ALR-69A Radar Warning Receiver (RWR)

Executive Summary

- The ALR-69A Radar Warning Receiver (RWR) program is in the System Development and Demonstration phase, in preparation for a 2QFY07 low-rate initial production (LRIP) decision.
- The DOT&E-approved ALR-69A operational assessment, which will support the LRIP decision, began in June 2006 after a 13-month delay and is scheduled to conclude in November 2006. This delay primarily was due to the lack of software maturity.

System

- The ALR-69 is a RWR that detects, identifies, and locates threat electronic signals.
- The Core ALR-69A RWR is designed to improve performance over the Air Force's primary RWR system, the ALR-69, by enhancing:
  - Detection range and time
  - Accuracy of threat identification
  - Location of threat emitter systems
  - Performance in a dense signal environment
  - Reliability and maintainability
- It is designed for fighter and transport aircraft. Lead platforms are the MC-130E and F-16C Block 30.
- Core ALR-69A RWR components include:
  - Digital quadrant receivers
  - Countermeasures computer
  - Control indicator
  - Azimuth indicator
- The Air Force incorporated spiral developments, which are incremental improvements to the core system, to provide the most significant new ALR-69A capabilities. These ALR-69A spirals are designed to improve the Core ALR-69A's threat-locating capabilities, which enable the following:
  - Spiral 1: Accurate threat-locating capability by single aircraft

The bottom left picture is of the legacy ALR-69 components
The bottom right picture is of the primary ALR-69A components

DQR - Digital Quadrant Receiver
MCC - Modular Countermeasures Computer

  - Spiral 2: Location of threat emitters through a multi-aircraft network, accurate enough for destruction with Global Positioning System-guided munitions
  - Spiral 3 (Unfunded): Specific Emitter Identification. Currently RWRs classify threats as general threat systems, but the Specific Emitter Identification is designed to "fingerprint" a specific threat.
- Spiral 1 is temporarily unfunded and development is on hold. Spiral 2 is part of the program of record and being assessed as an advanced concept technology demonstration effort. Spiral 3 is unfunded.

Mission

- Combatant commanders will use ALR-69A to enhance the survivability of transport, fighter, and special operations aircraft on missions that penetrate hostile areas.
- ALR-69A provides aircraft self-protection by warning pilots of radar threats, supporting threat avoidance, or permitting timely use of defensive countermeasures.

Activity

- The ALR-69A is in the System Development and Demonstration phase, with an LRIP decision planned for 2QFY07.
- The 2005 operational assessment was delayed 13 months, primarily due to the lack of software maturity.
- Government testing of the core system began in June 2006 and is scheduled to conclude in November 2006. This is an operational assessment to support the Milestone C/LRIP decision to acquire 50 low-rate initial production units of the 254 total ALR-69A systems.
- The Air Force Operational Test and Evaluation Center conducted an operational assessment beginning in 3QFY06 to support the Milestone C decision.
- FY06 Air Force testing included lab testing at the Electronic Warfare Avionics Integrated Support Facility, Warner Robins AFB, Georgia; the Integrated Demonstration and Applications Laboratory, Wright-Patterson AFB, Ohio; aircraft integration on the C-130/MC-130 at Benefield Anechoic Facility, Edwards AFB, California; and contractor/development test flights on the MC-130E.

- FY06 testing was conducted in accordance with the DOT&E-approved Test and Evaluation Master Plan (TEMP) and test plan.

Assessment

- The ALR-69A experienced software instability problems as demonstrated by inconsistent detection performance and numerous system lock-ups/re-starts during contractor testing at its Systems Integration Laboratory. However, the system software stability improved, allowing commencement of government testing.
- The system hardware is stable, as evidenced by the government's acceptance testing of the system design. However, this stability needs to be verified during government chamber and flight testing.
- Initial ALR-69A integration flight testing on the MC-130 will be redone, as it resulted in numerous system problems.
- An accurate assessment of the ALR-69A system's maturity, required to support the 2QFY07 LRIP decision and progress towards the FY07-08 IOT&E, will not be available until the system is adequately assessed in government tests.
- As directed by DOT&E in 2005, the Air Force continued development of a revised ALR-69A TEMP, including identification of the Air Force's lead platforms for ALR-69A integration.

Recommendations

- Status of Previous Recommendations. There were no recommendations from the FY05 DOT&E annual report.
- FY06 Recommendation.
  1. The Air Force must clarify the lead platforms for ALR-69A integration in a revised TEMP prior to low-rate initial production to support adequate IOT&E planning.