

P-8A Poseidon

Executive Summary

- The Operational Assessment conducted to support the Milestone C decision in August 2010 identified 75 system shortfalls. The shortfalls identified during the Operational Assessment, if not addressed, pose a risk to the successful completion of the IOT&E scheduled to start in 2012.
- Flight testing, using the three test aircraft, began in 2010.

System

- The P-8A Poseidon is the Navy's next generation maritime patrol aircraft that will replace the P-3C.
- The P-8A is based on the Boeing 737-800 aircraft, but uses the 737-900 extended-range wing.
- It is intended to carry and employ anti-ship missiles, air-to-surface weapons, torpedoes, sonobuoys, and other expendables.
- The P-8A onboard sensors include acoustics, radar, missile warning system (MWS), and electro-optic sensors.
- Survivability enhancement and vulnerability reduction features are incorporated into the P-8A design.
 - Susceptibility is reduced with an integrated Aircraft Survivability Equipment suite that consists of a radar warning receiver, chaff/flare dispenser, MWS, directed infrared countermeasures, and an Electronic Warfare Management Unit to control the system. Radio frequency countermeasures are planned for spiral development with installation provisions (including wiring and mounting pylons) incorporated into all production aircraft.
 - Vulnerability is reduced through the addition of fuel tank inerting systems and fire protection systems for the vulnerable dry bays that surround aircraft fuel tanks.



Mission

Units equipped with the P-8 will perform a wide range of patrol missions, including:

- Armed anti-submarine warfare
- Armed anti-surface warfare
- Intelligence collection, processing, evaluation, and dissemination to Naval and Joint forces
- Maritime and littoral reconnaissance

Major Contractor

Boeing Defense, Space, and Security – St. Louis, Missouri

Activity

- The Navy conducted an Operational Assessment between September 25 and October 9, 2009 in the P-8A Weapons System Integration Lab (WSIL), located at the Boeing facilities in Kent, Washington. The objective of the Operational Assessment was to test the sensors, computer workstations, computer processing algorithms, and other mission equipment that are being integrated into the P-8A aircraft in a laboratory environment. The Navy conducted a total of 67.5 test hours during 26 simulated missions.
- There are two non-flying developmental test aircraft: S-1 and S-2.
 - The prime contractor conducted structural testing on the S-1 (static test) aircraft throughout 2010 to support airworthiness flight testing. As of the Milestone C decision in August 2010, 74 percent of the planned structural testing was completed. The static testing is expected to be completed in March 2011. The S-1 aircraft will be used for Live Fire testing upon completion of OT structural testing.
 - The Navy placed fatigue testing on the S-2 aircraft on hold in October 2009 due to funding shortfalls. This testing is expected to begin in July 2011.
- There are three flight test aircraft: T-1, T-2, and T-3.
 - The T-1 test aircraft is used for airworthiness testing; it is heavily instrumented, but does not have the mission systems (e.g. sensors) integrated onboard the aircraft. Flight testing of T-1 began in October 2009 and continued in 2010. As of September 20, 2010, the integrated test team conducted 31 test flights (104 flight test hours).
 - The T-2 test aircraft has the full mission equipment (e.g., sensors, onboard computers, aircrew workstations)

integrated onboard. Flight testing of T-2 began in June 2010. As of September 20, 2010, the integrated test team conducted 14 test flights (50.6 flight test hours) on T-2.

- The T-3 test aircraft has the full mission equipment onboard. The instrumentation onboard the test aircraft includes a number of cameras to monitor the separation of weapons and sonobuoys launched from the aircraft. Flight testing of T-3 began in July 2010. As of September 20, 2010, the integrated test team conducted five test flights (16.2 flight test hours) on T-3.
- DOT&E approved the Test and Evaluation Master Plan (TEMP) to support the Milestone C decision in August 2010. The TEMP includes a plan under which the Navy will collect data during fleet and naval exercises on the legacy P-3 aircraft to compare its performance to the P-8A.
- The Navy's operational test force started collecting operational data from the currently fielded P-3 fleet to support comparison testing with the P-8A. The test force collected operational data on the P-3s flying during the Rim of the Pacific naval exercise in July 2010.
- The Navy is tracking system deficiencies and problems discovered during the Operational Assessment, as well as flight, ground, and laboratory testing. The P-8A Combined Reliability Board regularly reviews reliability data.
- There is potential for buffet loads on the P-8A's horizontal tail section to exceed the designed load limits during heavy weight, high angle-of-bank flight profiles. The Navy conducted simulated operational scenarios in the WSIL in August 2010 to determine the operational impacts of flying at reduced angles-of-bank to mitigate the loads on the tail section. The prime contractor is exploring design modifications to strengthen the horizontal tail section.
- Live Fire ballistic testing showed the horizontal tail's pitch control vulnerability.

Assessment

- The Operational Assessment identified 75 system shortfalls in a laboratory environment before test aircraft were available for flight testing. The shortfalls included aspect areas of track management, acoustics, sonobuoy and weapons deployment, flight planning, and interoperability with onboard sensors.

Thirty of the 75 deficiencies degraded mission performance, had no operator workaround, and had no corrective program in place to fix deficiencies. The shortfalls identified during the Operational Assessment, if not addressed, pose a risk to a successful IOT&E.

- Initial flight testing on the T-2 test aircraft suggests that the systems integration evaluated in the laboratory environment during the Operational Assessment provided an accurate representation of actual aircraft mission system functionality. System performance, including system deficiencies and system improvements, observed during flight test closely matched what was observed during the Operational Assessment conducted in the laboratory.
- The plan was to complete 77 test flights prior to Milestone C per the March 2007 DOT&E-approved TEMP. Approximately 35 test flights were completed prior to Milestone C. Delays in the flight test program can be attributed to delays in the delivery of architectural design drawings, the building of the test aircraft, structural testing on the S-1 static test aircraft, and instrumentation problems.
- Although reliability is being tracked, the sample size (i.e., number of test hours) is still too small to fully assess whether the P-8A will meet its reliability, maintainability, and sustainment requirements.
- The horizontal tail pitch control is vulnerable to the armor piercing incendiary (API) threats tested. The larger API threat severed the horizontal tail pitch control, resulting in loss of aircraft flight control. However, the jackscrew's cross-sectional area is small and it is surrounded by internal components that provide shielding against threats, thus its susceptibility to threats is small.

Recommendations

- Status of Previous Recommendations. The Navy is satisfactorily addressing previous recommendations.
- FY10 Recommendation.
 1. The Navy should fix the system shortfalls discovered during the Operational Assessment, specifically those that degrade the mission, have no operator workaround, and have no current corrective plan in place, in order to reduce the risk of an unsuccessful IOT&E.