

# AIR FORCE PROGRAMS

## 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 are intended to perform missions such as weather reconnaissance (WC-130J), electronic combat (EC-130J), and aerial refueling (KC-130J). The WC-130J is discussed in this report, the EC-130J is undergoing modification, and the KC-130J is addressed in a separate report.

The C-130J is more than 70 percent new, 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 handling system enhancements.

Contractor developmental test and evaluation began in spring 1996, and as capability is added, will likely continue past 2006. The C-130J aircraft procurement is proceeding under a commercial acquisition strategy that entered a multi-year procurement in 2003.

The Federal Aviation Administration (FAA) awarded a Type Certificate for a commercial version (Lockheed 382J, not produced or on contract) of the paper aircraft in 1998. However, significant military requirements were not included in the original FAA certification, and the contractor has not maintained FAA certification of government-required 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 LFT&E oversight in May 1995 and approved the Test and Evaluation Master Plan in July 1999. Threats include man-portable air defense systems, surface-to-air missiles, anti-aircraft artillery, air-to-air missiles, rockets, and small arms. The C-130J LFT&E vulnerability reduction program addresses wing dry bay fire, composite propeller blade ballistic vulnerability, engine and engine bay fire, vulnerability to man-portable air defense systems threats, and mission-abort vulnerability.

### TEST & EVALUATION ACTIVITY

The operational test program structure has been adjusted to accommodate the developmental test releases of software. Originally, one production representative version of software was to be released. Due to the immaturity, the software was released in increments – Block 5.1, Block 5.2, and Block 5.3. Block 5.3.6 is an upgrade that integrates defensive systems operations with the mission computer. Block 5.4 is now designated the production representative version. Block 6.0 will include global air traffic management capabilities and Block 7.0 is undefined at this time.

Qualification testing for mission software Block 5.3.6 is currently in test. Operational testing of Block 5.4 is scheduled for late CY05. Block 5.4 will contain some correction of previously documented deficiencies, but many fixes will not be addressed until Version 6.0 and Version 7.0 are installed in the FY06 and FY08 timeframes, respectively. The operational test plan is being revised to reflect the current structure of the test program. The C-130J LFT&E Vulnerability Reduction Program (VRP) Phase 2 (composite blade testing) completed fatigue testing of ballistically damaged propeller blades during 2003. VRP Phase 4 (engine nacelle fire suppression system testing) test planning and test article manufacturing began in July 2003.



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## 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; subsystem reliability; failure to meet required measures of system effectiveness and suitability; and resolution of documented deficiencies.

Due to system immaturity, operational testing was initially segmented into three phases of testing: Phase 1A, Phase 1B, and Phase 2. Phase 1A evaluated the ability of the aircraft to be used to train pilots. Phase 1B evaluated the aircraft's ability to perform the air/land mission. Phase 2, planned for FY06, will evaluate the ability to perform all missions to include airdrop. Based on the evaluation of test results conducted from Phase 1A and Phase 1B, 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 commands (United States Air Force, Air Force Reserves, and Air National Guard) are unable to verify manpower requirements to field this system until the crew workload evaluation is complete.

DOT&E determined that the aircraft is 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 the availability of spare parts. Additional contractor field service representatives are required to assist in the maintenance of the aircraft for the foreseeable future.

Although hardware and software modifications in Block Upgrade 5.3 showed improved navigation functions, flight displays, technical publications, and reduced nuisance faults, a large number of deficiency reports remain open that need to be resolved to achieve operational capability that is equal to the current C-130E/H fleet. An executable plan delineating deficiency correction with adequate funding that will result in an operational capability has not been formulated. Without an executable plan, the units with aircraft that have already been delivered and those that will receive additional aircraft prior to the correction of documented deficiencies are unable to perform the full range of essential combat delivery functions.

Assessment of the live fire VRP ballistic testing of the C-130J composite propeller blades awaits completion of the 46<sup>th</sup> Test Wing live fire test report. Test facility limitations narrowed the realism of the testing. The test facility was unable to support ballistic testing of dynamically rotating propellers. As a result, ballistic testing was accomplished on stationary blades with fatigue testing of the damaged blades conducted separately after the ballistic testing was complete.

### WC-130J

Four major issues confront the weather reconnaissance aircraft. The radar cannot perform the hurricane reconnaissance mission, continuous satellite communication is not achieved, there is propeller delamination, and there is excessive vibration in the auxiliary crew member's station.

The low-power color radar was designed as a weather avoidance radar, but it was installed in the WC-130J to perform the weather penetration mission. The radar does not support operational requirements for the weather mission. The program office has developed a plan to correct this deficiency. Additional software modification tests were planned for late 2003 (storm season), but testing was not accomplished due to software deficiencies. Hardware modifications will be tested approximately 26 months after the contract is awarded. Initial operational capability may be no sooner than FY06. 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 aerial refueling tankers and transferred to Air Combat Command. That will not occur until the WC-130J is fully operational.

A proposed fix to the propeller delamination problem has been installed on test aircraft. Data are currently being collected by the Air Force Reserves. The fix must be tested in a hurricane environment.