C-5 Avionics Modernization Program (AMP) and Reliability Enhancement and Re-engining Program (RERP)

Executive Summary

- The C-5 Reliability Enhancement and Re-engining Program (RERP) experienced a Nunn-McCurdy breach in September 2007. OSD is reviewing the current program.
- The existing acquisition strategy is no longer executable due to cumulative program delays and funding shortfalls. An updated C-5 acquisition strategy for full modernization should include both RERP completion and programmed correction of AMP deficiencies.
- DOT&E approved a C-5A/C AMP operational test that was completed in July 2007.
- The observed performance of the C-5 AMP modifications on A/C-models, as well as previously tested B-models, is not adequate as a baseline for RERP.
- The C-5 AMP modifications are not operationally suitable.

System

- The C-5 is the largest four-engine, military transport aircraft in the United States. The C-5 has 36 pallet positions and can carry a maximum payload of 270,000 pounds. The typical crew size is seven.
- The Avionics Modernization Program (AMP) incorporates a mission computer, a glass cockpit with digital avionics (including autopilot and autothrottles), and state-of-the-art communications, navigation, and surveillance components for air traffic management functionality.
- The RERP provides 50 reliability enhancements, plus new commercial engines, nacelles, thrust reversers, and pylons.

Mission

- Units equipped with the C-5 perform strategic airlift, emergency aero-medical evacuation, transport of brigade-size forces in conjunction with other aircraft, and delivery of outsize or oversize cargo to the warfighter.
- The C-5 must be able to execute missions at night, in adverse weather conditions, and in civil-controlled air traffic environments around the world.
- The C-5 receives in-flight aerial refueling for extended-range missions.

Activity

- The C-5 RERP experienced a Nunn-McCurdy breach in September 2007, at the end of the fiscal year. OSD is reviewing the current program.
- The C-5A/C AMP OT&E flying began on January 16, 2007, at Travis AFB, California. Data collection ended with a simulator mission on May 11, 2007. The single C-5C aircraft completed test flights and entered Programmed Depot Maintenance on April 26, 2007. Review of maintenance data ended in July 2007.
- The C-5C OT&E consisted of 13 overseas airlift sorties and 18 local training sorties for a total of 115.4 flight hours.
- The C-5C AMP operational test was similar to the B-model test conducted in 2006, but on a smaller scale. It included real-world airlift transport missions, simulator missions, maintenance demonstrations, and Information Assurance evaluations. Operational missions provided opportunities to evaluate the aircraft in typical environments.
- DOT&E observed the C-5A/C AMP testing and noted no significant difference in AMP capabilities between the C-5A/C and the C-5B models.
- The Program Office held a critical design review for correction of 24 AMP deficiency reports plus eight general improvements in September 2007. This is part of a series of planned changes to correct deficiencies identified in operational testing.
- The first developmental test flight of a C-5B RERP aircraft occurred on June 19, 2006. A second B-model began flight tests on November 17, 2006, and an A-model flew in January 2007.

- The content and timeline of the RERP developmental flight tests changed in 2006. A combination of legacy system problems, development delays, and funding constraints contributed to uncertainty regarding the planned completion of RERP developmental test and evaluation. Developmental test is now scheduled to complete in August 2008.
- RERP operational testing is currently scheduled to begin in September 2009.

Assessment

- The observed performance of the C-5 AMP modifications is not adequate as a baseline for RERP. The instability of the flight management system, Information Assurance vulnerabilities, and frequent autopilot disconnects were contributing factors. Operator workarounds increased crew workload and impacted operational effectiveness. However, situational awareness regarding navigation and other air traffic improved. Navigation and data link capabilities performed well in OT&E.
- The C-5 AMP is not operationally suitable. High AMP component failure rates, inadequate integrated diagnostics, lengthy technical order trouble shooting times, and high maintenance man-hours per flight hour adversely impacts the ability to generate aircraft missions.
- The AMP/RERP acquisition strategy is no longer executable due to program delays and funding shortfalls. Correcting AMP deficiencies, including the 14 delayed AMP capabilities, and completing RERP are not part of the current program of record.
- The current assets for RERP OT&E do not include a low-rate initial production aircraft in operational test as requested by DOT&E.

Recommendations

- Status of Previous Recommendations. The Air Force has not yet delivered an updated executable acquisition strategy (FY05), which should include RERP completion and programmed correction of AMP deficiencies (FY06). The Air Force should also apply lessons learned from the C-5 AMP development to RERP (FY06).
- FY07 Recommendation.

1. The Air Force should include a low-rate initial production aircraft in the operational test.