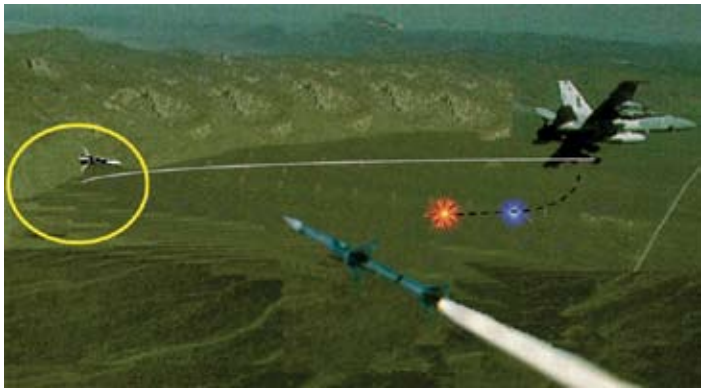
Integrated Defensive Electronic Countermeasure (IDECM)

Executive Summary

- The Navy commenced Integrated Defensive Electronic Countermeasures (IDECM) Block III (IB-3) IOT&E in June 2006 to determine the operational effectiveness and suitability of the system as installed in the F/A-18 E/F. This supports a 2QFY07 Milestone III full-rate production decision for IB-3's new off-board electronic jammer, the ALE-55 Fiber Optic Towed Decoy.
- The Navy suspended the IB-3 IOT&E flight testing in September 2006 because of significant reliability problems that appeared early in operational test.
- The Navy should improve ALE-55 Fiber Optic Towed Decoy reliability prior to resuming IOT&E.



System

- The IDECM system is a radio frequency, self-protection electronic countermeasure suite on F/A-18 E/F aircraft. The system is comprised of onboard components, which receive and jam radar signals, and off-board electronic jammers.
- There are three IDECM variants: Block I (IB-1), Block II (IB-2) and Block III (IB-3). All three variants combine an onboard radio frequency self-protection receiver and jammer installed on the F/A-18 with an expendable towed decoy that functions as an off-board self-protection radio frequency jammer.
  - IB-1 combined the legacy onboard system (ALQ-165) with the legacy (ALE-50) off-board towed decoyed (fielded FY02).
  - IB-2 combined the improved onboard system (ALQ-214) with the legacy (ALE-50) off-board towed decoy (fielded FY04).
  - IB-3 combines the improved onboard jammer (ALQ-214) with the new (ALE-55) off-board fiber optic towed decoy.

Mission

- Combatant commanders will use IDECM to improve the survivability of Navy F/A-18 E/F strike aircraft against radio frequency guided threats while on air-to-air and air-to-ground missions.
- IB-3 adds an ALE-55 Fiber Optic Towed Decoy that is more integrated with the advanced onboard receiver/jammer (ALQ-214). This provides a complex off-board jamming capability to increase survivability for the warfighter against modern radar-guided threats.

Activity

- In FY06, the Navy began dedicated flight testing of IB-3 on the F/A-18 E/F. The Navy used open air flight testing to assess safe flying qualities of the fiber optic towed decoy, while using laboratory and flight tests to evaluate on- and off-board system jamming effectiveness in challenging mission environments.
- Additionally, the Navy used a science and technology resource, the Airborne Seeker Test Bed, to qualitatively assess IB-3 effectiveness against modern radar-guided threats with complex guidance systems.
- The Navy commenced IB-3 IOT&E in June 2006 to determine the operational effectiveness and suitability of the system as installed in the F/A-18 E/F in support of a 2QFY07 Milestone III full-rate production decision.
- The Navy suspended IB-3 IOT&E flight testing in September 2006 because of significant reliability problems that appeared early in operational testing.
- IDECM testing was conducted at:
  - The Naval Air Warfare Center's Electronic Combat Simulator Emitter Laboratory (ECSEL) in Point Mugu, California
  - The Naval Air Warfare Center's Electronic Combat Range (ECR) in China Lake, California

  - The Air Force's Electronic Warfare Evaluation Simulator (AFEWES) in Fort Worth, Texas
  - The Air Force's Nevada Test and Training Range (NTTR)
- DOT&E approved the Navy's revised Test and Evaluation Master Plan (TEMP) and the IB-3 IOT&E Plan in FY06.
- IDECM testing in FY06 was conducted in accordance with the DOT&E-approved TEMP and test plans.

Assessment

- IDECM demonstrated reliability well below expectations (three of four decoys failed upon being expended), which caused the Navy to suspend the IB-3 IOT&E. The Navy will make a decision to resume IOT&E or stop test early in FY07, following analysis of the primary failure mode.
- Only 53 percent of key threats are available for high quality testing due to test resource availability on open air ranges and in hardware-in-the-loop facilities. However, the four main categories of threats will be adequately represented via development and operational tests conducted prior to the full-rate production decision.
- The primary test resource limitation is the lack of a modern threat using a complex guidance system, which was needed to provide a full quantitative assessment of the primary IB-3 key performance parameter. This limitation is noted in the approved TEMP, and the adequate alternative method of test was utilized to generate a qualitative assessment. Test resources for threats using more traditional guidance systems have been used to test IDECM Block III.
- The Navy's IB-3 fiber optic towed decoy has demonstrated improved operational effectiveness compared to the legacy ALE-50 towed decoy, but reliability is adversely impacting operational effectiveness.

Recommendations

- Status of Previous Recommendations. The Navy has taken effective action on the FY05 DOT&E recommendations.
- FY06 Recommendations.
  1. The Navy should improve ALE-55 Fiber Optic Towed Decoy reliability prior to resuming the IOT&E.
  2. The Services should provide a validated end-to-end advanced radio frequency guided threat test capability to quantitatively assess airborne self-protection suites.