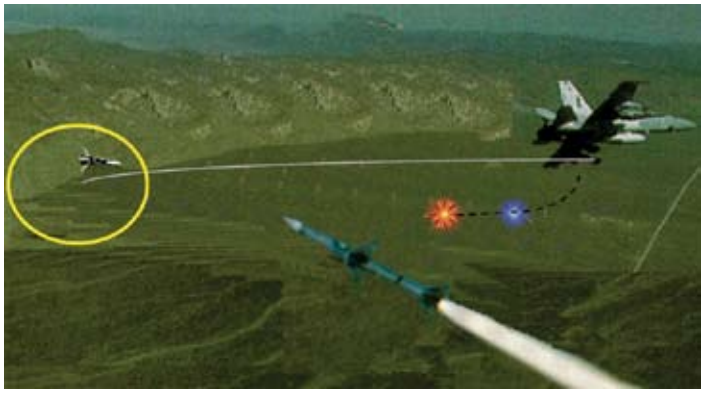
Integrated Defensive Electronic Countermeasures (IDECM)

Executive Summary

- The Navy decertified the Integrated Defensive Electronic Countermeasures (IDECM) Block 3 (IB-3) from operational testing in FY07 pending resolution of significant reliability problems related to the decoy deployment that appeared in the FY06 IOT&E.
- The Navy added follow-on development flight tests in FY07 to assess if the decoy was striking the aircraft on decoy deployments. This testing verified one instance of the decoy striking the aircraft, thus damaging the decoy, and causing minor damage to the skin of the aircraft.
- The Navy flight tested corrections to mitigate the IB-3 launcher installation and decoy production issues in FY07 and the Navy confirmed they were corrected on 11 successful decoy deployments. However, the Navy discovered intermittent decoy failures and improper countermeasures transmissions on these development test flights.
- The Navy has identified the root causes of some of the intermittent decoy problems, but some remain unresolved. If these problems are not corrected, they will negatively impact IDECM effectiveness and suitability.
- The Navy should improve ALE-55 Fiber Optic Towed Decoy reliability prior to resuming the IOT&E in FY08.

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 radar signals, and employ onboard 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 that is more integrated with the advanced onboard receiver/ jammer (ALQ-214).

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.
- The warfighters' use IB-3's complex off-board jamming capability to increase survivability against modern radar-guided threats.

Activity

- The Navy decertified IB-3 from operational testing in FY07 pending resolution of significant reliability problems related to the decoy deployment that appeared in the FY06 IOT&E.
- The IB-3 IOT&E was designed to allow the Navy to evaluate the operational effectiveness and suitability of the system as installed in the F/A-18 E/F, and is now planned to re-start in 1QFY08 in support of a 3QFY08 full-rate production decision.
- The Navy added follow-on development flight tests in FY07 to assess if the decoy was striking the aircraft on decoy deployments thus damaging the decoy and the aircraft These new tests were also designed to provide the Navy developers and operators more flight envelope data, and intermittent failure mode information.
- At DOT&E's request, the Navy's Operational Test Agency, Commander, Operational Test and Evaluation Force,

conducted laboratory testing at the Naval Air Warfare Center's facilities at Point Mugu, California, to evaluate combinations of threat radar signals not available at open air ranges.
- Additional development and operational laboratory testing was carried out against two modern Surface-To-Air-Missile (SAM) systems for the first time at the Air Force's Electronic Warfare Evaluation Simulator (AFEWES) in Fort Worth, Texas.
- IDECM testing in FY07 was conducted in accordance with the DOT&E-approved Test and Evaluation Master Plan and test plans.

Assessment
- The Navy's IDECM IB-3 fiber optic towed decoy demonstrated improved operational effectiveness compared to the legacy ALE-50 towed decoy, but poor reliability is also adversely impacting operational effectiveness.
- As a result of the follow-on decoy deployment flight testing, the Navy confirmed that the decoy actually struck the aircraft, thus damaging the decoy, and causing minor damage to the skin of the aircraft, on one of four follow-on test IB-3 deployments, resulting in significant delays to operational testing.
- The Navy flight tested IB-3 corrections to mitigate the decoy deployment and decoy production problems in FY07. These problems were confirmed as corrected on 11 successful decoy deployments. However, the Navy discovered intermittent decoy failures and improper countermeasures transmissions on these development test flights.
- The Navy identified the root causes of a portion of the intermittent decoy problems, but some remain unresolved. If these problems remain unresolved, they will negatively impact IDECM effectiveness and suitability, while also driving the decoy use rates well above planned quantities.
- The IDECM failure to track and/or transmit a countermeasure technique against specific threat radar signals was confirmed in laboratory testing. The Navy is investigating this anomaly related to the ALQ-214 onboard receiver jammer which negatively impacts the performance of the off-board ALE-55 Fiber Optic Towed Decoy.
- Only 67 percent of key threats are available for high quality testing due to lack of test resources on open air ranges and in hardware-in the-loop facilities. However, the four main categories of threats will be adequately represented in development and operational testing 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 Test and Evaluation Master Plan, and an adequate alternative method of test was used to generate a qualitative assessment.

Recommendations
- Status of Previous Recommendations. Although the Navy is focusing on improving the ALE-55 Fiber Optic Towed Decoy reliability, both DOT&E recommendations from FY06 remain unresolved. These recommendations center on the Navy improving ALE-55 Fiber Optic Towed Decoy reliability prior to resuming the IOT&E, and the Services providing a validated end-to-end advanced radio frequency guided threat test capability to quantitatively assess airborne self-protection suites.
- FY07 Recommendations. None.