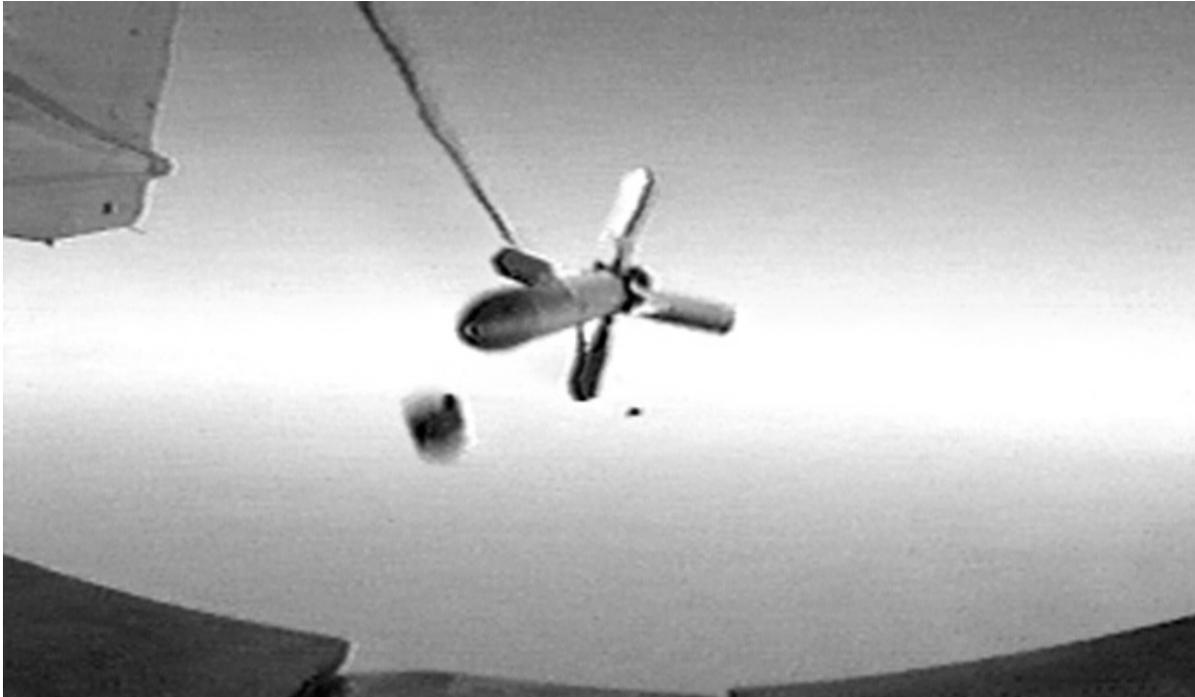


INTEGRATED DEFENSIVE ELECTRONIC COUNTERMEASURES (IDECM) AN/ALQ-214



NAVY ACAT II Program

Total Number of Systems:	459
Total Program Cost (TY\$):	\$2.71B
Average Unit Cost (TY\$):	
F/A-18 E/F:	\$2.27M
B-1B:	\$2.03M
F-15 (SCA only):	\$0.10M
Full-rate production:	3QFY02

Prime Contractor

Sanders (Lockheed Martin)

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2010

The Integrated Defensive Electronic Countermeasures (IDECM) contributes to the *Joint Vision 2010* concept of *full-dimensional protection* by improving individual aircraft probability of survival.

The IDECM suite is intended to provide self-protection and increased survivability for tactical aircraft against radio frequency (RF) and Infrared (IR) surface-to-air and air-to-air threats. The major hardware component to be developed by the IDECM program is the IDECM radio frequency countermeasures (RFCM) system and the ALE-55 Fiber Optics Towed Decoy (FOTD), which can be trailed at varying lengths behind the aircraft to optimize RFCM techniques against threat missiles and tracking/targeting systems.

IDECM will integrate specific electronic self-protection systems on the host aircraft. In addition to RFCM and FOTD for the IDECM lead aircraft (F/A-18E/F), these systems are defined as the radar

warning receiver, the Common Missile Warning System, the AN/ALE-47 chaff/flare dispenser, and an off-board decoy launch controller/dispenser. In 2QFY99, the Navy decided to add an on board jamming capability to complement FOTD off board capability. Addition of an on board jamming capability will allow a full self-protection capability throughout the entire operational flight envelope of tactical strike aircraft. Even if operational maneuvers or engagements deplete the limited numbers of FOTD's carried, the platform will still have a capable self-protection suite.

Upon completion of its own OPEVAL, the Advanced Strategic Tactical Expendable is one of several expendables that may be dispensed by AN/ALE-47. Integration of the entire IDECM system (ALR-67, ALE-47, FOTD, and RFCM) is intended to provide threat system warning, threat missile detection/warning, and the most effective countermeasure response to increase survivability of the host aircraft against IR and RF threats.

RFCM consists of an on-board receiver/processor/techniques generator that stimulates FOTD or on-board transmitters for transmission of the countermeasure technique. Tailored RFCM techniques are generated onboard the aircraft and sent to the FOTD via a fiber optic cable or to on-board transmitters. FOTD is intended to be compatible with and deployed from the ALE-50 launch controller used with the advanced airborne expendable decoy (AAED).

BACKGROUND INFORMATION

IDECM RFCM is intended to fill the electronic self-protection operational deficiency for Navy tactical aircraft. USAF requirements for a common FOTD and techniques generator were included in the IDECM RFCM EMD contract. USAF has selected components of IDECM RFCM for integration into the B-1B Defensive System Upgrade Program architecture, and is planning integration of IDECM RFCM components into F-15 ALQ-135 Tactical Electronic Warfare System architecture.

The Navy submitted a fully coordinated TEMP for approval in November 1997. Subsequently, the IDECM program was re-baselined to fund an 87 percent development cost overrun and extend the development schedule by at least six months. The coordinated draft TEMP was updated to reflect the new program baseline but was not submitted for Navy or OSD approval, pending Navy approval of an operational requirements change, which was already reflected in the coordinated draft TEMP. In September 1998, the Navy approved the ORD change and later submitted a revised IDECM TEMP to DOT&E, and it was signed in April 1999. Subsequent to that approval, technical difficulties and cost overruns resulted in a second restructuring of the IDECM program. The Navy is currently conducting EMD and developmental testing under the approved TEMP, but a new TEMP is required due to major changes in the IDECM development strategy.

A yet unapproved, but coordinated IDECM test strategy is included in three sequential phases. The first phase, IDECM Block I, is an interim F/A-18 E/F self-protection jamming suite consisting of the ALQ-165 (Advanced Self-Protection Jammer) and the ALE-50 Advanced Expendable Decoy. IDECM Block I OT-III A is scheduled to begin 3QFY00 and will be an extensive operational test of an improved variant of the ALQ-165. The IDECM Block I configuration will be the installed suite for the initial F/A-18 E/F deployments. IDECM Block II, a second interim configuration, will be comprised of the ALQ-214 RFCM (including the on board transmitter capability) and the ALE-50 towed decoy. Transition to this configuration is dependent upon RFCM successfully completing a RFCM OA (to support a RFCM LRIP) and OPEVAL (4QFY01, coincident with F/A-18E/F FOT&E) to support RFCM BLRIP. IDECM Block III will be the final configuration, and will be comprised of ALQ-214 RFCM and ALE-55 FOTD. IDECM Block III OPEVAL is scheduled for 4QFY01, with a Milestone III scheduled for 3QFY02.

OPEVAL for IDECM Integration with the Common Missile Warning System (CMWS) is planned subsequent to the CMWS MS III. CMWS integration in the F/A-18E/F will be supported through the IDECM Integration Milestone III in FY03.

The IDECM acquisition/operational test and evaluation strategy for the F/A-18E/F includes an OA of the RFCM. The OA will be based on flight testing in an Avionics Test Bed (ATB) aircraft that is an F/A-18E/F surrogate implemented in an F/A-18C/D airframe. Due to ATB airframe limitations, the launch controller/dispenser and FOTD will be carried in a pod and interfaced via internal avionics.

On a parallel schedule, the F/A-18E/F platform OPEVAL was conducted from 3QFY99-1QFY00. Since F/A-18E/F OPEVAL was conducted before the more capable IDECM RFCM was available, F/A-18 E/F OPEVAL aircraft were not equipped with IDECM RFCM. It was equipped with the ALE-50 Launch Controller/Dispenser portion of IDECM, including AAED, to fill part of the self-defense requirement in support of overall F/A-18E/F OPEVAL survivability assessment.

F/A-18E/F FOT&E with IDECM RFCM is planned concurrently with OPEVAL for the RFCM, supporting RFCM Milestone III and B-LRIP in FY02.

TEST & EVALUATION ACTIVITY

Test and evaluation activity during FY99 was beset by continued technical difficulties with the FOTD, FOTD launcher assembly, and integration of IDECM RFCM components. Early developmental testing revealed that FOTD flight envelope characteristics and IDECM component interoperability issues were more problematic than expected. Decoy fast deploy testing was completed in April 1999, and limited FOTD flight tests were done in the fall at the Electronic Combat Range at China Lake. System development was at a much slower pace than expected, and led to additional cost and schedule overruns that resulted in a program restructuring in July 1999. Efforts were hampered by difficulties encountered in developing reliable FOTD, launcher assembly, and IDECM system components, but some progress has been made. FOTD mass model and decoy testing on the ATB is continuing as a DT/OT event for the IDECM RFCM to demonstrate FOTD capabilities.

The TEMP was approved in April 1999 with the condition the TEMP was valid only through the RFCM OA and that the TEMP will be updated prior to the next test event. The TEMP IPT is currently updating the TEMP to include the three-phase approach to IDECM development, testing, and introduction to the Fleet. IDECM RFCM testing during FY99 centered on Contractor Qualification Testing, FOTD safe separation testing, laboratory testing, and RFCM risk reduction flight testing.

TEST & EVALUATION ASSESSMENT

Due to a second program restructuring and subsequent schedule slip, the IDECM RFCM OA in the Aircraft Test Bed has also been delayed until 2QFY00. Planned contractor deliveries of Operational Flight Program software are complete, but FOTD and IDECM component reliability problems continue to delay DT efforts and stress aircraft integration efforts. Any further slip in the IDECM schedule could result in less than complete OA results being available for consideration by the F/A-18E/F decision makers.

Several technical issues have stressed the program's schedule, most notably FOTD towline cable integrity, FOTD reliability, and Improved Multi-Platform Launch Controller (IMPLC) reliability,

impacting program schedule negatively. Exploration and analysis of the flight characteristics of the FOTD and towline have been beset by launch failures, high decoy and IMPLC failure rates, precluding the system's readiness for dedicated DT. However, if these problems can be corrected, analysis of completed test events indicates that potential IDECM technical jamming against modern threat systems should be impressive.

The IDECM test concept includes exploration of optimal tactics for aircraft survivability and mission accomplishment. This is the single biggest challenge to the program. If new tactics are initiated, highly credible T&E results will be required to convince operational forces to employ these tactics. Even if IDECM RFCM does everything that it is specified to do, improper aircraft tactical employment may negate the system's contribution to aircraft survivability.

CONCLUSIONS, RECOMMENDATIONS, LESSONS LEARNED

The Navy needs to continue developmental efforts to produce a reliable IDECM system, solve decoy launch/flight envelope issues, and gain further insight on towline characteristics and failure conditions. Additionally, they need to continue ongoing efforts to improve emitter capabilities and instrumentation to ensure a credible threat environment during all phases of testing.