a result, elements of the defense against aerodynamic weapons, that would take excessive time and funds to complete, were cut back in favor of a more rapid modernization of available weapons and equipments. These adjustments brought a reduction in the programs for the BOMARC missile and the hardened "supercombat" centers for the Semi-Automatic Ground Environment (SAGE) system, and an acceleration in the modernization of the fighter interceptor forces and in the construction of the Ballistic Missile Early Warning System (BMEWS). At the same time the research effort to develop more advanced warning systems against ballistic missiles was strengthened. The revised program provides an earlier completion of defenses against aerodynamic weapons, but on a less extensive scale than previously planned.

The BMEWS program includes three widely dispersed, long-range radar stations, a central computer and display facility in the United States, and a communications network to link the separate elements. This system is capable of providing a 15-minute warning of a massive ballistic missile attack. The first ground station at Thule, Greenland, was nearly completed during the year and construction schedules for the other two stations at Clear, Alaska, and Fylingdales, England, were advanced.

Annual Report of the Secretary of Defense, Research and Development, pp. 24-26:

Air Defense Missiles

Major emphasis in active air defense research continued to be placed on the development of weapons to counter enemy ballistic missiles. While further progress was made in this field, difficult scientific and technological problems remain to be resolved before an effective system will become available.

The NIKE-ZEUS effort is the program furthest advanced, and the highest national priority has been assigned to the development and full-scale test of this missile. Experimental models performed well in test flights during the year, and research and

development to improve the system's capability to detect, track, identify, and intercept ballistic missiles continued at full speed. The decision to approve quantity production must await the results of these studies.

Other approaches to resolving the ballistic missile defense problem are being investigated through project DEFENDER, assigned to the Advanced Research Projects Agency (ARPA). This effort was sharply increased. The search for new answers includes the analysis of the phenomena associated with the boost, mid-course, and terminal phase of the inter-continental ballistic missile (ICBM) flight pattern and the examination of techniques, other than those employed by NIKE-ZEUS, to find and destroy such missiles....

Progress was also made in improving the NIKE-HERCULES system. Particularly important was a test in which this air defense system successfully acquired, tracked, and intercepted a CORPORAL surface-to-surface ballistic missile, thus promising increased effectiveness against supersonic targets with a small cross-section.

The air defense of the Fleet was improved with the delivery of improved TERRIER and TALOS missiles which have twice the range and altitude of the first models issued. The development of the TARTAR, a smaller surface-to-air missile for deployment on destroyers, progressed satisfactorily through the first test of a production model. The Navy also began research on the TYPHOON missile system, designed to provide anti-aircraft and anti-missile weapons that will greatly outperform TERRIER, TALOS, and TARTAR.

Annual Report of the Secretary of the Army, Research and Development, pp. 186-189:

Rockets

NIKE-HERCULES

New developments during the year in NIKE-HERCULES, particularly in radar systems, indicated that it may be possible to increase greatly the capability of the NIKE-HERCULES air defense missile system against tactical enemy missiles such as those which might be fired against the United States from submarines along the coast. Proof of the improved technical capabilities of the system came toward the end of the fiscal year when the improved NIKE-HERCULES destroyed a CORPORAL missile fired at the Army's White Sands Missile Range, New Mexico. NIKE-HERCULES developments included efforts to perfect equipment which would operate effectively in an environment of massive electronic countermeasures....

HAWK

HAWK (Homing-All-the-Way-Killer) is one of the Army's newest air defense missiles to become operational. Its design provides optimum capability against medium and low-flying supersonic aircraft and cruise-type missiles. Developmental work

continued during fiscal year 1960 to improve its reliability and effectiveness against smaller and higher speed targets. HAWK demonstrated a technical capability to engage short-range ballistic missiles when the system destroyed an HONEST JOHN tactical field artillery rocket during the past year.

MAULER

Development began on MAULER in fiscal year 1960. It is a completely self-contained, self-propelled guided missile system for air defense mounted on a tracked chassis of standard design. MAULER will be able to move with armor and infantry units of the field Army to provide protection against short-range ballistic missiles as well as low-flying high-performance tactical aircraft.

NIKE-ZEUS

NIKE-ZEUS is being developed to provide a defense of the United States against ballistic missiles. It is the only weapon under development specifically designed to meet this threat. Started four years ago, research and development on the radars and high-performance missile continued on schedule during fiscal year 1960 in accordance with established program objectives. During the past year a firing test program for the prototype missile was carried on at the White Sands Missile Range. These tests have provided data to evaluate the launch, propulsion, and aerodynamic characteristics of the missile, and to test the underground launcher.

A powerful new electronic tube has been developed which makes possible several breakthroughs of fundamental importance in the NIKE-ZEUS system. The ability of the new tube to generate and control precisely a large amount of high-frequency radar power gives accuracy, speed, and certainty in tracking small fast-moving targets at much greater ranges than heretofore achieved. This new tube will permit more effective discrimination between a genuine missile nose cone and decoys. Significant advances have been made in the technology of using the new equipment for the purpose of decoy discrimination.

In the past three years, the Department of Defense has allocated \$459 million for the development of NIKE-ZEUS. Toward the end of fiscal year 1960, an additional \$22 million which the Army had saved in other areas was transferred to the NIKE-ZEUS research and development program to speed development of automatic processes for production of new types of electronic transistors, resistors, and other NIKEZEUS components. This action reflects the urgency which the Army feels about proceeding as rapidly as possible with development, testing, and preproduction engineering of NIKE-ZEUS as an effective antimissile system.