

October 1993

**MISSILE
DEVELOPMENT**

**TSSAM Production
Should Not Be Started
as Planned**



**National Security and
International Affairs Division**

B-245324

October 8, 1993

The Honorable Sam Nunn
Chairman, Committee on Armed Services
United States Senate

The Honorable Daniel K. Inouye
Chairman, Subcommittee on Defense
Committee on Appropriations
United States Senate

The Honorable Ronald V. Dellums
Chairman, Committee on Armed Services
House of Representatives

The Honorable John P. Murtha
Chairman, Subcommittee on Defense
Committee on Appropriations
House of Representatives

The Tri-Service Standoff Attack Missile (TSSAM) program is a \$14.5 billion program to develop and acquire a common, low observable, medium range, conventional cruise missile for the Air Force, Army, and Navy. The TSSAM system has been in development for 7 years.

This program has a history of development problems, cost growth, and schedule delays. Congressional committees have continually expressed concerns about the TSSAM development program. As a result of this interest and the significant cost and tactical importance of this system, we reviewed the program's progress and its readiness to enter low-rate initial production. We also reviewed progress made to address past development problems and identified new issues and challenges meriting congressional attention. This is an unclassified summary of a classified report we recently issued.

Background

Since 1986, Northrop Corporation, Aircraft Division, Hawthorne, California, the primary contractor, has been developing the family of missiles under a fixed-price incentive fee contract. Four missile variants are being developed that have many common components but somewhat different avionics and munitions. Two variants have precision terminal guidance systems to achieve pinpoint accuracy. The other two variants

dispense submunitions to attack area targets or armored vehicles. The services plan to buy 6,650 missiles and begin low-rate initial production in 1995. To this end, the Air Force requested \$195.9 million for fiscal year 1994 to buy long lead items for one of the four variants.

Results in Brief

The TSSAM system has not yet proven its ability to work under operational conditions. Major critical subsystems continue to have technical problems, which have delayed the flight test program. The details of these deficiencies are classified. Unless the rate of flight testing increases substantially, planned schedules will not be met. For example, although the original development schedule has been extended for 64 months, the mission planning software programs necessary for the operation of the missile, continue to fall behind schedule.

Development problems, testing delays, and reduced quantities of missiles planned for production have contributed to increase in the unit cost of the TSSAM system even though cost-reduction efforts have reduced the size of the development program. Significant changes in the total program and its cost may result from additional changes to the planned quantity of missiles to be purchased and the uncertainty of which launch platforms will be capable of firing TSSAMS.

While the Air Force requested \$195.9 million for long lead funding for fiscal year 1994 for the combined effects bomblets (CEB) variant, it does not plan to complete tests to demonstrate missile performance in an operational test environment before starting low-rate initial production. Although the CEB variant is the least complex variant, its operation depends on mission planning software that has not been flight tested and some subsystems that are either being redesigned or do not meet technical specifications.

Also, the Air Force does not plan to complete testing of critical subsystems necessary to accomplish the more difficult precision terminal guidance missions for about 4 years. This capability is required on 4,250 of the 6,650 missiles, or 63.9 percent of the planned missile buy. Further, developmental concerns and technical problems experienced to date do not warrant initial steps for production.

Performance Not Demonstrated and Schedule Uncertain

The TSSAM development program contains an extensive flight test program in its early stages. Although TSSAM has had some success in its early flight test program, the developmental flight testing has not fully demonstrated the missile system's requirement to autonomously locate and destroy a target. Further, operational testing to demonstrate this capability is not planned to begin for 2 years and is not scheduled to be completed until 2 years later. The Department of Defense's (DOD) plan to start low-rate initial production does not require the complete demonstration of performance for the weapon system. Rather, DOD plans separate decisions for each variant without requiring the more complex missions and system capabilities to be proven before starting the production line with the least complex variant.

Major critical subsystems, such as the mission planning software required for the operation of the missile, have not yet been flight tested. Further, other subsystems are being redesigned, thus the subsystems being flight tested at this time are not the subsystems that will be produced. Also, some subsystems being tested are early designs that do not meet the technical specifications.

Progress in the flight test program has been slow and much work remains to be accomplished. Early flight test program problems contributed to a 31-month schedule extension in December 1992. Four flight tests were accomplished in calendar year 1992, and as of June 30, 1993, four tests were accomplished in 1993. Numerous short delays have occurred and continue to occur in planned flight test dates. For example, the first flight test missile launched from a Navy aircraft had 22 delays between July 1992 and its actual launch in April 1993.

To complete the flight test program by the December 1997 contract completion date, the program must complete numerous tests during calendar years 1994 and 1995. Although current planning allows for some delays due to unsuccessful test results, the planned schedule requires extensive testing involving multiple test ranges. Program officials recognize that the schedule cannot be met unless Northrop improves its ability to manufacture and ground test missiles.

Cost Uncertainties

The TSSAM development and production program faces the potential for cost growth. While the total program cost estimate is \$14.5 billion, major adjustments could be required because of optimistic planning assumptions. Further, the quantity of missiles planned for production

faces some uncertainty, and some schedule adjustments may be made to add work after the scheduled completion date of the current development contract. While some adjustments, such as a quantity reductions, would likely reduce total program cost, such adjustments would increase the unit cost of the missiles.

Recommendations

We recommend that the Secretary of Defense not allow the TSSAM program to proceed into low-rate initial production until all critical pieces of the CEB variant have been developed and adequately tested. These tests should include both the hardware and the required software. Also, the tests should include production representative components and not systems that will not be a part of the production program.

We also recommend that the Secretary of Defense direct that the TSSAM program office demonstrate the more difficult and challenging performance characteristics of the TSSAM system before approving the start of low-rate initial production. In this regard, the demonstration should be under operational conditions and include all the required software necessary for the operation of the missile.

Matters for Congressional Consideration

Because the Air Force predicated its \$195.9 million fiscal year 1994 funding request for TSSAM long lead procurements on plans to begin producing the CEB variant in fiscal year 1995 and it is unlikely that it will be ready for production then, the Congress may wish to consider not providing the \$195.9 million until all critical subsystems for the TSSAM program have proven adequate performance in realistic conditions.

If the funding is provided, the Congress may wish to prohibit the Secretary of the Air Force from obligating such funds until the Secretary of Defense certifies to the Congress that the above conditions have been met.

Agency Comments and Our Evaluation

DOD believes that some concurrency between development and production is prudent and, therefore, does not agree with our conclusions that it is premature to procure long lead items for the CEB variant and that TSSAMS should demonstrate the more difficult precision terminal guidance missions before the production program is started. DOD views this development program as four missile programs, each with its own production decision. DOD further states that adequate developmental and operational testing to minimize risk to an acceptable level will be

accomplished before production decisions on each variant. DOD maintains that its plan to go forward with the CEB variant is consistent with this approach.

We have not changed our conclusions and recommendations because (1) the requirement that generated this program can only be filled by all four variants and (2) the CEB variant does not meet acceptable levels of testing to assure minimal cost, schedule, and technical risks for low-rate initial production. While the \$195.9 million long lead funding requested to start the low-rate initial production of a less complex variant represents a small portion of the \$9 billion production program, we believe it constitutes a commitment to a production program. Two of the four variants require the precision terminal guidance and the planned buy of these two variants represents 63.9 percent of the total planned buy.

Previous work on other weapon systems has shown that once a production commitment is made, even though categorized as limited, or low-rate production, the production continues despite the subsequent discovery of major system performance problems. We believe a decision to enter a production program should be based upon the performance of the entire system, rather than upon a single variant. We also believe it is more desirable to delay low-rate initial production until there is a high degree of confidence that difficult development tasks have been proven. To do otherwise risks the extensive cost of retrofit or modification. A more costly mistake is the fielding of a system that does not perform as intended.

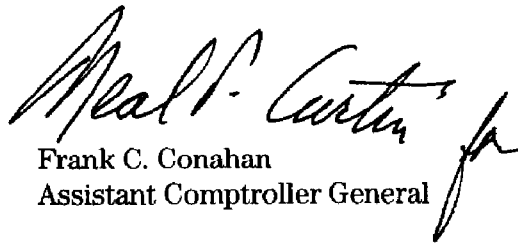
Scope and Methodology

We conducted our review primarily at the Joint System Program Office at Wright-Patterson Air Force Base, Ohio. We reviewed test results, schedule impacts, and contractor and program office proposals on the recovery work necessary to complete the TSSAM program.

To assess the Air Force's plan to enter low-rate initial production, we evaluated the revised program and test schedule, test plans, and flight test planning documentation. We also analyzed the availability and performance of critical subsystems to support the flight test program. To assess the cost estimates, we reviewed the TSSAM program office's cost estimates and those facets of the program that are subject to change. We performed our review from September 1992 to June 1993 in accordance with generally accepted government auditing standards.

We are sending copies of this report to the Chairmen and Ranking Minority Members of the House Committee on Government Operations and Senate Committee on Governmental Affairs; the Ranking Minority Members of the Senate and House Committees on Armed Services and on Appropriations; the Secretaries of Defense, the Army, the Navy, and the Air Force; and the Director, Office of Management and Budget. We will also make copies available to others upon request.

This report was prepared under the direction of Louis J. Rodrigues, Director, Systems Development and Production Issues, who may be reached on (202) 512-4841 if you or your staff have any questions. Major contributors to this report are listed in appendix I.



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