Phased Array Tracking Radar Interception on Target (PATRIOT)/Medium Extended Air Defense System (MEADS) Combined Aggregate Program (CAP)

SUMMARY

- PAC-3 demonstrated effectiveness, suitability, survivability, and lethality against a limited set of threats during Initial Operational Test and Evaluation (IOT&E). However, both IOT&E and Operation Iraqi Freedom (OIF) revealed problems with the Phased Array Tracking Radar Interception on Target (PATRIOT) system.
- The Army is addressing these problems through the PAC-3 evolutionary development program.
- The Army conducted two highly successful PAC-3 flight tests during 2004, the second of which involved multiple targets and PAC-3 interceptors in flight simultaneously. These tests completed objectives still outstanding from the IOT&E.
- With OSD approval of Milestone B, the Army successfully merged the PAC-3 program and the Medium Extended Air Defense System (MEADS) program into the PATRIOT/MEADS Combined Aggregate Program (CAP).

MEADS will be a highly mobile air and missile defense system for the protection of maneuver forces and fixed assets.

SYSTEM DESCRIPTION AND MISSION

The PAC-3 air and missile defense system detects, tracks, engages, and destroys short-range ballistic missiles, cruise missiles, fixed-wing aircraft, and other air-breathing threats. A PAC-3 battery includes an Engagement Control Station for battle management, a C-band radar, and up to eight launchers. PAC-3 batteries have a mix of new hit-to-kill PAC-3 missiles and older blast-fragmentation PAC-2 missiles, and PAC-2 Guidance Enhanced Missiles.

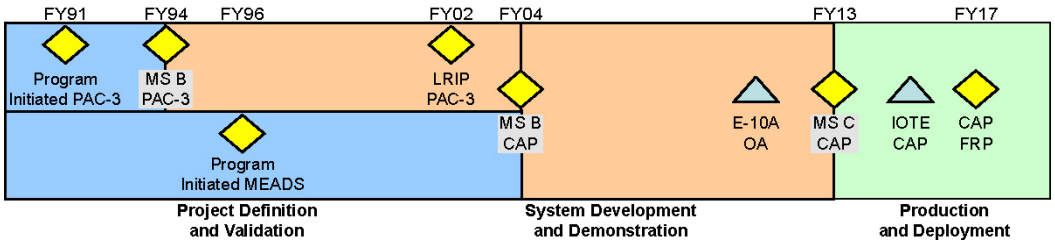
MEADS will be a highly mobile air and missile defense system for the protection of maneuver forces and fixed assets. The system should provide area and point defense capabilities against multiple, simultaneous, 360-degree attacks by ballistic missiles, large caliber rockets, fixed-wing and rotary-wing aircraft, unmanned aerial vehicles, cruise missiles, tactical air-to-surface missiles, and anti-radiation missiles. It should be strategically deployable by C-130 roll-on/roll-off, and tactically mobile to keep up with maneuver forces. MEADS is an international co-development program with Germany and Italy.

The Army merged the PAC-3 program and the MEADS program into the PATRIOT/MEADS CAP. The CAP includes improvements to the current PATRIOT air and missile defense system and the development of MEADS through three acquisition increments (AIs):

- AI-1 will produce an initial Battle Management, Command, Control, Communications, Computers, and Intelligence (BMC4I) element to replace current PATRIOT BMC4I elements. AI-1 IOT&E is in FY09.
- AI-2 will produce a new lightweight launcher and an improved Missile Segment Enhancement PAC-3 missile. AI-2 IOT&E is in FY11.

- AI-3 will produce the objective MEADS system, which will include the objective BMC4I element, a new UHF-band surveillance radar, and a new X-band multifunction fire control radar. The system will use both PAC-3 and Missile Segment Enhancement missiles. AI-3 IOT&E is in FY16.

TEST AND EVALUATION ACTIVITY



The Army conducted PAC-3 flight test ATM 2-1 at White Sands Missile Range, New Mexico, on March 4, 2004. The PAC-3 system fired two PAC-3 missiles at a PATRIOT as a Target (PAAT) missile, emulating a short-range ballistic missile. The first PAC-3 killed the target, satisfying a flight test objective from the IOT&E (Flight Test OT/DT-4b). The second PAC-3 self-destructed as designed.

The Army conducted PAC-3 flight test DT/OT-11 at White Sands Missile Range on September 2, 2004. DT/OT-11 was the first flight test to use PAC-3 missiles that incorporate cost reduction initiative changes to reduce missile cost while maintaining performance. Using a shoot-shoot tactical firing doctrine, the Army fired two PAC-3 missiles at a Modified PAAT (MPAAT) target missile. The first PAC-3 missile successfully killed the modified MPAAT. The second PAC-3 self-destructed as designed. Near simultaneously, using shoot-look-shoot tactical firing doctrine, the Army fired one PAC-3 missile at a cruise missile flying the same trajectory as the target in the failed OT-3b flight test during IOT&E. The PAC-3 successfully killed the cruise missile.

There are currently 28 flight tests scheduled for FY05-10 to verify upgrades to the PATRIOT system. There are also three flight tests scheduled for FY07-09 to test CAP AI-1, 7 flight tests scheduled for FY08-FY11 to test CAP AI-2, and 13 flight tests scheduled for FY11-17 to test CAP AI-3.

The Program Office conducted the MEADS Risk Reduction Effort exit demonstration near Rome, Italy, on May 6, 2004. DOT&E approved the PATRIOT/MEADS TEMP in August 2004. This fully-funded TEMP is adequate to evaluate the PAC-3 evolutionary development program and is adequate to evaluate the PATRIOT/MEADS CAP.

TEST AND EVALUATION ASSESSMENT

PAC-3 demonstrated effectiveness, suitability, survivability, and lethality against a limited set of threats during IOT&E. However, IOT&E and OIF revealed significant problems with the PATRIOT system. The Program Office is addressing these problems through the PATRIOT evolutionary development program.

DOT&E has not yet received sufficient data on PATRIOT operations during OIF to perform a comprehensive evaluation of PATRIOT combat performance. However, the data we have received suggest a need for one or two additional flight mission simulator hardware-in-the-loop systems to conduct battalion level testing. Only one flight mission simulator was available during IOT&E, which limited testing to only one PATRIOT battery at a time. Data also suggests that air and missile defense testing should occur during Joint and coalition exercises that include large numbers of different aircraft types, sensors, BMC4I, and weapon systems.

The current MEADS test plan contains no U.S.-only operational testing prior to the battalion-level IOT&E in FY16. However, the International MEADS Evaluation Board plans to conduct a Fire Unit-level international operational test that includes two DT/OT flight tests and a multiple phase ground test program using production-representative equipment prior to the first unit equipped in FY15. Such a test would verify operational system performance prior to initial deployment. It would also provide an opportunity to discover and fix system problems prior to U.S. IOT&E.