

F/A-18E/F Super Hornet and EA-18G Growler

Executive Summary

- The Navy conducted Software Qualification Testing of System Configuration Set (SCS) H10E for the F/A-18E/F Super Hornet and EA-18G Growler aircraft with fleet release planned for early 2016. Major upgrades tested during this period for the Super Hornet include improvements to multi-sensor integration, aircrew displays, short-range tracking, and combat identification. Growler improvements tested include the Joint Tactical Terminal Receiver, enhanced combat identification capabilities, and expanded jamming assignments.
- The F/A-18E/F Super Hornet weapon system continues to demonstrate operational effectiveness for most threat environments; however, the platform is not operationally effective in specific threat environments, which are detailed in previous DOT&E classified reports.
- Although the reliability of the APG-79 radar has improved over multiple phases of operational test, Active Electronically Scanned Array (AESA) radar software stability problems resulted in the continued failure of the radar to meet reliability and built-in test (BIT) performance requirements. DOT&E expects improved AESA reliability with SCS H10.
- DOT&E previously assessed the EA-18G Growler weapons system equipped with SCS H8E as operationally suitable and operationally effective with the same radar limitations as the F/A-18E/F.
- The Navy completed SCS 25X testing in 4QFY15 for non-Higher Order Language (HOL) software on F/A-18s and release to the fleet in 2QFY16. Early lot F/A-18E/Fs will remain in the Non-HOL configuration (SCS 25X) until mission computers are upgraded to operate HOL.

System

F/A-18E/F Super Hornet

- The Super Hornet is the Navy's premier strike-fighter aircraft and is a more capable follow-on replacement to the F/A-18A/B/C/D and the F-14.
- F/A-18E/F Lot 25+ 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 for target coordination precision
 - Implementation of air-to-ground target aim points
- Additional systems include:
 - APG-73 or APG-79 radar
 - Advanced Targeting Forward-Looking Infrared System
 - AIM-9 infrared-guided missiles and AIM-120 and AIM-7 radar-guided missiles
 - Multi-functional Information Distribution System for Link 16 tactical datalink connectivity



- Joint Helmet-Mounted Cueing System
- Integrated Defensive Electronic Countermeasures

EA-18G Growler

- The Growler is the Navy's land- and carrier-based, radar and communication jamming aircraft.
- The two-seat EA-18G replaces the four-seat EA-6B. The new ALQ-218 receiver, improved connectivity, and linked displays are the primary design features implemented to reduce the operator workload in support of the EA-18G's two-person crew.
- The Airborne Electronic Attack system includes:
 - Modified EA-6B Improved Capability III ALQ-218 receiver system
 - Advanced crew station
 - Legacy ALQ-99 jamming pods
 - Communication Countermeasures Set System
 - Expanded digital Link 16 communications network
 - Electronic Attack Unit
 - Interference Cancellation System that supports communications while jamming
 - Satellite receive capability via the Multi-mission Advanced Tactical Terminal
- Additional systems include:
 - APG-79 AESA radar
 - Joint Helmet-Mounted Cueing System
 - High-speed Anti-Radiation Missile
 - AIM-120 radar-guided missiles

System Configuration Set (SCS) Software

- Growler and Super Hornet aircraft employ SCS operational software to enable major combat capabilities. All EA-18Gs and Block 2 F/A-18s (production Lot 23 and beyond) use high-order language or "H-series" software, while F/A-18E/F prior to Lot 23 and all legacy F/A-18 A/B/C/D aircraft use "X-series" software.

FY15 NAVY PROGRAMS

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 naval aircraft
 - Provide the fleet with an organic tactical reconnaissance capability
- Combatant Commanders use the EA-18G to:
 - Support friendly air, ground, and sea operations by countering enemy radar and communications
 - Jam integrated air defense systems
 - Support non-integrated air defense missions and emerging non-lethal target sets
 - Enhance crew situational awareness and mission management
 - Enhance connectivity to national, theater, and tactical strike assets
 - Provide enhanced lethal suppression through accurate High-speed Anti-Radiation Missile targeting
 - Provide the EA-18G crew air-to-air self-protection with the AIM-120

Major Contractor

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

Activity

- The Navy conducted F/A-18E/F and EA-18G H10 Software Qualification Testing from March through September 2015 in accordance with a DOT&E-approved test plan and in support of fleet introduction in 2QFY16. Test aircraft equipped with SCS H10E accumulated 1,820 flight hours.
- Major upgrades tested during this period for the Super Hornet include improvements to multi-sensor integration, aircrew displays, short-range tracking, and combat identification.
- Growler improvements tested include the Joint Tactical Terminal Receiver, enhanced combat identification capabilities, and expanded jamming assignments.
- The Navy has continued to defer development of the AESA's full electronic warfare capability to later software builds and plans to test this capability in SCS H12 and H14.
- Early lot F/A-18E/Fs will remain in the Non-HOL configuration (SCS 25X) until mission computers are upgraded to operate HOL.
- The Navy completed SCS 25X testing in 4QFY15 for earlier lot F/A-18s and is expected to begin releasing the non-HOL software to the fleet in 1QFY16.
- Early results from SCS H10 testing suggest improvements in AESA reliability. The Navy has made incremental improvements in AESA radar reliability since the 2006 IOT&E. Radar software instability has resulted in the program's failure to meet reliability and BIT performance requirements in every test period. The AESA provides improved performance compared to the legacy APG-73 radar used on older F/A-18E/F aircraft.
- DOT&E determined that the EA-18G Growler was operationally effective and suitable, though subject to the same threat limitations as the Super Hornet, noting a need for improved jammer timeliness. SCS H10E FOT&E results are not likely to change this assessment.
- SCS H8E testing did not include an end-to-end multi-AIM-120 missile shot. This Navy operational capability has not been demonstrated previously in a successful test. The Navy has agreed to include a multi-missile shot during SCS H12 testing.

Recommendations

- Status of Previous Recommendations. Per previous recommendations, the Navy should continue to improve the reliability and BIT functionality of the AESA radar and develop and characterize the full electronic warfare capability of the APG-79 radar. DOT&E's recommendation to conduct an operationally representative end-to-end missile test to demonstrate APG-79 radar and system software support for a multiple AIM-120 missile engagement also remains.
- FY15 Recommendation.
 1. The Navy should focus on improvements that will allow the Super Hornet and Growler to be operationally effective in all threat environments.

Assessment

- DOT&E does not expect test results from SCS H10E FOT&E to alter the previous assessment made in F/A-18E/F and EA-18G reports regarding key deficiencies in operational performance. While both systems remain operationally effective in some threat environments, DOT&E has noted in classified reports that both systems remain not effective in the more stressful current air warfare environments. Though the Navy has begun to address long-standing deficiencies in air warfare by making incremental improvements in capability during recent FOT&E periods, DOT&E is unlikely to change this finding until deficiencies are resolved.