

F/A-18 E/F/G Super Hornet

The FA-18E/F Super Hornet is a multi-mission, day/night strike fighter aircraft that provides precision strike capabilities to Joint Task Force and Carrier Strike Group Commanders. The aircraft features improvements in range, endurance, carrier bring-back, weapon payload, and survivability over earlier models of the Hornet. It also provides in-flight refueling for other tactical aircraft and additional room for growth and upgrades. The F/A-18E is a single-seat aircraft while the F/A-18F is a two-seater. The EA-18G is the planned electronic attack variant and will closely resemble the two-seat F/A-18F model.

F/A-18 E/F aircraft through Lot 25 are all Block 1 aircraft. Beginning with Lot 26 (FY03), production transitioned to Block 2 with a re-designed forward fuselage and provisions to incorporate Block 2 equipment including Active Electronically Scanned Array (AESA) radar, Advanced Crew Station (ACS), 8x10 Display, Fiber Channel Network Switch, and Digital Video Map Computer. Advanced Mission Computers and Displays (AMC&D) upgrades the mission computers from an assembly language based system to an open architecture higher order language and were introduced beginning with Lot 25.

With AESA, the APG-79 radar, the Navy intends to enhance E/F capabilities in all warfare areas: aircraft lethality, survivability, and signature characteristics. Because of the potential significance of AESA, DOT&E placed it on oversight for both OT&E and LFT&E. AESA Milestone B occurred in February 2001. Milestone C is planned for December 2003 with operational evaluation (OPEVAL) beginning in February 2006 and an initial operating capability in FY07.

The ACS provides a completely re-designed aft cockpit in Block 2 F model aircraft. The intent of ACS is to provide a work station for the Weapon System Officer that will enhance aircrew coordination and situational awareness for increased combat capability in heavy threat and high cockpit task loading environments. ACS was designed to allow for spiral capability upgrades, potentially including completely de-coupled cockpits in which one crewmember can be in air-air mode and the other in air-ground mode. ACS began with Lot 26 (FY03).

Advanced Targeting and Designation Forward-Looking Infrared System (ATFLIR) represents the latest generation of technology in infrared targeting capabilities, including Navigation Forward-Looking Infrared (NAVFLIR), laser spot tracker (LST), air-to-air laser ranging, electronic zoom, geographic-point targeting, and Electro-optics. It will combine the functions of three legacy pod systems (TFLIR, NAVFLIR, and LST) into one pod. This next-generation technology is designed to provide three fields of view, incorporate a larger detector array, and allow flight operations up to 50,000 feet altitude.

The EA-18G aircraft, chosen to augment electronic attack capabilities across the services and replace the Navy's EA-6B, will be a missionized F/A-18F airframe to provide capabilities to detect, identify, and locate hostile radio frequency emitters in order to direct jamming against radar and communications threats, and to fire suppression weapons such as High-speed Anti-Radiation Missiles (HARMs). The EA-18G incorporates a version of the airborne electronic attack (AEA) suite developed for the Improved Capability (ICAP) III EA-6B upgrade. The Navy plans to include a newly configured Communications Countermeasure Set as a replacement for the USQ-113. The Navy expects approval of the Operational Requirements Document for the EA-18G in October 2003. The Milestone B decision review is expected in



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NAVY PROGRAMS

November 2003; Milestone C is planned for April 2007. A spiral acquisition strategy leads to a planned Core Block I capability (described below) at the initial operating capability in FY09.

TEST & EVALUATION ACTIVITY

In April 2000, DOT&E's beyond low-rate initial production (BLRIP) report to Congress stated that the F/A-18E/F was operationally effective and operationally suitable. The Operational Test and Evaluation Force conducted follow-on test and evaluation (FOT&E) 1 of the F/A-18E/F with new tactical software (Software Configuration Set (SCS)-18E) from September 2001 to May 2002 in accordance with a DOT&E-approved Test and Evaluation Master Plan (TEMP) and Test Plan.

The Operational Test and Evaluation Force conducted the second FOT&E period with Lot 25 aircraft from May 12, 2003 - November 2003. This period tested the new higher order language SCS known as H-1 and the first version of AMC&D. It also tested several component upgrades, such as the Signal Data Computer Replacement, Digital Expandable Color Display, and others. OPEVAL of the ATFLIR Block 1 was conducted from March 21 - June 23, 2003.

FOT&E 3 is scheduled to begin in March 2004 and will test SCS H-2 (the first higher order language software that will deploy in late FY04 or early FY05), the Shared Advanced Reconnaissance Pod (SHARP) reconnaissance pod, ATFLIR Block 2, AIM-9X (for the E/F), and other F/A-18 roadmap improvements.

FY03 test and evaluation activities focused on preparation of the TEMP for the AEA suite's integration into the F/A-18E/F. Risk reduction testing continued during FY03 in preparation for a System Development and Demonstration contract award in February 2004. The TEMP correlates with the EA-18G Acquisition Strategy and current plans and funding for a Core Block I configuration. Core Block I will consist of a repackaged ICAP III receiver/antenna system (the ALQ-218), an existing Multi-Mission Advanced Tactical Terminal, a newly configured Communications Countermeasure Set, and existing ALQ-99 jammer pods. It will be able to deliver HARM and Advanced Medium Range Air-to-Air Missile weapons. The electronic attack system will not be interoperable with AESA, nor will the aircraft have Integrated Defensive Electronic Countermeasures or ALR-67.

Initial test efforts included wind tunnel aeromechanical testing, antenna measurements, limited initial flight tests that did not include functional avionics, and preliminary electromagnetic interference/compatibility measurements. These initial tests supported feasibility studies and early design activity, and revealed potential antenna problems. The early tests were conducted in a limited flight envelope and provided initial flying qualities, loads, noise, and vibration data that were used to define EA-18G design criteria.

TEST & EVALUATION ASSESSMENT

DOT&E based its assessment on operational testing activities conducted during the past year, as well as operational experience gained in Operation Iraqi Freedom. The Navy certified several new systems for early operational capability in conjunction with accelerated wartime deployments: ATFLIR, Multi-functional Information Distribution system (MIDS), joint helmet mounted cueing system (JHMCS), and SHARP were all deployed aboard *USS NIMITZ*. All these systems received either a preliminary report or an operational assessment prior to the early operational capability. OPEVAL of MIDS, JHMCS, and ATFLIR are complete. The Navy will conduct OPEVAL for SHARP as part of FOT&E 3 beginning in March 2004.

For the F/A-18E/F OPEVAL the Navy approved 50 waivers to the testing of required capabilities. FOT&E 1 resolved 30 of those waivers with nine additional waivers to be resolved during FOT&E 2. ATFLIR OPEVAL resolved four more waivers (one ATFLIR test waiver is to be resolved during FOT&E 3). The Navy expects that incorporation of the testing of the Advanced Crew Station will resolve two more test waivers and AESA will resolve the final four waivers to required capabilities.

NAVY PROGRAMS

The DOT&E beyond low-rate production report to Congress found that the ATFLIR was operationally effective for air-to-surface operations, its primary mission area, and operationally suitable. DOT&E found that Block 1 is not operationally effective for air-to-air operations.

Even though the EA-18G has a high degree of commonality with the F/A-18F airframe and is integrating existing jammer pods, the new antennae and receiver will be a significant challenge and represent high risk with the given schedule. Three key areas will need to be demonstrated: Does it meet the EA-6B ICAP III baseline performance? Does it meet reliability, availability, and maintainability requirements? Will a two person aircrew be able to accomplish the required Electronic Attack and Electronic Support functions? At present, a comprehensive definition of the EA-18G AEA system will not be available until a Preliminary Design Review has been reached in late 2004.

The Navy plans to review the first TEMP submitted for Milestone B decision review shortly after the Preliminary Design Review. The limited number of operational assessment flights prior to a Milestone C decision date is a concern and is associated with the timeliness and adequacy of modeling and simulation facilities needed to supplement flight testing. The capability of the wingtip receiver pod design to support interferometric-based geolocation requirements warrants special consideration in early T&E planning and assessments, along with aircrew display and control interfaces. Because the aircrew is reduced from four to two, there will be an impact on operator workload and consequent modifications to existing EA-6B operational concepts and tactics.

