

## F/A-18E/F Super Hornet Naval Strike Fighter

### Executive Summary

- Between November 2010 and June 2011, the Navy conducted APG-79 Active Electronically Scanned Array (AESA) radar FOT&E, concurrent with Software Qualification Testing (SQT) for System Configuration Set (SCS) H6E and 23X software. Major upgrades tested during this period included APG-79 radar software anomaly report fixes, Joint Standoff Weapon (Block III) integration, Joint Helmet-Mounted Cueing System (JHMCS) enhancements, and Air Intercept Missile (AIM)-120 capability improvements, including high off-boresight targeting.
- Emerging APG-79 radar FOT&E results indicate marginal improvements since the previous FOT&E period with significant deficiencies remaining in performance, particularly regarding short-range air combat maneuvering engagements, failure to meet reliability requirements, and poor built-in test (BIT) functionality.
- Emerging SQT results indicate the H6E and 23X SCSs are stable and reliable.
- DOT&E will complete its analysis of test data in early FY12 and subsequently report its full findings.

### System

- The Super Hornet is the Navy's premier strike-fighter aircraft that replaces earlier F/A-18 variants in carrier air wings. The F/A-18E is a single-seat aircraft while the F model has two seats.
- The operational software for the Super Hornet, or SCS, includes major combat capabilities. Newer Block 2 aircraft with updated processors use "H-series" software, while aircraft prior to Block 26 and legacy F/A-18 A/B/C/D aircraft use "X-series" SCS. The current fleet release software are H5E and 21X, respectively.
- F/A-18E/F Lot 26+ aircraft provide functionality essential for integrating all Super Hornet Block 2 hardware upgrades, which include:
  - Single pass multiple targeting for GPS-guided weapons
  - Use of off-board target designation
  - Improved datalink target coordination precision
  - Implementation of air-to-ground target points
- Additional systems include:
  - APG-73 or APG-79 radar
  - Advanced Targeting and Designation Forward-Looking Infrared System



- AIM-9 infrared-guided missiles and AIM-120 and AIM-7 radar-guided missiles
- Shared Reconnaissance Pod
- Multi-functional Information Distribution System for Link 16 tactical datalink connectivity
- JHMCS
- Integrated Defensive Electronic Countermeasures

### Mission

- Combatant Commanders use the F/A-18E/F to:
  - Conduct offensive and defensive air combat missions
  - Attack ground targets with most of the U.S. inventory of precision and non-precision weapon stores
  - Provide in-flight refueling for other tactical aircraft
  - Provide the fleet with an organic tactical reconnaissance capability

### Major Contractor

The Boeing Company, Integrated Defense Systems – St. Louis, Missouri

### Activity

- DOT&E reported on APG-79 radar IOT&E in FY07, assessing it as neither operationally effective nor suitable due to significant deficiencies in tactical performance, reliability, and BIT functionality.
- The Navy conducted APG-79 radar FOT&E in FY09 in conjunction with SCS H4E SQT. The Navy's Commander, Operational Test and Evaluation Force subsequently reported

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that significant deficiencies remained for both APG-79 performance and suitability; DOT&E concurred with this assessment.

- Between November 2010 and June 2011, the Navy conducted a second APG-79 radar FOT&E period, concurrent with SQT for SCS H6E and 23X. Major upgrades tested during this period included APG-79 radar software anomaly report fixes, Joint Standoff Weapon (Block III) integration, JHMCS enhancements, and AIM-120 capability improvements, including high off-boresight targeting.
- The Navy executed 999.3 Super Hornet flight hours over 739 sorties during SCS H6E SQT.
- The Navy executed an additional 447.3 Super Hornet and legacy F/A-18 flight hours over 366 sorties for SCS 23X SQT.
- The Navy executed a mix of 591.6 Super Hornet and EA-18G (electronic attack variant of the F/A-18) flight hours conducting APG-79 radar FOT&E.
- DOT&E analysis of APG-79 FOT&E and SCSs H6E and 23X SQT data is ongoing.
- The Navy conducted all testing in accordance with DOT&E-approved Test and Evaluation Master Plans and operational test plans.

## Assessment

- The APG-79 radar FOT&E period did not include an end-to-end multi-AIM-120 missile shot. This capability is a Navy operational requirement not previously demonstrated or successfully tested.

- Full development of APG-79 electronic warfare capability remains deferred to later software builds.
- Overall, the APG-79 radar demonstrates improved capability over the legacy APG-73 radar, providing longer-range detections for air-to-air operations and improved synthetic aperture radar performance for air-to-ground operations.
- Emerging APG-79 radar FOT&E results indicate marginal improvements since the previous FOT&E period with significant deficiencies remaining in performance, particularly regarding short-range air combat maneuvering engagements, failure to meet reliability requirements, and poor BIT functionality.
- Emerging SQT results indicate H6E and 23X SCSs are stable and reliable.
- DOT&E will complete its analysis of test data in early FY12 and subsequently publish an in-depth operational assessment.

## Recommendations

- Status of Previous Recommendations. The Navy made progress addressing one FY09 recommendation (there was no FY10 report). The recommendations to continue to improve APG-79 AESA reliability, to conduct an operationally representative end-to-end missile shot to demonstrate APG-79 radar and current SCS ability to support multi-AIM-120 engagement, and to develop and characterize the APG-79 AESA's full electronic warfare capability remain valid.
- FY11 Recommendations. None.