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

Executive Summary
- Operational evaluation of the latest F/A-18E/F Software Configuration Set (SCS), H3E, began in June 2006 following a year-long period of integrated test.
- Testing of both the Advanced Targeting and Designation Forward-Looking Infrared (ATFLIR) system and the Shared Reconnaissance Pod (SHARP) continued throughout 2006.
- The Test and Evaluation Master Plan (TEMP) for SCS 20X was signed by DOT&E in September 2006.

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 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 (HARM) at enemy radar systems
  - Provide in-flight refueling for other tactical aircraft
- The SHARP system provides the fleet with an organic tactical reconnaissance capability available for tasking by the Carrier Strike Group Commander and supported Joint Task Force.

Activity
- DOT&E approved the TEMP, Revision D, for the H3E software upgrade and Follow-on Test and Evaluation (FOT&E) 4 in December 2005. The Operational Test Addendum to the Integrated Test Plan was signed in February 2006. Revision E of the TEMP is currently being coordinated to address the H4E Software Qualification Testing and F/A-18E/F FOT&E 5. Since this test period is intended to resolve the remaining two deferrals from the F/A-18E/F

operational evaluation, this will be the last scheduled FOT&E period for the program.
- The dedicated operational test period for the latest F/A-18E/F SCS, H3E began in June 2006 and is ongoing. Thus far, the operational test period has included interoperability testing conducted during an Air Force Weapons School Mission Effectiveness phase and an air-to-air weapons detachment to Naval Air Station Key West, Florida.
- Other systems concurrently in test on the F/A-18E/F include:
  - Joint Mission Planning System – Maritime (reported on separately in this annual report)
  - Aft-cockpit Joint Helmet Mounted Cueing System
  - Aft-cockpit crew station improvements
  - ATFLIR Block 2, ALR-67(v)3 radar warning receiver
  - Integrated Defensive Electronic Countermeasure Block 3 (reported on separately in this annual report)
  - APG-79 Active Electronically Scanned Array radar (reported on separately in this annual report)
  - AIM-120 and AIM-9X (reported on separately in this annual report)
  - Multi-Function Information Distribution System (reported on separately in this annual report)
- The Navy conducted SHARP operational evaluation (OPEVAL) from August 16 - November 3, 2005, for the Medium Altitude Sensor. An additional period from February 28 - March 9, 2006, was required to re-rate OPEVAL imagery using the National Imagery Interpretability Rating Scale (NIIRS). The High Altitude Sensor will be tested in 2007.
- The Navy conducted Quick Reaction Assessments for the ATFLIR Data Link and the Infrared Marker. A Developmental Test Assist for the radar warning receiver ALR-67(v)3 was conducted during FY06.
- The Navy began initial planning and development for the F/A-18E/F SCS H4E TEMP and its associated Test Plan during 4QFY06.

Assessment
- The F/A-18E/F Super Hornet is a system-of-systems, which integrates capabilities provided by ATFLIR, Joint Helmet Cueing System, SHARP, and each new software configuration set. It is paramount that all of these systems interoperate properly in order to allow for optimal operational effectiveness and suitability.
- The Navy issued Fleet Releases this year for SCS H2E+, ATFLIR video downlink capability, and the Joint Helmet Mounted Cueing System on Lot 23-29 aircraft. They also approved a verification of correction of deficiencies for the voice terminal functions of the Multi-Function Information Distribution System. As of this year, the Super Hornet now has a fully integrated Joint Helmet Mounted Cueing System and AIM-9X capability.
- The Navy rated the SHARP Medium Altitude Sensor as operationally effective, but not operationally suitable upon completion of OPEVAL. The Navy did not recommend Fleet initial operational capability at this time.
- The H3E software upgrade is still in test; however, the Navy issued a number of anomaly reports concerning weapons integration deficiencies with the AIM-120 missile.
- The risk in the SCS H4E timeframe is that all of the cost and schedule will be consumed without having reduced or minimized the outstanding deficiencies.

Recommendations
- Status of Previous Recommendations. The FY05 DOT&E recommendations remain valid:
  FY05 #1: DOT&E recommended that Commander, Operational Test Force continue its efforts to refine and codify its Integrated Test Framework for use by other Navy programs in future testing. An established process for handling the administrative procedures is still being formalized.
  FY05 #2: DOT&E recommended that the Navy strengthen efforts to relieve the shortages of trained personnel at the test squadrons at China Lake, California. Progress was made in FY06 towards relieving trained maintenance personnel shortages within both VX-9 and VX-31. However, planned VX-9 aviator staffing for FY07 is forecasted to become critical.
- FY06 Recommendations. The Navy must:
  1. Ensure that program manager funding of follow-on testing for SCS H4E is not reduced and that all deficiencies are addressed prior to proceeding to follow-on test and evaluation.
  2. Ensure that adequate test resources (ATFLIR and SHARP) are made available to VX-9 during the operational evaluation of SCS 20X and SCS H4E. The program manager must ensure that these resources are included in the H4E TEMP.