

## E-2D Advanced Hawkeye

### Executive Summary

- DOT&E provided details on the FY12 IOT&E in the classified E-2D Advanced Hawkeye (AHE) IOT&E report in February 2013. The E-2D was operationally effective for legacy missions and suitable for legacy missions conducted from land-based operations. Suitability for carrier-based operations was unresolved.
- On March, 1, 2013, USD(AT&L) approved entry into full-rate production (FRP) and procurement of FRP Lot 1 aircraft. An In-Progress Review to receive approval for FRP Lot 2 and beyond is scheduled for FY14.
- The Navy's Cooperative Engagement Capability (CEC) FOT&E occurred between October 2012 and June 2013. It focused on testing the USG-3B, the CEC system specific for the E-2D and a critical enabler for the Theater Air and Missile Defense (TAMD) mission. The testing focused on interoperability with legacy CEC systems. During FOT&E, CEC performance was degraded relative to the CEC version in the E-2C.
- In 4QFY13, Commander, Operational Test and Evaluation Force conducted a Verification of Correction of Deficiencies (VCD) in order to assess the program's progress in addressing deficiencies found during IOT&E. Not all of the problems identified in the DOT&E IOT&E report will be resolved during the VCD, but will be corrected through a series of hardware and software changes that are incorporated and demonstrated through FY16.

### System

- The E-2D AHE is a carrier-based Airborne Early Warning and Command and Control aircraft.
- Significant changes to this variant of the E-2 include upgraded engines to provide increased electrical power and cooling relative to current E-2C aircraft; a strengthened fuselage to support increased aircraft weight; replacement of the radar system, the communications suite, and the mission computer; and the incorporation of an all-glass cockpit, which permits the co-pilot to act as a tactical fourth operator in support of the system operators in the rear of the aircraft.



- The radar upgrade replaces the E-2C mechanically-scanned radar with a phased-array radar that has combined mechanical and electronic scan capabilities.
- The upgraded radar provides significant improvement in littoral and overland detection performance and TAMD capabilities.
- The E-2D AHE System includes all simulators, interactive computer media, and documentation to conduct maintenance, as well as aircrew, shore-based initial and follow-on training.

### Mission

The Combatant Commander, whether operating from the aircraft carrier or from land, will use the E-2D AHE to accomplish the following missions:

- Theater air and missile sensing and early warning
- Battlefield management, command, and control
- Acquisition, tracking, and targeting of surface warfare contacts
- Surveillance of littoral area objectives and targets
- Tracking of strike warfare assets

### Major Contractor

Northrop Grumman Aerospace Systems – Bethpage, New York

### Activity

- In 4QFY13, Commander, Operational Test and Evaluation Force conducted a VCD to assess the program's progress in addressing deficiencies found during IOT&E at Naval Air Station (NAS) Patuxent River, Maryland; NAS Fallon, Nevada; and Point Mugu, California. The Program Office has developed a multi-year test strategy to address all IOT&E deficiencies.
- DOT&E provided details on the FY12 IOT&E in the classified E-2D AHE IOT&E report in February 2013.
- The Navy conducted the CEC FOT&E in accordance with a DOT&E-approved test plan from October 2012 through June 2013 in overland and overwater environments with CEC networks of varying complexity, which included E-2D,

# NAVY PROGRAMS

E-2C, USS *Nimitz*, USS *Preble*, USS *Princeton*, USS *Shoup*, USS *Stockdale*, USS *William P. Lawrence*, and various land-based towers. The most complex network consisted of nine participants or roughly two times the normal operational environment of four to five participants.

## Assessment

- Based on the CEC FOT&E results, the current implementation of the CEC in the E-2D has degraded effectiveness relative to that of the E-2C. Software changes will be required to improve E-2D CEC performance.
- The February 2013 IOT&E report included the following assessments:
  - Due to testing limitations, DOT&E could not fully assess E-2D's TAMD mission, but currently assesses it as not operationally effective based on current identified deficiencies.
  - The E-2D was not operationally suitable for the TAMD mission based upon poor availability.
  - The E-2D is operationally effective for legacy missions and suitable for legacy missions conducted from land. Suitability of carrier operations was unresolved. E-2D has improved surveillance capabilities relative to the E-2C. Test aircrews identified performance shortfalls with operator workload in dynamic, high-target density environments where the E-2D mission system erroneously swapped identification labels for crossing/closely-spaced aircraft tracks. Subsequently, the tracks required manual aircrew re-labeling in the mission system, which can lead to operator overload and loss of situational awareness.
  - The E-2D AHE demonstrated significant improvements to the radar tracking capability over the E-2C. While the system provided improved overland performance, the Navy needs to continue radar and mission system development efforts to provide a robust capability in all overland environments.
  - The E-2D mission planning system, the Joint Mission Planning System, is not currently effective. Operators use

the Joint Mission Planning System to provide a means of importing mission-planning data into the E-2D mission computer for use during flight.

- Based on IOT&E reliability and availability data, DOT&E has identified shortfalls on some radar reliability and weapon system availability metrics.
- The E-2D aircraft performed nominally during at-sea operations, but immature logistics and maintenance support precluded an adequate assessment to demonstrate carrier-based flight operations. The current E-2C system operates in a four-aircraft-per-squadron configuration as opposed to the E-2D, which the Navy plans to operate in a five-aircraft-per-squadron configuration.
  - The E-2D at-sea testing did not fully demonstrate the ability to support the logistics of the proposed five-aircraft E-2D squadron in the aircraft carrier environment. The limited number of at-sea sorties and the current limited spare parts support for E-2D precluded a full at-sea logistics supportability assessment of the five-aircraft E-2D squadron concept.
  - Full demonstration of a five-aircraft E-2D squadron in the aircraft carrier environment is not expected until 3Q-4QFY14.

## Recommendations

- Status of Previous Recommendations. The Navy continues efforts to improve radar and mission system performance overland, improve radar and overall weapon system reliability and availability, and resolve the mission system track re-labeling deficiency.
- FY13 Recommendations. The Navy should:
  1. Correct E-2D to CEC integration shortfalls identified during the E-2D CEC FOT&E.
  2. Demonstrate full shipboard suitability and logistical supportability.