

C-17

Executive Summary

- Using the Formation Flight System (FFS), the C-17 is operationally effective in large airdrop formation missions during visual and instrument meteorological conditions, day and night.
- The Air Force conducted Phase I of the Force Development Evaluation (FDE) on the improved FFS in fall 2010; the Air Force conducted Phase II in March 2011.
- The training aids and materials for the FFS need improvement.

System

- The C-17 is a four-engine turboprop cargo aircraft with a crew of three (two pilots and one loadmaster).
- The C-17 has 18 pallet positions to carry cargo and can carry payloads up to 170,900 pounds.
- The FFS combines automated station keeping equipment functions within the C-17 formation, and digital intra-formation messaging with Traffic Collision and Avoidance System functions that provide separation from aircraft outside the formation.
- The C-17 can fly formations in visual and instrument meteorological conditions, day and night, at low-level and cruise altitudes in conjunction with airdrops of personnel, heavy equipment, and supplies for up to brigade-size units using an improved FFS.



Mission

Units equipped with the C-17:

- Provide worldwide theater and strategic airlift and airdrop
- Augment aero-medical evacuations and Special Operations
- Deliver loads (including passengers; bulk, oversize, and outsize cargo; and special equipment) to austere airfields

Major Contractor

The Boeing Company, Integrated Defense Systems – Long Beach, California

Activity

- Since IOT&E, the C-17 has not been able to perform the strategic brigade airdrop mission.
- The improved FFS is replacing an earlier FFS implementation, as well as the Station Keeping Equipment 2000 subsystem, which was inadequate in the 1995 C-17 IOT&E and in subsequent modifications.
- Phase I of the FDE of the improved FFS occurred in September 2010. New FFS software allowed completion of two multi-element formation missions using six C-17s in an integrated developmental/operational test.
- Phase II (dedicated operational testing) FDE commenced in the spring of 2011. The Air Force used seven modified C-17 aircraft with the latest mission computer software and the updated FFS components for the tests.
- The Air Force conducted testing in accordance with the DOT&E-approved test plan.

Assessment

- With the improved FFS, the C-17 crew can now accomplish the strategic brigade airdrop mission that previously could not be safely accomplished in instrument meteorological conditions.

- Large C-17 airdrop formations can be flown effectively using the FFS in visual and instrument meteorological conditions, day and night. The FFS satisfactorily demonstrated the following functions: (1) station keeping with the Automatic Flight Control System engaged; (2) station keeping with the aircraft flown manually; (3) station keeping during formation lead changes; (4) transfer of aircrew FFS data communications; and (5) adequate range of operations in the Silent Mode.
- The test results regarding safety, human factors, aircrew documentation, and aircrew training in support of operational suitability were satisfactory with the exception of aircrew training.
- Crew training aids and materials require modification to adequately explain FFS functions, procedures, and performance. Similarly, the FFS computer-based training module was not suitable for the aircrew to fully understand FFS operations and limitations. Missions as complex and demanding as formation airdrop require thorough and complete pre-mission training experiences, data, and documentation.

AIR FORCE PROGRAMS

- There were no FFS reliability failures during the operational test period.
- The improved FFS corrects the last major deficiency identified in the DOT&E C-17 Globemaster II Airlift Aircraft report, dated November 1995. This concludes DOT&E oversight of the C-17 program.

Recommendations

- Status of Previous Recommendations. The Air Force addressed all previous recommendations.
- FY11 Recommendation.
 1. The Air Force should update aircrew training aids and materials.