

C-130J Airlift Aircraft

The C-130J is a medium-range, tactical airlift aircraft designed primarily for the transport of cargo and personnel within a theater of operations. The cargo area can adapt to accommodate a combination of passenger, cargo, and/or aeromedical airlift missions. Variants of the C-130J will perform missions such as weather reconnaissance (WC-130J) and aerial refueling (KC-130J). The KC-130J is addressed in a separate report; the WC-130J is discussed in this report.

The C-130J retains many structural characteristics of the C-130H, having the same overall interior/exterior dimensions. However, the C-130J is more than 70 percent unique, relative to previous models. Significant differences include an advanced integrated digital avionics system, a redesigned flight station intended to facilitate a two-person cockpit, a new propulsion system intended to provide improved take-off, climb and cruise performance, and cargo compartment enhancements.

Contractor Developmental Test and Evaluation began in spring 1996 and will likely continue past 2006. The C-130J aircraft procurement is proceeding under a commercial acquisition strategy.

The Federal Aviation Administration (FAA) awarded Lockheed Martin a Type Certificate for a commercial version of the C-130J-30 aircraft (this version is longer than the C-130J) in 1998. However, significant C-130J and C-130J-30 military requirements were not included in the original FAA certification and Lockheed has not sought FAA certification of deficiency corrections and modifications. This necessitates additional testing by the Air Force and other U.S. government users.

DOT&E designated the C-130J aircraft for Live Fire Test and Evaluation Oversight in May 1995. Threats include man-portable air defense systems (MANPADS), surface-to-air missiles, anti-aircraft artillery, air-to-air missiles, rockets, and small arms. The C-130J LFT&E program addresses wing dry bay fire, composite propeller ballistic vulnerability, engine and engine bay fire, vulnerability to MANPADS threats, and mission abort vulnerability. The Test and Evaluation Master Plan (TEMP) describing the program was approved by DOT&E in July 1999.

TEST & EVALUATION ACTIVITY

Qualification testing for mission software Version 5.3.1 was completed in Spring 2002. A number of deficiencies were identified for corrective action and retest. Operational testing of Version 5.4 is now scheduled for late CY05. The Operational Test team will test the interim versions as they are released. The Operational Test plan is being revised to reflect the current structure of the test program.

Live Fire Test and Evaluation Phase 2 (composite blade testing) finished ballistic testing in October 2001. Fatigue testing is currently in progress. Phase 3 (MANPADS assessment) is also complete. Battle damage assessment and repair evaluation of wing damage was completed in December 2001, and the residual strength evaluation of wing fuel tank hydrodynamic ram testing in March 2002. Planning for engine nacelle fire suppression system (phase 4) ballistic testing has begun.



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AIR FORCE PROGRAMS

TEST & EVALUATION ASSESSMENT

C-130J

Major issues confronting the C-130J program include: funding of logistics support and training systems; hardware, software, and technical order deficiencies; manufacturing quality; sub-system reliability; failure to meet required measures of system effectiveness and suitability; and resolution of documented deficiencies. The United States Air Force is now taking an active role in resolution of these issues.

Based on the evaluation of test results conducted from Phase 1A and Phase 1B (airland portion of the combat delivery mission), the aircraft is not operationally effective. The airdrop mission cannot be evaluated until deficiency corrections are implemented and the developmental tests are completed in FY06. Aircrew workload issues, software discrepancies, and cargo loading and constraint requirements are still major issues. The using command is unable to verify manpower requirements to field this system until the crew workload evaluation is complete.

In addition, the aircraft is assessed as not operationally suitable. The evaluated reliability, maintainability, availability, and logistics supportability during Phase 1B were below operational requirements. Deficiencies were noted with on-aircraft integrated diagnostics and fault isolation systems, portable maintenance aids, maintenance technical orders, and availability of spare parts. Additional contractor field service representatives will be required to assist in the maintenance of the aircraft for the foreseeable future.

Although Block Upgrade 5.3 showed improved navigation functions, flight displays, technical publications, and reduced nuisance faults, there remain a large number of open deficiency reports that need to be resolved to achieve operational capability. Testing of full operational capability will not occur until the delivery of the Block 5.3.2. Block 5.4 will be tested to evaluate the defensive systems and some Global Air Traffic Management capability in FY04-05.

Results of the wing fuel tank hydrodynamic ram live fire test indicate that the wing is vulnerable to hydrodynamic ram damage. This potential vulnerability is not limited to the C-130J, but could affect all models/variants of the C-130E/H/J as they share a common wing design and internal structure. Final assessment on the results of the ballistic testing of composite propeller blades awaits post-damage fatigue testing.

Test limitations on the composite propeller blade evaluation severely affected realism. The test facility could not accommodate ballistic testing of dynamically rotating propellers. The initial compromise was to test a statically loaded propeller blade and perform a dynamic post-damage evaluation. If the results were not conclusive, the agreement was to conduct dynamic tests. The program has not resolved the details of how the dynamic evaluation will be done.

The evaluation of hydrodynamic ram effects continues to be problematic. Current predictive techniques are inadequate for evaluating damage to and structural response of large aircraft wing fuel tanks subjected to hydrodynamic ram damages. Test facilities need to be upgraded to accommodate large aircraft ballistic testing.

WC-130J

Major issues confronting the weather reconnaissance aircraft are: the radar's inability to perform the weather mission, continuous satellite communications not achieved, propeller delamination, and excessive vibration in the auxiliary crew members station.

The Low Power Color Radar was designed as a "weather avoidance" radar but sold as a "weather penetration" radar; the radar does not meet mission requirements. The program office has developed, but not funded, a spiral improvement plan to correct this deficiency. Additional software modifications will be tested in late 2003 (storm season) and hardware modifications (if required) will be tested in late 2005. Since the WC-130J cannot perform its primary mission the correction of this deficiency is critical. The secondary impact is that the ten older WC-130H models that currently perform the mission were to be converted to tankers and transferred to Air Combat Command where they are needed. That will not occur until the WC-130J is fully operational.

Proposed fixes to the satellite communications, propeller delamination, and the excessive vibration is planned to be tested in the fall storm season 2003.