

P-8A Poseidon Multi-Mission Maritime Aircraft (MMA)

Executive Summary

- The P-8A Engineering Change Proposal (ECP) 2 upgrade provides new and operationally effective capabilities including P-8A receiver air refueling, AGM-84D Harpoon Block 1 advanced employment modes, and multiple communication system upgrades. Despite significant efforts to improve P-8A intelligence, surveillance, and reconnaissance (ISR) sensors, overall P-8A ISR mission capabilities remain limited by sensor performance shortfalls.
- P-8A operational suitability has declined since initial fielding in 2013. P-8A ECP 2 OT&E data and fleet-reported metrics show consistently negative trends in fleet-wide aircraft operational availability due to a shortage of critical spare parts and increased maintenance requirements. Despite negative fleet availability and reliability trends, forward-deployed P-8A units currently report relatively high mission capable rates when sufficient spare parts, expedited logistics supply support, and priority maintenance support are available. However, prioritizing support for forward-deployed units frequently reduces aircraft availability and increases part cannibalization rates at other fleet operating locations.
- The Navy plans to incrementally improve baseline P-8A capabilities by integrating the Advanced Airborne Sensor (AAS), AGM-84 Harpoon Block II+, and High Altitude ASW Weapon Capability (HAAWC) MK 54 torpedo.

System

- The P-8A Poseidon Multi-mission Maritime Aircraft (MMA) design is based on the Boeing 737-800 aircraft with modifications to support Navy maritime patrol mission requirements. It is replacing the P-3C Orion.
- The P-8A incorporates an integrated sensor suite that includes radar, electro-optical, and electronic signal detection sensors to provide search, detection, location, tracking, and targeting capability against surface targets. An integrated acoustic sonobuoy launch and monitoring system provides search, detection, location, tracking, and targeting capability against submarine targets. Sensor systems also provide tactical situational awareness information for dissemination to fleet forces and ISR information for exploitation by the joint intelligence community. The P-8A carries MK 54 torpedoes and the AGM-84D Block 1C Harpoon anti-ship missile system to engage submarine and maritime surface targets.
- The P-8A aircraft incorporates aircraft survivability enhancement and vulnerability reduction systems. An integrated infrared missile detection system, flare dispenser, and directed infrared countermeasure system is designed to



- improve survivability against infrared missile threats. On- and off-board sensors and data transfer systems provide tactical situational awareness. Fuel tank protection and fire suppression systems reduce aircraft damage vulnerability.
- Incremental future upgrades include the addition of the HAAWC MK 54 torpedo, AAS radar, AGM 84 Harpoon II+ anti-ship missile, ASW signals intelligence sensors, and avionics architecture improvements.

Mission

- Theater Commanders primarily use units equipped with the P-8A MMA to conduct ASW operations including the detection, localization, tracking, and destruction of submarine targets.
- Additional P-8A maritime patrol missions include:
 - SUW operations to detect, identify, track, and destroy enemy surface combatants or other maritime targets
 - ISR operations to collect and disseminate imagery and signals information for exploitation by the joint intelligence community
 - Command, control, and communication (C3) operations to collect and disseminate tactical situation information to fleet forces
 - Identification and precise geolocation of targets ashore to support fleet strike warfare missions

Major Contractor

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

Activity

- The Navy Operational Test and Evaluation Force (OPTEVFOR) completed P-8A ECP 2 OT&E flight events in December 2017 and operational suitability data collection in May 2018. This testing included evaluation of initial P-8A air-to-air receiver refueling capabilities, ISR mission system improvements, advanced AGM-84 Block 1C Harpoon missile employment modes, communication system enhancements, and corrective actions for additional deficiencies identified during previous test periods. The Navy also conducted a system-level cybersecurity assessment and a complete re-evaluation of P-8A fleet availability, reliability, and maintainability. The P-8A ECP 2 OT&E was conducted in accordance with a DOT&E-approved test plan.
- The Navy did not complete the planned Multi-Static Active Coherent (MAC) wide area ASW search sensor testing during the ECP 2 OT&E period due to submarine target unavailability. As a result, OPTEVFOR submitted a separate operational test plan to complete remaining MAC ASW test events during future operational test periods.
- The Navy continues to plan and progressively execute an incremental series of ECPs and associated follow-on test events to improve baseline P-8A aircraft capabilities. In addition, the P-8A program is coordinating with other Navy weapon and sensor programs to integrate new capabilities. The Navy plans to conduct operational test events for the AAS, AGM-84 Harpoon Block II+, and HAAWC MK 54 torpedo in the FY19 through FY20 timeframe.
- Upon completion of the P-8A ECP 2 OT&E period, DOT&E issued a P-8A ECP 2 FOT&E Report in August 2018 and removed the P-8A aircraft from formal operational test oversight. DOT&E will continue to oversee major P-8A capability upgrades through operational test oversight for the separate AAS, MAC, and HAAWC sensor and weapon upgrade programs.
- P-8A operational suitability has declined since initial fielding in 2013. P-8A ECP 2 OT&E data and fleet-reported metrics show consistently negative trends in fleet-wide aircraft operational availability due to a shortage of spare parts and increased maintenance requirements. Despite these negative trends, forward-deployed P-8A units currently report relatively high mission capable rates when sufficient spare parts, expedited logistics supply support, and priority maintenance support are available. However, prioritizing support for forward-deployed units frequently reduces aircraft availability and increases part cannibalization rates at other fleet operating locations.
- Supply support system spare part contracting and delivery delays also exacerbate the impact of current mission critical spare part shortages. Navy Supply Systems Command reliance on engineering model predictions, instead of actual fleet reliability data, ensures that some mission critical spare part contracts lag actual fleet needs. This lag time further extends the already lengthy 6 to 9 month contracting process for repairable spare parts. These delays are a major contributing factor to the observed increases in aircraft downtime awaiting parts and higher part cannibalization rates. Defense Logistics Agency consumable item procurement processes also lag actual fleet needs by requiring stock depletion and backorders before initiating procurement actions. The P-8A program is currently working with Naval Supply Systems Command to implement a more flexible and proactive parts contracting strategy and, to transition to use of fleet reliability data as the basis for advance parts procurement.

Assessment

- The P-8A ECP 2 upgrade provides new and operationally effective capabilities including P-8A receiver air refueling, AGM-84D Harpoon Block 1 advanced employment modes, and multiple communication system upgrades. The associated Operational Flight Program Fleet Release 40.2 software also includes effective corrections for 28 previously identified system performance deficiencies. Despite significant efforts to improve P-8A ISR sensors, overall P-8A ISR mission capabilities remain limited by persistent performance shortfalls.
- P-8A ECP 2 cybersecurity testing identified five priority areas for improvement. The ECP 2 operational test report includes specific test results and recommendations to improve the cybersecurity posture.

Recommendations

The Navy should:

1. Continue planning and execution of MAC, AAS, and HAAWC MK 54 operational testing to demonstrate and characterize improved P-8A operational capabilities.
2. Continue efforts to correct remaining P-8A aircraft and mission system shortfalls and deficiencies identified in P-8A ECP 2 OT&E and previous operational test periods.