Suite of Integrated Radio Frequency Countermeasures (SIRFC) (AN/ALQ-211)

Executive Summary

- The U.S. Army's Special Operations Command (USASOC) is developing and integrating the Suite of Integrated Radio Frequency Countermeasures (SIRFC) on the MH-47G and MH-60K+ helicopters.
- The Navy and Air Force Special Operations Command (AFSOC) are integrating SIRFC on the CV-22 aircraft.
- Early USASOC helicopter and AFSOC CV-22 testing of SIRFC has demonstrated that the Radar Warning Receivers (RWR) effectiveness are sufficiently mature for the respective stage of development, but the Electronic Countermeasures (ECM) jamming is limited in effectiveness as the sole source of protection. However, USASOC regression testing demonstrated that better integration of SIRFC on its MH-47G and MH-60K+ helicopters substantially improved both the performance of the RWR and the stand-alone ECM jamming.
- DOT&E will provide a full report of SIRFC operational effectiveness and suitability as installed on the MH-47G, following completion of the FY07 SIRFC IOT&E.
- FY06 flight testing of SIRFC demonstrated the system's readiness to commence IOT&E in 2QFY07. This testing was conducted with mature software on operationally representative MH-47G and MH-60K+ helicopters.

System

- SIRFC is an advanced radio frequency self-protection system designed for installation on aircraft.
- Major SIRFC subsystems are:
  - Advanced threat RWR
  - Advanced threat radar jammer/ECM

- SIRFC is being developed for use on Army Special Operations MH-47 and MH-60 helicopters and Air Force Special Operations CV-22 tilt rotor aircraft.

Mission

- Special Operations Forces will use SIRFC to enhance the survivability of aircraft on missions that penetrate hostile areas.
- SIRFC is designed to provide self-protection against threat radar-guided weapons systems by:
  - Improving aircrew situational awareness and threat warning
  - Employment of active electronic jamming countermeasures
  - Expending countermeasures (i.e. chaff)

Activity

U.S. Army Special Operations Command

- USASOC conducted development flight tests of SIRFC on operationally representative MH-47G and MH-60K+ aircraft at the Naval Air Warfare Center, China Lake, California, and the Air Force Nevada Test and Training Range.
- The purpose of these tests was to assess SIRFC's effectiveness and suitability, the integration of SIRFC with the new "glass cockpit" MH-47G and MH-60K+, and regression testing of the new detect-band antenna arrays and jamming antenna configurations on the helicopters. This also included assessment of SIRFC integrated with the Common Missile Warning System (CMWS) and AVR-2B laser detector set.
- SIRFC development testing included ground and flight testing of the entire system and testing of the reliability of the redesigned jamming technique generator component in preparation for the 1QFY07 SIRFC IOT&E.
- The IOT&E will support a 2QFY07 full-rate production decision for SIRFC integrated on the MH-47G.
- DOT&E approved USASOC's SIRFC Test and Evaluation Master Plan (TEMP) in January 2006 and all FY06 USASOC testing was conducted in accordance with that TEMP.

Air Force and Navy Test Activity Supporting CV-22 Development

- AFSOC incorporated a phased electronic countermeasures requirement in FY06 to initially field a SIRFC jamming capability on the CV-22 to meet Global War on Terror threats. For the long-term, they plan to implement a jamming

capability for the remainder of CV-22 priority threats. The Air Force and Navy agreed to implement a two-phased testing approach (IOT&E Phase I and II) to test this staggered jamming capability.
- The Navy and Air Force conducted Electronic Warfare Integrated Assessment development flight tests in FY06 to make an initial demonstration of the CV-22's survivability. This was done in a limited radio frequency threat environment using a combination of SIRFC radar warning, electronic jamming, expendable chaff, and tactics.
- The Air Force Operational Test and Evaluation Command (AFOTEC), AFSOC, and the Navy's V-22 program test personnel developed an initial electronic warfare test process for the CV-22 in preparation for the IOT&E. This process includes electronic warfare development flight test periods and precise infrared and ECM end-game effectiveness testing.
- OSD approved a revised V-22 TEMP in FY06, which includes the CV-22.
- FY06 Navy and Air Force testing was conducted in accordance with the DOT&E-approved TEMP using four CV-22 low-rate production special operations variants.

Assessment

Although SIRFC development and testing is being conducted under two separate TEMPS, inter-program communication is good allowing the CV-22 program to benefit from the USASOC SIRFC lessons-learned.

U.S. Army Special Operations Command
- FY06 flight testing of SIRFC demonstrated the system's readiness to commence IOT&E in 2QFY07.
- USASOC's FY06 regression testing confirmed that modifications to the host aircraft for SIRFC integration do significantly improve radar warning and stand-alone ECM effectiveness. However, there are still reliability concerns. SIRFC's baseline RWR and ECM effectiveness still require minor improvement. DOT&E will report on SIRFC operational effectiveness and suitability following the FY07 SIRFC/MH-47G IOT&E.
- Demonstrated survivability of the MH-47G and MH-60K+ consistently improves when electronic countermeasures are combined with tactics and use of expendables.

Air Force and Marine Corps CV-22 Development
- The Navy has not incorporated the SIRFC EW test process and phased IOT&E plan in the draft V-22 TEMP to align electronic warfare test expectations for the CV-22. This phased SIRFC test process was not fully coordinated until after the FY06 V-22 TEMP was approved by OSD.
- Electronic Warfare Integrated Assessment I provided early identification of SIRFC/CV-22 integration concerns. However, it has limited utility due to changing SIRFC configurations and the limited scope of the threat environment used for testing. DOT&E's assessment of SIRFC/CV-22 effectiveness and suitability will not be available until operational representative testing is conducted.

Recommendations

- Status of Previous Recommendations. One of the five previous DOT&E annual report recommendations is unresolved:
  FY05 #5: The Services should employ more realistic short-range radar-guided missile threats which will support adequate testing of self-protection systems against radio frequency guided threats. This recommendation remains valid.
- FY06 Recommendations.
  1. USASOC: None.
  2. The Navy should formally outline the SIRFC electronic warfare test process and phased IOT&E plan in the CV-22 TEMP.