

AN/APR-39 Radar Warning Receiver

Executive Summary

- The AN/APR-39 is the most widely installed Radar Warning Receiver (RWR) in the DoD with over 4,000 systems integrated on Army, Navy, and Air Force rotary-wing and transport aircraft.
- The Army and Navy have been forced to consider strategies to upgrade their current APR-39 inventory due to the APR-39's limited situational awareness, marginal threat discrimination, parts obsolescence, supportability of the operational flight program (OFP) software, and very limited processor speed.
- In FY07, the Army established a three phase plan to upgrade their version of the APR-39 RWR. The Navy is currently planning to leverage the Phase 1 processor and OFP upgrade of the Army upgrade path for their version of the APR-39.
- A Test and Evaluation Master Plan (TEMP) revision is required in FY08 to ensure that the first major (Phase II advanced digital processor) system upgrade is properly characterized when tested in FY09.

System

- The APR-39 is a RWR that detects, identifies, and provides relative location of threat electronic signals. The APR-39 also acts as the display for the missile and laser warning systems, and as the countermeasures dispenser on most aircraft in which it is installed.
- The Navy has the lead on this multi-Service Navy/Army program. The Air Force does not develop its own APR-39 variant, but purchases the Navy APR-39 systems, while incorporating Air Force unique threat libraries.
- The APR-39A initially fielded in FY96 on the Marine Corps UH-1N. The Navy's APR-39A/B variants are installed on over 1,000 Navy/Marine Corps helicopter, tilt-rotor, and transport aircraft and more than 200 Air Force Special Operations helicopters. The Army has installed a lighter-weight variant of the APR-39A on over 3,000 helicopters.
- The Army's variants can detect pulse and pulse doppler threat radars, while the heavier Navy variants add the capability to detect continuous wave threats and have improved identification via frequency discrimination.
- The Army and Navy are coordinating their spiral upgrade efforts to improve system effectiveness and maintainability.

Activity

- The Services have made only minor modifications to the APR-39 since the Navy entered full-rate production in FY96.
- The Army and Navy are coordinating their spiral upgrade efforts to improve system effectiveness and maintainability.



1 - Central Processor/Receiver 4 - Display Unit
 2 - Two Dual Channel Receivers 5 - Control Unit
 3 - Blade Antenna 6 - Four Quadrant Antenna

- The Navy's near-term spiral upgrade (unfunded) leverages the Army's processor upgrade and antenna changes to address obsolescence issues, improve areas of APR-39 detection performance, and enhance direction of arrival accuracy.
- The Army's near-term spiral upgrade (funded) is designed to improve reaction time and to increase pulse density and complex wave form capabilities.
- The core APR-39 components include a cockpit control unit, a system processor, a cockpit display indicator, receivers, and antennae.

Mission

- Combatant commanders use the APR-39 to enhance the survivability of Army, Navy, Marine Corps, and Air Force Special Operations rotary wing and transport aircraft on missions that penetrate hostile areas.
- Commanders use the APR-39 to provide aircraft self-protection by warning pilots of radar threats, supporting threat avoidance, or permitting timely use of defensive countermeasures.

- The Army's near-term spiral upgrade (funded) is designed to provide pilots better overall threat situational awareness and discrimination.

NAVY PROGRAMS

- The Army has funded and is currently executing Phase 1 of a three phase upgrade plan. The three phase upgrade includes the following:
 - Phase 1: Processor Upgrade to sustain APR-39A(V) 1 and 4
 - Phase 2: Advanced digital RWR
 - Phase 3: Active Radio Frequency countermeasures
- The U.S. Army Intelligence and Information Warfare Division processor upgrade lab testing and U.S. Army Technical Test Center processor upgrade flight testing are both scheduled for 2QFY08.
- Although the Navy APR-39 Spiral upgrade is unfunded, the FY08 Navy plans include a Preliminary Design Review, Critical Design Review, and an update to the TEMP in FY08. A Navy flight test of the APR-39B(V)2 on a AH-1Z is currently planned for 4QFY08.
- The integration of APR-39 on new platforms was conducted in accordance with a DOT&E-approved platform TEMP. There was no stand alone testing of the APR-39 in FY07.
- A TEMP is not required to support the Phase I processor upgrade, but the Army needs an updated TEMP in FY08 to support the extensive development and testing of the Phase II advanced digital processor in FY09.
- A multi-service TEMP update by the Army and Navy should ensure the overarching test strategies are aligned between the Services.
- DOT&E coordination on APR-39 test plan development in FY08 is very important to ensuring the Services optimize resources and test efforts.
- In recent Navy testing, there were several significant APR-39 deficiencies as integrated on the MV-22, AH-1W, and the KC-130T. Further detailed evaluation of the APR-39 capability upgrades and performance assessments are required.

Assessment

- The TEMP for APR-39 is seven years old and does not reflect current system upgrades, development or test plans.

Recommendations

- Status of Previous Recommendations. There are no previous recommendations as there have been no DOT&E reports on APR-39 since 2002.
- FY07 Recommendation.
 1. The Army must coordinate with the Navy (lead Service) to provide an updated APR-39 TEMP for DOT&E approval in FY08.