

## ALR-69A Radar Warning Receiver (RWR)

### Executive Summary

- The Air Force entered the first phase of low-rate initial production (LRIP) (10 units) for the ALR-69A Radar Warning Receiver (RWR). However, due to limited performance, the Air Force's Milestone Decision Authority established specific entry criteria in the LRIP Acquisition Decision Memorandum prior to entering a larger second LRIP in FY08.
- Following the formal completion of the Operational Assessment (OA), the Air Force incorporated several key re-designs to ALR-69A software, hardware, and aircraft integration efforts.
- The Air Force, in coordination with DOT&E, added a series of additional tests in FY07 to augment the OA and provide more recent information on ALR-69A maturity prior to the LRIP decision.
- DOT&E concurred with Air Force Operational Test and Evaluation Center (AFOTEC) that during the formal portion of the OA, the ALR-69A did not demonstrate potential for operational effectiveness and suitability. Additional testing prior to the LRIP decision demonstrated some system performance improvement however there was also system performance regression in other areas based on developmental test provided SoftWareVersion 6.X test data. DOT&E observed considerable improvements to ALR-69A hardware stability, aircraft integration, and system stability.
- The Air Force must ensure that ALR-69A maturity and ground testing meet the Milestone Decision Authority's required entry criteria prior to commencing the second OA in FY08.

### 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 transport and fighter aircraft. Lead platforms are the C-130H 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
  - Spiral 2: Location of threat emitters through a multi-aircraft network, accurate enough for destruction with Global Positioning System-guided munitions
  - Spiral 3: 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.
- Commanders use the ALR-69A to provide aircraft self-protection by warning pilots of radar threats, supporting threat avoidance, or permitting timely use of defensive countermeasures.

# AIR FORCE PROGRAMS

## Activity

- The Air Force entered the first phase (10 units) of ALR-69A LRIP in FY07.
- AFOTEC, the Air Force's Operational Test Agency, completed the first OA of the ALR-69A in FY07 in support of the LRIP decision.
- The dedicated ALR-69A OA events were all ground-based test events. The Air Force utilized the Electronic Warfare Avionics Integrated Support Facility, Warner Robins AFB, Georgia, and the Integrated Demonstration and Applications Laboratory, Wright-Patterson AFB, Ohio. The Air Force tested ALR-69A aircraft integration on the MC-130/C-130 aircraft in the Benefield Anechoic Chamber, Edwards AFB, California.
- Following the formal completion of the OA, the Air Force incorporated several key re-designs to ALR-69A software, hardware, and aircraft integration efforts.
- The Air Force, in coordination with DOT&E, added a series of additional tests in FY07 to augment the OA and provide more recent information on ALR-69A maturity prior to the LRIP decision. These additional ALR-69A test events included MC-130 and C-130 flight tests at Eglin AFB and Duke Field, Florida.
- The Air Force replaced the MC-130 lead transport aircraft for ALR-69A integration with the Air Mobility Command's (AMC) C-130H.
- DOT&E approved a second revised ALR-69A Test and Evaluation Master Plan (TEMP) in FY07. This revised TEMP supports LRIP requirements, the new phased ALR-69A LRIP acquisition strategy, and clarifies suitability resources needed for ALR-69A IOT&E.
- FY07 ALR-69A testing was conducted in accordance with the DOT&E-approved TEMP.

## Assessment

- The Air Force's OA was adequate to support the ALR-69A LRIP decision.
- The ALR-69A experienced software stability problems in the first OA.
- DOT&E concurred with AFOTEC that during the formal portion of the OA, the ALR-69A did not demonstrate potential for operational effectiveness and suitability. However, based on additional testing prior to the LRIP decision, DOT&E observed considerable improvements to ALR-69A hardware stability, aircraft integration, and system stability.
- ALR-69A end-to-end utility as a RWR has not been demonstrated because onboard operators could not see the simulated threats due to a cluttered display. However, the availability of manually derived post-flight detection information in the follow-on testing mitigates some of the risk.
- The Air Force entered the first phase of LRIP (10 units) and the Milestone Decision Authority established specific entry criteria in the LRIP Acquisition Decision Memorandum prior to entering a larger second LRIP in FY08.

## Recommendations

- Status of Previous Recommendations. The Air Force has taken effective actions on DOT&E's previous recommendation.
- FY07 Recommendation.
  1. The Air Force should ensure ALR-69A maturity and ground testing meet the Milestone Decision Authority's required entry criteria prior to commencing the second OA in FY08.