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Missile Defense: Theater High Altitude Area Defense (THAAD) Flight Testing

(name redacted)
Specialist in National Defense
Foreign Affairs, Defense, and Trade Division

Summary

After two successful intercepts in June and August 1999, the Pentagon announced it would scrap the remaining THAAD flight tests and proceed to the EMD (Engineering and Manufacturing Development) phase. Doing so, the Pentagon and others argue, would save some money and expedite THAAD deployment somewhat. THAAD supporters argue that these intercepts have validated the system's major component's and that the system's near-term deployment is now a possibility. Critics continue to argue that THAAD's checkered test legacy over a controlled test range is insufficient for the program to move forward with high confidence and caution that costly system fixes may lie in store for THAAD in the future. Congress has appropriated about $3.8 billion for the THAAD effort since 1989. The Administration is requesting $4.4 billion for Fiscal Years (FY) 2000 - 2005. The total program acquisition cost is estimated at $14.7 billion. This report will be updated after future developments. For broader treatment, see CRS Issue Brief 98028.

Background

The THAAD program is designed to field as soon as possible an upper-tier system (upper atmosphere/lower space) to hit and destroy attacking theater or medium-range ballistic missiles.[1] Currently, the first THAAD units are scheduled to begin delivery in FY2005 and continue through FY2013. The THAAD program is in part a product of long-standing congressional support for developing and deploying effective theater missile

[1]For an assessment of global ballistic missile and weapons of mass destruction proliferation, see Robert Shuey, *Nuclear, Biological, and Chemical Weapons and Ballistic Missiles: the State of Proliferation*, CRS Report 98-103.

defenses (TMD) to protect U.S. troops abroad, U.S. interests overseas, as well as U.S. allies and friends.[2]

The proposed THAAD system, as depicted below, would feature eight hit-to-kill (direct impact) interceptor missiles mounted on a mobile truck launch platform. A THAAD battery would consist of nine such mobile platforms, as well as a mobile ground-based radar and a BM/C^3 (battle management, command, control and communications) system. For further program details see *Theater Air and Missile Defense: Issues for Congress*, CRS Issue Brief 98028. The Flight Test (FT) program is critical to the overall THAAD effort and is examined briefly in the following section.

THAAD Flight Test Program

The THAAD program has experienced numerous schedule delays and test failures. Both the Pentagon and the General Accounting Office (GAO) have examined the test program because of concern over a variety of flight test problems. GAO recommended in September 1997 that Congress pursue a slower test and development program before committing to a THAAD acquisition decision. In February 1998, a Pentagon group (Panel on Reducing Risk in Ballistic Missile Defense Flight Test Programs) found that numerous technical failures were due to poor design and fabrication, inadequate test planning and preflight review, as well as the pressure to test. In debating the FY 1999 defense bill, Senator Bingaman cited both these reports in criticizing THAAD's "rush to failure" and pointed out that the program at that time was four years behind schedule (*Congressional Record*, May 13, 1998, S4755).

Eleven tests have been conducted since 1995. The primary test objectives in the initial tests, and the subsequent interceptor test objectives are summarized in the table below. It should be added, however, that each of these tests had numerous other objectives. In fact, the Pentagon stressed that the latest test accomplished most of its objectives; the primary

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[2]See (name redacted) and Paul Zinsmeister, *The Patriot Air Defense System and the Search for an ATM Missile Defense*, CRS Report 91-456.

objective being an intercept was not realized.[3] Nonetheless, continued support for the program likely will be a function of the intercept attempt test results.

Table THAAD Flight Tests: Summary Table

Flight Test—Date	Test Objectives	Test Result	Cause
FT-1 (4/21/95)	Launch system, missile flight, sensor shroud	Success	NA
FT-2 (7/31/95)	Missile flight, guidance & control, kill vehicle separation	Partial success; test range destruct	Booster flare failure
FT-3 (10/13/95)	Kill vehicle seeker & acquisition, radar	Qualified Success	Minor technical problems
FT-4 (12/13/95)	Missile intercept (exoatmosphere)	Failure	Avionics software processing error
FT-5 (3/22/96)	Missile intercept (high endoatmosphere)	Failure	Booster separation anomaly
FT-6 (7/15/96)	Missile intercept (high endoatmosphere)	Failure	Sensor & signal processor overload
FT-7 (3/6/97)	Missile intercept (high endoatmosphere)	Failure	Divert & Attitude Control System
FT-8 (5/12/98)	Missile intercept (high endoatmosphere)	Failure	Booster anomaly
FT-9 (3/30/99)	Missile intercept (high endoatmosphere)	Failure	Divert & Attitude Control System
FT-10 (6/10/99)	Missile intercept (high endoatmosphere)	Success	N/A
FT-11 (8/2/99)	Missile intercept (exoatmosphere against separating target)	Success	N/A

After the FT-8 (May 1998) intercept failure, Lockheed-Martin established a review team of its senior engineers and solicited and received external technical advice. Lockheed-Martin also accepted a cost-sharing arrangement with the Pentagon of $75 million if it failed to achieve three successful intercepts of the remaining five scheduled tests. This arrangement placed emphasis on completing the tests earlier rather than later.

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[3]According to the Pentagon, telemetry data from THAAD was lost completely after about a minute into the flight. Hence, this has complicated efforts to determine the precise cause of the intercept failure. Nonetheless, BMDO currently believes the likely cause was a failure of one of the Divert and Attitude Control System thrusters, which began to degrade after about 20 seconds into the flight.

Because FT-9 (March 30, 1999) failed, Lockheed-Martin was penalized $15 million. (Technically, Lockheed-Martin will not bill the Government for $15 million of effort under this particular contract.) With the second successful test on August 2, Lockheed-Martin avoided a $20 million penalty. Penalties established in law for additional test failures have apparently been waived with the decision to scrap the remaining flight tests.

Despite the previous test failures, the Ballistic Missile Defense Organization (BMDO) praised Lockheed-Martin's efforts. Specifically, BMDO cited improvements in management and program leadership, stronger technical support, and enhanced engineering quality control procedures. Many suggested that the recent successful tests are due in no small part to these management and quality control improvements.

Currently, the U.S. Army is preparing for an EMD decision, possibly late 1999 or early 2000. As part of that decision, an independent cost assessment for THAAD will have to be completed.

Congressional Concerns

Congress has had much to say about the THAAD program. There remains overall support for THAAD as evidenced in the FY1999 House and Senate defense authorization and defense appropriation subcommittee reports. Funding cuts were generally related to savings due to envisioned delays in testing and acquisition of an early operational THAAD capability. Although both defense committees expressed support for an early deployment concept, the House Appropriations Committee (HAC) raised serious questions about the plan at that time.

This year, Congress directed critical questions to BMDO and THAAD program managers regarding the flight test program. But after the recent successful flight tests, congressional concerns about the program, as reflected in current defense authorization and appropriations bills, may be relieved.

Issues for Congress

For more than a decade, Congress has wanted to deploy an effective TMD to protect U.S. forces and interests abroad against what many consider a variety of near-term ballistic missile threats. The principal weapons candidate for this mission has made significant improvements, as demonstrated in the two recent test successes. But has THAAD demonstrated that it can meet the requirements to defend U.S. troops and assets against fast moving medium-range ballistic missiles? There remain two strong and divergent schools of thought in this regard. Meanwhile, there simply are no other near-term hit-to-kill technologies available for this mission in the near- or mid-term future.

Congress, recognizing a national security need to deal with the threat posed from medium-range ballistic missiles, has made a significant budgetary and political commitment to THAAD. How will the upper-tier plan for TMD be affected, which states that one of two programs, THAAD or Navy Theater Wide, will be selected as the lead area TMD effort and given more funding and support, while the other is put on a lower schedule? Will time and money lead to the deployment of an effective THAAD system? Should the pace and scope of this commitment continue or be adjusted as some have recently

suggested? Are there advantageous alternative or concurrent technical, military, or political approaches to counter long-range theater ballistic missiles? If the THAAD program cannot produce an effective TMD system, what are the near- and medium-term implications for U.S. national security and for U.S. troops deployed overseas in areas where troops are threatened by ballistic missiles? Even if the THAAD program is successful, the system is likely to be less than perfect. What then are the implications of the hostile deployment of theater ballistic missiles with weapons of mass destruction or their threat of use on U.S. military strategy?