~~14113~~
115231

REPORT BY THE COMPTROLLER GENERAL OF THE UNITED STATES

REVIEW OF THE HIGH SPEED ANTI-RADIATION MISSILE PROGRAM

D I G E S T

The High Speed Anti-Radiation Missile (HARM) is being developed to give aircraft performing surface attack missions a better chance of penetrating enemy radar defenses by destroying or suppressing radars which direct enemy surface-to-air missiles and antiaircraft guns. The system is designed to detect, identify, and lock on to a wide range of enemy radars and then launch the HARM missile to home on and destroy the target.

GAO reviewed the HARM program to determine whether it had met the development objectives that were required to be met before awarding a limited production contract for 80 missiles. GAO believes the HARM system has demonstrated the performance that was required before limited production.

Full-scale production of HARM is scheduled to begin in 1982, following completion of operational testing.

Major problems that halted flight testing in October 1979 appear to have acceptable solutions. (See p. 6.) Other problems and concerns remain. Solutions acceptable to the Navy and Air Force, although not necessarily complete solutions, appear available for remaining problems noted to date. Some remaining problems are described below.

--A great deal of labor and time on test facilities is required to compensate (or adjust) each HARM seeker and perform acceptance testing. This is expensive and reduces the life of the seeker. Unless the time required to compensate and test seekers is substantially reduced from the current 400 hours, as the contractor and the Navy expect, additional test facilities may be needed to meet the full-scale production rate. Alternatively, HARM production might have to be

stretched out to accommodate the number of test facilities available. (See pp. 8 and 9.)

--In one of the Navy's operational modes for using HARM, missiles may be launched at targets that are falsely displayed to the pilot. Such targets cannot be hit. A solution to this problem exists; however, its implementation would be expensive and would involve a new piece of equipment. (See pp. 9 and 10.)

--Wing flutter has been noted on some firings and captive flights. A serious flutter could affect a missile's accuracy. (See p. 11.)

--The Air Force HARM system is limited in its effectiveness by a basic design limitation in another part of the aircraft weapons system that will use HARM. (See p. 12.)

--The Air Force and Navy operational testers are concerned with the adequacy of HARM's built-in test capability. (See p. 12.)

--In the Navy HARM system, common threat information is not programed into both the radar warning receiver and the command launch computer. The Navy has instructed the contractor to prepare the necessary software change to correct this problem. (See p. 12.)

--The Air Force does not believe that the so-called multipath phenomenon 1/ is adequately understood and that corrective actions to mitigate its effects on HARM are sufficient. (See pp. 12 and 13.)

1/A condition where radar signals are received indirectly after having bounced off buildings or terrain features as well as directly from the radar.

--Another problem, the description of which is classified, is discussed on pages 10 and 11.

In addition to the above problems, there are concerns and uncertainties in other areas, as follows:

--Although development and production concurrency is less now than it was before flight testing was halted in October 1979, some concurrency remains. There is, therefore, a degree of risk in going into limited production before operational testing. Solutions to currently known problems appear to be acceptable, but they may not prove to be adequate.

--Two of the 11 missile firings since March 1980 were failures. One other firing had to be aborted because of technical difficulties. Both failures and the aborted firing were attributed to poor quality control in producing the missile control sections. Although the contractor has taken measures to improve quality control, the Naval Weapons Center is still concerned. (See pp. 14 and 15.)

--Three other firings in 1980 were considered by the Navy as partial failures because of target miss distances. (See pp. 15 and 16.)

--The HARM program will be committed to limited production before a high degree of reliability has been demonstrated. If reliability does not improve as fast as expected, a low degree of reliability might be present in the 80 limited production missiles which will be used to establish the Navy's initial operational capability. (See pp. 16 and 17.)

--The HARM seeker was tested in a special ground facility to determine the missile's ability to withstand various electronic countermeasures. The results of these tests are discussed on pages 17 to 20.

--A decision to change the HARM specification to hold down cost has reduced HARM's ability to cope with certain radars. (See p. 18.)

RECOMMENDATION

GAO recommends that before the HARM system is permitted to enter full-scale production, the Secretary of Defense provide assurances to the Congress (1) that key identified technical problems have been solved and their solutions proven by testing and (2) that HARM has the potential for meeting anticipated future threats despite the specification change which reduced HARM's capability against certain radars.

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.