EA-18G Airborne Electronic Attack (AEA) Aircraft

The EA-18G is operationally effective for all mission areas, except for missions that require a full escort profile against an active air defense system. It is not operationally suitable due to Built-in Test (BIT) failures that resulted in excessive maintenance. The EA-18G is survivable. Testing was adequate to determine operational effectiveness, operational suitability, and survivability within the usual limitations involved with testing Electronic Warfare systems. After operational testing was complete, additional testing in July 2009 using a newer version of aircraft software indicated the BIT problems that kept the EA-18G from being fully suitable have been improved. Additional testing will be required to confirm these preliminary results.

System Description

The EA-18G is the fourth major variant of the F/A-18 family of aircraft and will serve as the Navy's replacement for the aging fleet of EA-6Bs. It provides a capability to detect, identify, locate, and suppress hostile emitters (radars or communications equipment operating on land, sea, or in the air). The EA-18G is an F/A-18 F (Lot 30 and subsequent) aircraft with Airborne Electronic Attack (AEA) equipment and related systems installed. To reduce development risk and cost, the Navy adapted the EA-6B Improved Capability (ICAP) III AEA system for use on the EA-18G. This system includes Electronic Surveillance equipment to identify and locate threat radars and communications systems, and provides an integrated Electronic Attack suite to jam and degrade threats. The AEA system also provides targeting information on threat radar systems for employment of onboard weapons such as the High-Speed Anti-Radiation Missile (HARM). Additional EA-18G modifications include a new communications countermeasures set, a new electronics interface unit, and enhancements designed to improve aircrew communications reception while onboard jamming (transmission of radio signals that intentionally disrupt radar and/or communications receivers) is active.

Test Adequacy

Testing was adequate to assess the EA-18G AEA aircraft radar/communication signal receiving capability and the communications countermeasures capability. However, testing was not adequate to fully evaluate AEA radar jamming against early warning and engagement threat radars due to limited availability of threat systems, Federal Communications Commission (FCC) restrictions against certain frequency bands, and the poor reliability of the legacy tactical jamming pods. A total of five EA-18G production aircraft logged 471.4 hours between September 2008 and March 2009 in support of the Initial Operational Test and Evaluation (IOT&E). Operational testers used both developmental and operational test data to evaluate Key Performance Parameters (KPPs) and Key System Attributes (KSAs). Operational testing was conducted in accordance with the Director, Operational Test and Evaluation (DOT&E)-approved test plans.

Operational Effectiveness

Aircrews utilizing the EA-18G demonstrated the ability to conduct representative missions covering all seven of the mission areas defined for the EA-18G, utilizing all four typical mission profiles. The EA-18G is operationally effective for all missions, except for those requiring a full escort mission profile against an active air defense system. The shortfall in conducting a full escort profile is due to the excessive time required to display situational awareness information and the AEA suite's lengthy response time for making reactive jamming assignments. Supporting this conclusion, the EA-18G did not meet the KPP threshold criteria for selective reactive jamming response (SRJR). While the EA-18G did not meet this KPP, the full escort mission profile is uncommon and is not likely to be used by the EA-18G.

The EA-18G AEA system met KPP threshold criteria that support the standoff and modified escort mission profiles, including radar/communications receive frequency range and radar azimuth coverage. The system did not meet the KSA threshold criteria for geolocation of ground emitters, but demonstrated sufficient capability for aircrew situational awareness and to allow targeting of air-to-ground weapons. The EA-18G met KPP threshold criteria for deck spot factor, aircraft carrier launch and recovery wind limitations, recovery payload, and additional internal fuel capacity.

Operational Suitability

The EA-18G is not operationally suitable. The system met the availability KPP and reliability threshold for Mean Flight Hours Between Operational Mission Failure (MFHBOMF) while falling just below the threshold for maintainability. However, the BIT capability is immature and did not meet any of its thresholds. Poor BIT performance leads to additional maintenance on the aircraft to correctly isolate faults or to conduct unnecessary troubleshooting of false BIT indications.

Additionally, the high rate of false BIT indications can lead to a lack of aircrew confidence in the AEA system health impacting the decision to take the aircraft on a given mission. Additional testing in July of 2009 of software version H5E+ indicates that the newer software may have eliminated many of the BIT problems. The Navy has scheduled a Verification of Correction of Deficiencies for September 2009 and follow-on operational test and evaluation for spring of 2010 to confirm that the majority of suitability problems will have been corrected. The EA-18G system is compatible with the aircraft carrier operating environment.

Survivability

The EA-18G is survivable in the standoff and modified escort missions where the AEA system provides aircrews cues allowing them to avoid known threats. Testers assessed survivability by separately evaluating the EA-18G's susceptibility and vulnerability to threat Integrated Air Defense systems. Large Force Exercises (LFEs) conducted during operational test provided a susceptibility evaluation with multi-Service forces. Although quantitative data was limited, operational crews completed detailed surveys. Previous F/A-18E/F Live Fire Test and Evaluation (LFT&E) analysis provided the basis for assessing vulnerability of the EA-18G aircraft.

The EA-18G retains the vulnerability reduction features of the F/A-18E/F, and the vulnerabilities of the two aircraft are comparable over a wide range of threats. The vulnerability is acceptable and is less than that of the F-16 and EA-6B. The DOT&E EA-18G Live Fire Test and Evaluation Report dated September 2009 provides further details.

Recommendations

In order for the EA-18G to be fully operationally effective and suitable and to increase survivability, the Navy should do the following:

EA-18G Aircraft-specific

- Improve reliability of the current ALQ-99 pods and accelerate development of the Next Generation Jammer.
- Mature maintainability and BIT.
- Improve reactive jamming assignment and display performance.
- Improve INCANS performance reliability.
- Ensure logistics supportability and quality control support system availability.
- Minimize aircrew workload management to include upgrading the pilot Tactical Situation Display comparable to the EA-6B.
- Improve hardware and software diagnostic tools for the ALQ-218 and update the Interactive Electronic Technical Manual System accordingly.
- Conduct survivability studies to assess the benefits of a threat warning system that could provide timely notification of types and locations of targeting threats.
- Assess the safety and performance benefits of adding higher performance engines.

Electronic Warfare Warfighting Improvements

- Support ongoing DoD efforts to investigate, evaluate, and make recommendations to improve Enterprise Electronic Warfare test capabilities associated with open-air ranges, test and evaluation facilities, concepts, processes, and procedures.
- Assess requirements to improve Electronic Warfare modeling and simulation capabilities to support ground testing of future AEA capabilities, to include multi-signal threat environments.
- Assess the need for and benefits of building a more capable threat range at Naval Air Station Whidbey Island, Washington.