

F/A-18 E/F Hornet Naval Strike Fighter (All Upgrades)

Executive Summary

- The fourth period of Follow-on Test and Evaluation (FOT&E) for the F/A-18E/F Super Hornet took place from June through December 2006 concurrent with the APG-79 Active Electronically Scanned Array (AESA) IOT&E. Testing was adequate to assess operational effectiveness and suitability.
- The DOT&E Operational Test and Evaluation Report assessed the APG-79 radar system as not operationally effective and not operationally suitable for combat.
- Commander, Operational Test Force (COTF) also found the APG-79 radar not operationally effective and not operationally suitable for combat, but recommended the system be used for training. Despite the adverse operational test results, the Navy approved full-rate production of the APG-79 in July 2007. The first deployment of AESA-equipped F/A-18Fs is planned for 2008.
- An FOT&E period is planned for 1QFY08 to assess deficiency corrections from the IOT&E, and also to characterize performance in an electronic warfare environment prior to the first deployment of AESA-equipped F/A-18E/F. Performance issues may delay this testing and could result in deployment prior to the completion of operational test and evaluation.
- F/A-18E/F Super Hornet is a system-of-systems. The Navy continues to evaluate subsystems separately with individual Test and Evaluation Master Plans (TEMPs) and test plans. This approach detracts from total mission level evaluation of the Super Hornet platform.

System

- The Super Hornet is replacing earlier F/A-18 Hornets and F-14 Tomcats in the Navy's carrier air wings. The F/A-18E is a single-seat aircraft and the F model has two seats.
- The H3E software upgrade provides functionality essential to the integration and operation of all Super Hornet Block 2 hardware upgrades. These upgrades provide capabilities including:
 - Single pass multiple targeting for Global Positioning System (GPS) weapons
 - Use of all AIM-9 series infrared-guided missiles, AIM-120, and AIM-7 radar-guided missiles
 - Off-board target designation
 - Improved data link target coordinate precision
 - Implementation of air-to-ground target points
- The APG-79 radar is one of several sub-systems that comprise the F/A-18E/F planned common avionics suite upgrade (Block 2), which will be integrated into Lot 26 aircraft and beyond.
- The aircraft carries the Advanced Targeting Forward Looking Infrared (ATFLIR) system that the aircrew uses in order to locate surface and airborne targets. The ATFLIR will



have an infrared marker and laser target designator/ranger capability in addition to being able to provide infrared and/or electro-optical streaming video via data link. The laser target designator/ranger provides the F/A-18E/F with the ability to obtain GPS-guided weapons quality target coordinates. The laser designator/ranger can also be used for delivery of laser-guided bombs, while the infrared marker provides air-to-ground cueing to both ground and aerial observers equipped with night vision devices.

- The Super Hornet is also fitted with the Shared Reconnaissance Pod, the Multi-Function Information Distribution System for Link 16 tactical data link connectivity, the Joint Helmet Mounted Cueing System, and the Integrated Defensive Electronic Countermeasures system. The Joint Mission Planning System – Maritime is the fleet mission planning system.

Mission

- Carrier Strike Group Commanders and Joint Force Air Component Commanders use the F/A-18E/F to:
 - Conduct air combat missions
 - Attack ground targets with most of the U.S. inventory of GPS-guided, laser-guided, and free-fall weapons, as well as the 20 mm cannon
 - Fire the High Speed Anti-Radiation missile at enemy radar systems
 - Provide in-flight refueling for other tactical aircraft
 - Provides the fleet with an organic tactical reconnaissance capability available for tasking by the Carrier Strike Group Commander and supported Joint Task Force

NAVY PROGRAMS

Activity

- The Navy conducted FOT&E of the Software Configuration Set (SCS) H3E from June through December 2006. F/A-18E/F aircraft flew 976 flight hours in 657 sorties. The APG-79 AESA radar IOT&E was conducted concurrently with AESA H3E FOT&E; four F/A-18F aircraft equipped with LRIP-1 AESA radars flew 377 sorties for 515 flight hours.
- DOT&E approved the TEMP for the H4E software upgrade in April 2007; the APG-79 TEMP revision is in coordination. Simultaneous testing of the APG-79 AESA and H4E is planned. Additional FOT&E is expected for this program to ensure electronic protection functionality.
- DOT&E approved the ATFLIR TEMP for Block 2 testing to be conducted concurrently during the H4E FOT&E period.
- Other sub-systems in test this year include the Combined Interrogator Transponder, Accurate Navigation, and Infrared Search and Track

Assessment

- The APG-79 radar system, as installed in the F/A-18E/F with SCS H3E, is neither operationally effective nor operationally suitable for combat. The APG-79 IOT&E revealed 22 major deficiencies, which COTF recommended be fixed prior to FOT&E. The program has implemented fixes for 16 deficiencies. These corrections require flight test verification. The program intends to correct the remaining deficiencies in future software releases.
- The program did not demonstrate the APG-79's ability to support multiple AIM-120 missiles in-flight.
- The Navy has expended significant efforts on APG-79 anti-tamper and associated deficiencies with limited time

available to mature and develop deferred modes and capabilities. Electronic protection, the final remaining deficiency from the Super Hornet IOT&E, has been deferred by the program office to a later software release.

- The test program is now event driven with an anticipated spring 2008 fleet deployment. It is highly likely that the first deployment of the AESA-equipped F/A-18F will be prior to FOT&E completion. In this case, the warfighter will deploy without full knowledge of current system performance and limitations.

Recommendations

- Status of Previous Recommendations. The program has taken effective action on the two remaining FY05 recommendations. However, the following FY06 recommendations remain valid:
 - COTF should continue its efforts to refine and codify its integrated test framework for use by other Navy programs in future testing.
 - The Navy should strengthen its efforts to relieve the shortages of trained personnel at the test squadrons in China Lake.
- FY07 Recommendations. The program should:
 1. Conduct live, end-to-end missile shot testing demonstrating multi-AIM-120 shot capability.
 2. Fully characterize the current AESA electronic protection capability and continue to develop and refine the full electronic warfare capability of the AESA radar.