CV-22 Osprey

Executive Summary

- Air Force Special Operations Command (AFSOC) procured a removable armor package for the CV-22 in response to an urgent need request. LFT&E of the armor package demonstrated improved force protection of the CV-22 platform against selected small arms threats.
- Preliminary assessment of integrated testing of Suite of Integrated Radio Frequency Countermeasures (SIRFC) software version 8.02 did not demonstrate aircraft survivability improvements against selected radio frequency threats. SIRFC performance is consistent with previous test results and therefore does not meet survivability requirements against some threat systems.
- The Program Office addressed key deficiencies revealed during the developmental testing of the next Tactical Software Suite, new mission computer, and a new Color Helmet Mounted Display. Operational testing of these systems is scheduled for 1QFY16.

System

- The CV-22 is the AFSOC variant of the V-22. It succeeded Special Operations Forces MH-53 helicopters in 2008. The tilt-rotor design provides the speed and range of a conventional fixed-wing aircraft and vertical take-off and landing capabilities of a helicopter.
- The CV-22 has terrain-following/terrain-avoidance radar, an advanced multi-frequency radio communication suite, an integrated electronic defense suite and aerial refueling capability, allowing it to augment the AFSOC MC-130 fleet.
- The CV-22 electronic defensive suite includes the SIRFC and the Directional Infrared Countermeasures (DIRCM) System with the AAR-54 Missile Warning Sensor, Small Laser Transmitter Assembly jammer and the ALE-47 Countermeasure System capable of dispensing both flares and chaff. The Dedicated Electronic Warfare Display provides an integrated threat picture to the crews from SIRFC and DIRCM.
- The CV-22 can carry 18 combat-ready Special Operators 538 nautical miles and return. It can self-deploy up to 2,100 nautical miles with one aerial refueling.
- In response to CV-22 damage and passenger casualties in a December 2013 combat incident in South Sudan, AFSOC submitted an urgent need request for a removable armor package to protect passengers from small arms threats. AFSOC, in collaboration with the V-22 Joint Program Office (PMA-275), established requirements, and awarded the Advanced Ballistic Stopping System (ABSS) contract to The Protective Group, Inc. The final ABSS kit solution weighs 825 pounds. The vendor delivered 16 ABSS kits to AFSOC in September 2014.
- Bell-Boeing delivered 45 of 50 purchased aircraft; 42 are operational and 3 of the remaining 50 are in storage awaiting operational testing that is on hold, pending completion of deficiency report corrective actions for Mission Computer Obsolescence Initiative and the Color Helmet Mounted Display. The final two aircraft are expected to be delivered by the end of 2016.

Mission

Commanders will employ AFSOC squadrons equipped with the CV-22 to provide high speed, long-range insertion and extraction of Special Operations Forces to and from high-threat objectives.

Major Contractors

- Bell-Boeing Joint Venture:
  - Bell Helicopter – Amarillo, Texas
  - The Boeing Company – Ridley Township, Pennsylvania
- The Protective Group, Inc. – Miami Lakes, Florida

Activity

- In 2014, Naval Air Systems Command completed expedited live fire testing of the ABSS armor and evaluated its performance against the specification threat. To help meet the urgent need request for new armor, DOT&E did not require approval authority of the ABSS armor live fire test plan. Instead, DOT&E reviewed the test plan and ensured the test was conducted in accordance with the agreed upon test plan.

- AFSOC conducted operational testing in September 2014 to evaluate the ability of the unit to remove and install the armor and the ability of the crew to perform their normal mission with the armor installed.
- AFSOC completed a fraction of the upgraded SIRFC software version 8.02 tests in February through March 2015 at China Lake and Nevada Test and Training Range to address CV-22 SIRFC active counter-measure deficiencies. Remaining testing of the SIRFC software was completed in October 2016.
- The Navy has continued with developmental testing on the new Tactical Software Suite (TSS) 20.2.02, which has included testing of a new aircraft mission computer needed to address obsolescence problems. Operational testing of the TSS 20.2.02 and the Color Helmet Mounted Display is scheduled for 1QFY16.
- AFSOC also plans to conduct a Cooperative Vulnerability and Penetration Assessment of cybersecurity protections and vulnerabilities in the first half of FY16.

Assessment

- DOT&E assessed the conduct of the ABSS armor test against the specification threat was adequate.
- ABSS armor met the ballistic protection requirements for a selected range of engagement conditions. ABSS armor effectiveness against other operationally realistic threats was not assessed.
- Operational testing demonstrated that the CV-22 aircrew and maintenance personnel were able to perform their mission with the ABSS installed. Testing also demonstrated that the maintenance personnel would require approximately 8 hours to install (or remove) ABSS, prior to the mission. Due to added weight, installed armor imposes a limited penalty in combat range and in a number of combat-ready Special Operators on a mission.
- Preliminary data analyses suggest that the active counter-measure component of the SIRFC 8.02 system did not address the subsystem deficiencies. Consistent with previous results, the subsystem does not meet most survivability requirements.
- The AFSOC identified four deficiencies in the TSS 20.2.02 developmental testing during FY14: (1) the mission computer randomly dropped map symbols after the map symbology memory data reached its capacity; (2) vibrations, associated with certain flight conditions, degraded the readability of the Color Helmet Mounted Display; (3) the new data transfer unit for navigation, communication, and threat data created the possibility for data spillage between classified and unclassified systems; and (4) the Intelligence Broadcast Receiver, which provides near real-time updates on threat and survivor location throughout a mission, occasionally erased threat data during flight, even though erasure was not commanded. With the exception of the dropped map symbols issue, which is too extensive to make the current TSS 20.2.02 release and will be addressed in future software release, the Program Office addressed all key deficiencies. These activities, in part, delayed entry into operational testing until FY16.

Recommendations

- Status of Previous Recommendations. The Services have been working on addressing the two FY13 recommendations. The Navy completed developmental testing of the TSS 20.2.02 to attempt to address the SIRFC deficiencies while AFSOC has been working on test plans to start the radio-communication test in the context of end-to-end operational missions in a variety of operational and atmospheric conditions in FY16.
- FY15 Recommendations.
  1. The Navy should continue to address deficiencies in SIRFC active counter-measure performance and AFSOC should verify deficiency correction in future operational testing.
  2. DOT&E funded a joint live fire program to assess the performance of ABSS against threats not assessed in the CV-22 ABSS LFT&E program. The CV-22 Program Office and AFSOC should review these data to account for the effectiveness of the ABSS against these additional, operationally realistic threats and to adjust the tactics, techniques, and procedures, as needed.