REPORT BY THE COMPTROLLER GENERAL OF THE UNITED STATES

# PROGRESS AND PROBLEMS OF THE ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE PROGRAM

## D I G E S T

The Advanced Medium Range Air-to-Air Missile (AMRAAM) is being developed as an all-weather, air-to-air missile responding to Air Force and Navy operational requirements for the 1985-2005 time frame. Operating both within and beyond visual range, AMRAAM is to be compatible with the F-14, F-15, F-16, F-18, and other appropriate aircraft. It is intended to replace the aging Sparrow medium range air-to-air missile.

AMRAAM is currently in a 33-month concept validation phase scheduled to be completed in November 1981. The full-scale engineering development phase is scheduled to end in March 1985, and delivery of first production items is to follow in September 1985. As of January 1979, the Air Force estimated that AMRAAM's life-cycle cost for 20,000 missiles would be $3.9 billion.

GAO was severely hampered on this review because the Air Force withheld most of the current cost, schedule, and performance data on the basis of the data being competition sensitive. GAO could not therefore fully assess the program's status and is issuing this interim report on the basis of the limited data made available. The Secretary of the Air Force released the data in late November 1980, too late for GAO's analysis and inclusion in this interim report. GAO plans to issue a more comprehensive report based on its follow-on review of the recently released program data. (See pp. 4 and 5.)

GAO's review of the limited data released identified the following problems related to the AMRAAM program:

--The Air Force and Navy may be unable to fully test AMRAAM during full-scale

engineering development because of deficiencies in high altitude, high speed targets.

--Operational questions exist regarding the full use of AMRAAM in a beyond visual range role.

--The total costs related to AMRAAM have not been estimated, but available information shows that total costs will be much more than the $3.9 billion life-cycle cost forecasted in January 1979.

TESTING CONCERNS

High altitude, high speed targets projected to be available during AMRAAM's full-scale engineering development testing will not fully satisfy certain AMRAAM test requirements. The targets will not have the capability to either fully simulate the threat or provide scoring data to assess system lethality. Unless more capable targets are made available to fully test AMRAAM's capabilities, the system could be approved for production with unknown performance deficiencies or the production decision could be delayed because of insufficient performance data. (See p. 6.)

The Department of Defense has known for several years that more capable high altitude, high speed targets are needed for testing such high performance missile systems as AMRAAM, but a program to develop a more capable target has been given low priority. The services established a high altitude, high speed target development program in 1970, but current projections indicate the target will not be available until January 1985, about 2 months before completion of AMRAMM's full-scale engineering development phase. If the targets were available for testing AMRAAM, as currently designed, it would still not fully satisfy AMRAAM test requirements. (See pp. 6 and 7.)

Air Force Headquarters officials told GAO that existing targets in inventory will be set aside

for testing AMRAAM and that they believed those targets will be adequate. The officials could not, however, provide supporting data showing that these targets, with their known limitations, will satisfy AMRAAM's high altitude, high speed testing requirements. (See pp. 6 and 7.)

AMRAAM program officials told GAO that any AMRAAM performance deficiencies would be disclosed by simulations and flight test demonstrations at lower altitudes. However, the May 1977 requirement document for the high altitude, high speed target development program stated that lack of a high altitude, high speed target increases the probability of air superiority weapon systems having unrecognized performance deficiencies until used in an air combat environment. (See p. 8.)

OPERATIONAL QUESTIONS

The United States and its North Atlantic Treaty Organization (NATO) allies may be unable to fully utilize AMRAAM's beyond visual range capability. AMRAAM's full use in a beyond visual range role will require that the United States and its allies have the capability to positively identify potential targets as friend or foe. However, the principal identification, friend, or foe (IFF) system currently used, the 1950-vintage Mark XII, has operational inadequacies. (See pp. 9 and 10.)

In an effort to resolve the IFF problem, the Department of Defense has initiated action to develop an improved NATO-interoperable IFF system under a cooperative development program. At the time of our review, however, there was uncertainty as to when such an improved NATO-interoperable IFF system could be deployed. (See pp. 10 and 11.)

Until new equipment is deployed, the rules-of-engagement for employing beyond visual range weapon systems need to be optimized. (See p. 11.)

ESTIMATED COSTS

Total costs related to AMRAAM have not been estimated and all current cost information was not provided to GAO, but data provided showed that total costs associated with AMRAAM will be much more than the January 1979 life-cycle cost estimate of $3.9 billion. The AMRAAM costs will be much higher because

--estimated development costs had already increased $179 million, or 45 percent, between January 1979 and April 1980, and the April 1980 estimate of $575 million did not include all costs related to AMRAAM development (see pp. 13 and 14) and

--the January 1979 estimate did not include tactical aircraft modification costs which could amount to $900 million for F-15 and F-16 aircraft and an undetermined amount for F-14 and F-18 aircraft. (See p. 14 and 15.)

In addition to these costs, the Office of the Secretary of Defense has directed the Air Force to conduct a costly operational utility evaluation of AMRAAM. Air Force officials said that preliminary estimates indicate the evaluation could cost $200 million.

GAO had insufficient data to project the total estimated costs related to AMRAAM. The Air Force was withholding data on updated life-cycle cost estimates for AMRAAM, and the Navy had not estimated total costs to modify F-14 and F-18 aircraft for AMRAAM.

RECOMMENDATIONS

GAO recommends that the Secretary of Defense

--reconsider the need for high altitude, high speed target subsystems, such as improved radar and infrared augmentation, cooperative vector scoring, and threat representative countermeasures, in order to adequately test the operational capabilities of AMRAAM;

--aline the development schedule for the high altitude, high speed target with AMRAAM's full-scale engineering development schedule;

--urge the adoption of rules-of-engagement, pending improved IFF capability, which permit optimum employment of such air superiority systems as AMRAAM; and

--provide the Congress with the total estimated cost of development, procurement, and deployment of AMRAAM, including the associated aircraft modification costs.

GAO did not request official comments on this report because of the tight reporting deadline. Instead, a draft of this report was discussed with high level officials associated with management of the program to assure that the report is accurate and complete. Their points of view are included where they differ with GAO's.