C-17 Globemaster III Airlift Aircraft

The C-17 is a four-engine turbofan aircraft capable of airlifting large payloads over intercontinental ranges without refueling. It is intended to allow delivery of outsize combat cargo and equipment directly into austere airfields. The C-17 is required to deliver passengers and cargo between continents, provide theater and strategic airlift in both airland and airdrop modes, and augment aeromedical evacuation and special operations missions. Initial Operational Test and Evaluation (IOT&E) of the C-17 was conducted in three phases from May 1992 to August 1995. Based upon results of IOT&E and live fire testing, DOT&E submitted an Operational and Live Fire Test and Evaluation Report to Congress to support the Beyond Low-Rate Initial Production Report (BLRIP), or Milestone III decision, in November 1995. The report assessed the operational effectiveness and suitability of the aircraft to conduct operational missions within the context of the existing airlift system. The C-17 was judged to be operationally effective (with limitations) and operationally suitable. Survivability was not adequately evaluated to make an assessment. A formal, three-year phase of Follow-on Test and Evaluation (FOT&E) started in October 1995. Since the completion of that phase, various periods of combined Developmental Test and Evaluation (DT&E) and FOT&E, involving the contractor, the Flight Test Center, Air Mobility Command, and the Air Force Operational Test and Evaluation Center (AFOTEC) have occurred on a nearly continuous basis.

TEST & EVALUATION ACTIVITY

C-17 follow-on tests and program developments that affect operational limitations, identified in the BLRIP report to Congress, are being monitored. These include the On-Board Inert Gas Generating System (OBIGGS), introduction of the composite material horizontal tail, an extended range fuel containment system (ERFCS), crew protection armor, liquid oxygen bottle design, and changes related to the Strategic Brigade Airdrop mission. Efforts to include dual-row cargo/equipment airdrop are in progress to reduce vulnerability and the drop zone delivery time.

One high visibility test item still in progress involves improvements to the OBIGGS. High failure items (e.g., compressor, air separation module and bleed pressure regulator) are tracked on a weekly basis to ensure adequate spare parts exist. FY03 funding is planned to initiate a two-stage effort to improve OBIGGS. In stage one, reliability upgrades will be implemented for high failure rate items in the current OBIGGS system. In stage two, OBIGGS will be redesigned for improved reliability. The first production aircraft scheduled to be delivered with the redesigned OBIGGS is aircraft 138, planned for delivery in FY05.

The C-17 carries outsize cargo and equipment over intercontinental ranges and is capable of delivery to austere airfields.

DT&E will continue at Edwards Air Force Base as part of the Follow-On Flight Test Program. The AFOTEC-Detachment 5 at Edwards Air Force Base will maintain involvement through ongoing communication with the Program Office and the combined contractor/Government C-17 Test Team resident at Edwards Air Force Base.

DOT&E has initiated a review of all changes made to the C-17 since November 1995. Since completion of initial LFT&E testing, two major structural modifications have been incorporated

that require further analyses and additional testing. The horizontal tail has been changed to a composite material construction, and the ERFCS has been added in the center-wing area of the fuselage. These changes will be assessed by the Air Force and DOT&E for potential impacts on aircraft survivability.

TEST & EVALUATION ASSESSMENT

The C-17 TEMP is four years out of date. An update to the Test and Evaluation Master Plan (TEMP) must be submitted to better address continuing flight tests, particularly the Follow-On Flight Test Program at Edwards Air Force Base and operational testing by AFOTEC and the 33 Flight Test Squadron at McGuire Air Force Base. The TEMP must also define the future LFT&E program. In addition, an updated Operational Test plan must be submitted. The updated plan must define the scope of testing for the next four years and delineate responsibilities.

Challenges to developmental and operational flight-testing in 2003 and beyond include constraints to individual project budgets, test resources, and aircraft availability for test. The only dedicated aircraft for developmental flight-testing is not production representative. Requests for flight test time on operational aircraft are in competition with high operational mission demands. Also, the large numbers of aircraft undergoing planned modifications limits the available aircraft to perform operational missions, training, and testing. These challenges have affected the depth and duration of testing conducted following aircraft modification and upgrade.

The C-17 aircraft are delivered in a “Block” configuration with each block containing approximately fifteen aircraft. The next block will have software modifications and station keeping equipment (utilized in flying formation) with testing to complete in 2004. The following block will contain an avionics modernization package and a weather radar modification with testing to be completed in 2005. The next block is planned to contain the upgraded onboard inert gas generating system along with navigation and safety modifications. Additional enhancements, modifications, and corrections to existing deficiencies are concurrent and include a fuel system retrofit, main landing gear (three major issues) deficiency correction, and a wheel brake and tire cost saving initiative. Detailed developmental and operational test planning is underway.