

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

Executive Summary

- Operational testing began October 1, 2009, in accordance with the DOT&E-approved test plan.
- The Air Force needs to present an adequately funded plan to develop C-5 Reliability Enhancement and Re-engining Program (RERP) deferred capabilities and correct identified deficiencies.

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 auto-throttles), and state-of-the-art communications, navigation, and surveillance components for air traffic management functionality.
- The RERP provides 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



outsized or oversized cargo (cargo that does not fit on a standard pallet) to the warfighter.

- Units equipped with the C-5 execute missions at night, in adverse weather conditions, and in civil-controlled air traffic environments around the world. As the C-5 receives in-flight aerial refueling, the units are capable of completing extended range missions.

Prime Contractor

- Lockheed Martin Aeronautics Company, Marietta, Georgia

Activity

- C-5 RERP production software version 3.4 completed developmental flight testing in September 2008.
- DOT&E approved the C-5 fleet-wide Test and Evaluation Master Plan, mandated by the Milestone C Acquisition Decision Memorandum, in September 2009.
- The Developmental Test and Evaluation effort was completed and the first aircraft was delivered to the Air Force in February 2009 for Familiarization and Demonstration prior to IOT&E.
- The Program Offices continue to pursue parallel efforts to upgrade software and hardware for both the RERP and the AMP.
- Initial testing on the C-5 AMP identified more than 150 deficiencies. Testing of the second upgrade will address 31 deficiencies. Additional deficiency corrections will be addressed in future block upgrades. Developmental flight testing is currently scheduled for early 2010.
- A second RERP Integrated System Evaluation was completed in December 2008 over the Pacific Ocean that included seven days outside of the Continental United States.
- The C-5 RERP production software version 3.4, that incorporated maintenance fixes from the first upgrade, was installed in July 2009. As a risk reduction measure prior to IOT&E, a Pacific Ocean mission was flown to Alice Springs, Australia, that included an equator and international dateline crossing.
- Live Fire conducted production wing dry bay fire leading and trailing edge ballistic testing during FY09. The testing was not completed because of extensive fire damage to the test asset. The Program Office is currently in the process of obtaining another production wing to complete this testing by December 2009.
- The vulnerability modeling and simulation effort has been completed by the contractor, and the report has been delivered

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to the Program Office. This report will be delivered to DOT&E by January 2010 and the results will be incorporated into the combined Operational and Live Fire Test Beyond Low-Rate Initial Production report.

- IOT&E began October 1, 2009, in accordance with the DOT&E-approved test plan.

Assessment

- The C-5 RERP is entering operational test with known, potentially significant deficiencies and deferred capabilities in the following areas:
 - Survivability enhancements (tests of the C-5M large aircraft infrared countermeasures and C-5M performance differences)
 - Training systems and devices
 - Auto throttles
 - Environmental control system
 - Thrust reversers
 - Built-in test system
 - Communication, navigation, and surveillance/air traffic management capabilities
 - Information assurance

- The extent of deferred capabilities and deficiencies impact on C-5 RERP operations will be evaluated during the IOT&E. The Air Force will provide mitigation plans at the scheduled interim program review in December 2009.
- Live Fire test results show that the wing leading and trailing edge fire suppression system was not effective in suppressing fires induced by all threats tested.

Recommendations

- Status of Previous Recommendations. The Air Force has made satisfactory progress on all but one of the previous recommendations.
- FY09 Recommendations.
 1. The Air Force should enhance the wing leading and trailing edge fire suppression system performance.
 2. The Air Force needs to present an adequately funded plan to develop C-5 RERP deferred capabilities and correct identified deficiencies.