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COMPTROLLER GENERAL'S REPORT TO THE CONGRESS

ARMY AIR DEFENSE: SAM-D PROGRAM Department of Defense B-163058

D I G E S T

WHY THE REVIEW WAS MADE

GAO made this review early in 1972 to assist the Congress in determining whether the proposed SAM-D (surface-to-air missile development) system, now in the engineering-development stage, will fulfill, at an acceptable cost, an essential air defense need for the United States.

Subsequently, the Chairman, Research and Development Subcommittee, Senate Armed Services Committee, asked GAO for specific information on the SAM-D program before the hearings to be held in the spring of 1973. (See app. II.)

The Army is fielding a new system, the Improved HAWK (homing all-the-way killer), and is developing a new one, the SAM-D, which will require greater resources. SAM-D will replace the Improved HAWK and the Nike Hercules systems.

Background

The Army is using advanced technology in the SAM-D system for use starting in 1980; the system will be capable of operating in a severe electronic countermeasure environment and against massive attacks. The Department of Defense (DOD) justifies the SAM-D on the basis that it will be more cost effective than other systems, including fielding the Improved HAWK system in greater numbers.

FINDINGS AND CONCLUSIONS

Need

There are differences of opinion among officials in DOD about the extent of the enemy threat to be countered by air defense systems, including the SAM-D system.

The Defense Intelligence Agency estimates a lesser enemy threat to be countered by the SAM-D system than the threat estimated by the Army. (See p. 33.)

Operations

1. A single Improved HAWK radar can scan a greater area than a single SAM-D radar. (See p. 25.) The Army is studying ways to increase the SAM-D radar coverage and ways to increase radar survivability against enemy antiradiation missiles. (See p. 38.)

2. Reloading times are significantly longer for the SAM-D system than for the Improved HAWK. However, an Improved HAWK battery is easier to overwhelm than a single SAM-D fire section, since the Improved HAWK can engage fewer targets concurrently than the SAM-D system. (See p. 26.)

3. The SAM-D system can track a significantly greater number of targets than can the Improved HAWK. (See p. 26.)

4. The SAM-D system also has a longer range, a higher altitude capability, and a faster firing rate than the Improved HAWK. (See p. 30.)

5. The Army is planning to use fewer personnel to deploy the SAM-D system. (See p. 29.)

Testing

Current U.S. Army and Office of the Secretary of Defense policy regarding development of a new weapon system stresses the importance of testing components in advanced development to avoid costly mistakes in engineering development and procurement.

The Army requested, and the Director of Defense Research and Engineering approved, the deletion of certain advanced development testing originally included in the test plan. The Director based his approval on the fact that delays had occurred in the program plan due principally to funding shortages. These delays resulted in a less mature design model available for testing. It was felt by the Director that testing of this model would have significantly increased the costs of the tests and decreased the benefits to be gained over that previously envisioned.

For example, missile flight-testing of the critical track-via-missile guidance was postponed until 1974. Testing the sensitive warhead-fuzing interface will not take place until the SAM-D system is well into engineering development. By the time the missiles are flown to test the guidance, and by the time the fuzing interface test is made, about $793 million will have been invested in the program.

The Army stated that it had gained assurance through simulation and captive flight-testing that its request to postpone the missile flight-testing was sound; it expressed confidence that its revised test plan would be successful. (See p. 45.)

Past experience has shown that decisions to forego testing during advanced development have often resulted in substantially increased costs and in lower performance accomplishments.

Cost

The SAM-D system, for various reasons--most of which are similar to those identified with other large programs where the technological state of the art is challenged--has shown a severe drop in the number of units to be procured. Total program cost has increased about 9 percent since the 1967 development estimate.

The program unit cost of these fire sections is more than three times the unit cost in the development estimate. According to the Army's variance analyses, the reasons for the increased unit cost are (1) escalation, 42 percent, (2) reduced quantities to be purchased, 27 percent, and (3) correction of prior estimating errors and engineering and schedule changes, 31 percent. (See p. 8.)

RECOMMENDATIONS OR SUGGESTIONS

This report contains no recommendations.

AGENCY ACTION AND UNRESOLVED ISSUES

GAO provided copies of its draft report to representatives of the

Office of the Secretary of Defense and the Department of the Army for review and discussion. Their comments are incorporated as appropriate.

MATTERS FOR CONSIDERATION BY THE CONGRESS

The issues discussed in this report on the Army's acquisition of its proposed air defense system, SAM-D, are critical to the success of the program.

The Congress may want to consider:

--What assumptions were made justifying that the SAM-D's greater engagement capability would offset its slower reloading time.

--Why the Army used its threat assessment rather than DIA's and whether a new analysis should be made that would include consideration of all support and systems that would be available, including ground and air, to counter the threat beyond 1980.

--Whether the Army has left its forces and the assets it is to protect vulnerable to attack by developing a system, namely the SAM-D, that has limited radar coverage.

--Whether the SAM-D, or any other air defense system for that matter, can survive or be effective in an environment where antiradiation missiles are used.

--Whether the Army is still assured as to the prospects of being able to operate the SAM-D with fewer personnel and attain simplified maintenance in view of changes in quantities to be acquired and changes in performance characteristics.

--Whether the decisions to defer testing of critical components, i.e., the warhead-fuzing and guidance subsystems until a considerable expenditure of funds has been made is justified in the light of past experience.

--Whether the current trend of rising costs on the SAM-D program can be curtailed and whether continued rising costs would impact on the capabilities and quantities of fire sections acquired.

--Whether a new cost effectiveness study is warranted in view of the changes made to the SAM-D performance characteristics, quantities, and additional changes contemplated, as well as the product improvement program on the Improved HAWK.

Another matter of particular concern that the Congress may wish to examine relates to the Mutual and Balanced Force Reduction program presently under negotiation. Since the need for the SAM-D is predicated, in part, on the Army's assumption that its forces in Europe will be increased, reduction in the size of these forces and the Warsaw Pact forces could impact significantly on the quantities of SAM-D fire sections needed in that area.