

HC/MC-130J

Executive Summary

- DOT&E issued an IOT&E report for the HC/MC-130J in April 2013. The HC/MC-130J is operationally effective, suitable, and survivable in the low- to medium-threat environment where the Air Force expects to operate this aircraft.
- Problems with the enhanced electrical system have limited Increment 2 aircraft to the existing 200 Amp power supply instead of the planned 400 Amp system, which is required to support future capability upgrades and the AC-130J gunship modification.
- Air Combat Command (ACC) is developing additional communications capabilities for the HC-130J, but additional work is required before the aircraft can receive an updated interoperability certification.
- Air Force Special Operations Command (AFSOC) is preparing for developmental test and evaluation of Increment 3 in April 2014. The Air Force should update the Test and Evaluation Master Plan (TEMP) and include sufficient detail to assess future operational testing of Increment 3.

System

- The HC/MC-130J is a medium-sized, four-engine turboprop tactical transport aircraft with hose and drogue aerial refueling, airdrop, and command and control capabilities. The core configuration is based on the Marine Corps KC-130J refueling tanker design with modifications including the ability to receive fuel in flight, a nose-mounted electro-optical/infrared sensor, and a combat systems operator flight deck station.
- The HC/MC-130J program delivers capability in increments. Increment 1 modifications include additional countermeasure dispensers, high-altitude ramp and door hydraulics, an additional (fourth) flight deck crew member station, an additional cargo compartment intercom panel, and cargo compartment 60-Hertz electrical outlets. Increment 2 includes increased 28-volt direct current internal power capacity, crash-worthy loadmaster scanner-position seats, and provisions for Large Aircraft Infrared Countermeasures. Increment 3 includes dual special mission processors and a secure file server.
- The HC-130J will replace legacy HC-130P/N and MC-130P (rescue) aircraft; the MC-130J will replace legacy MC-130E/P



(special operations) aircraft. The Air Force intends to procure 37 HC-130Js and 94 MC-130Js; only the MC-130Js will be developed to Increment 3 capability. Of the 94 MC-130Js, 37 will be converted to AC-130J gunships under a separate U.S. Special Operations Command program.

Mission

- ACC uses the HC-130J to support the personnel recovery mission through:
 - Aerial and ground refueling of vertical lift assets used during personnel recovery missions
 - Para-rescue jumper deployment with rescue-related equipment
 - Infiltration/exfiltration and resupply by airdrop or air-land operations
- AFSOC uses the MC-130J to support special operations missions requirements, including:
 - Aerial refueling and forward arming and refueling point operations of Special Operations Forces rotary and tilt-rotor aircraft
 - Infiltration/exfiltration, resupply, or delivery of Special Operations Forces personnel and equipment via airdrop or landing on austere, short runways in hostile or denied territory

Major Contractor

Lockheed Martin Aeronautics Company – Bethesda, Maryland

Activity

- The Air Force Operational Test and Evaluation Center conducted the IOT&E from March 1 through May 30, 2012, in accordance with a DOT&E-approved test plan. DOT&E issued an IOT&E report for the HC/MC-130J in April 2013 and approved an updated TEMP in August 2013.
- The Milestone Decision Authority approved the Air Force request to enter full-rate production on October 4, 2013.
- The contractor is now delivering all aircraft in the Increment 2 configuration with the exception of the planned 400 Amp regulated transformer rectifier unit (RTRU), which has

AIR FORCE PROGRAMS

experienced mechanical, electrical, and software problems. The additional power (over the current 200 Amp RTRU) will be required for future system upgrades on the MC-130J and to support modification of 37 MC-130J aircraft into AC-130J gunships. Contractor efforts to troubleshoot the 400 Amp RTRU are ongoing and regression testing is anticipated in 1QFY14.

- ACC intends to field a “T-1” communications modification for the HC-130J to address shortfalls in some legacy HC-130P/N aircraft enhancements. The T-1 modification includes the Specialized Automated Mission Suite/Enhanced Situational Awareness (SAMS/ESA) system, Blue Force Tracker, and the Joint Precision Airdrop System. The SAMS/ESA system provides Situational Awareness Data Link, High Power Waveform, and Air Force Tactical Radio System-Ruggedized.
- ACC conducted limited operational evaluations in FY13, including participation in the Angel Thunder search and rescue exercise, which the Joint Interoperability Test Command (JITC) observed in order to update the HC-130J interoperability certification. Development of the T-1 modification is ongoing and DOT&E expects to review a follow-on operational test plan from ACC prior to any final testing that supports a fielding decision.
- AFSOC continues to work with the contractor on development of Increment 3 with government developmental test and evaluation scheduled to begin in April 2014.

Assessment

- The HC/MC-130J is operationally effective for most combat search and rescue and Special Operations Forces missions as described in the classified annex to the IOT&E report. The combat search and rescue and Special Operations Forces-specific modifications to the HC/MC-130J supported the ability of aircrews to conduct these missions. The aircrew successfully conducted air-land, airdrop, aerial and ground refueling, and formation flight operations across a range of environmental conditions and operations.
- The HC/MC-130J is operationally suitable. The aircraft met all quantitative suitability requirements except for Mean Time to Diagnose a Fault (required to be less than 30 minutes; achieved 119 minutes) and probability of completing a 4-hour mission without a failure (required to be at least 91 percent;

achieved 83 percent). These shortfalls are not operationally significant – the system nonetheless exceeded the materiel availability Key Performance Parameter objective requirement of 89 percent by demonstrating a mission-capable rate of 95 percent.

- The HC/MC-130J is survivable in the low- to medium-threat environment where the Air Force expects to operate this aircraft. Specific threats and mission scenarios are detailed in the classified annex to the IOT&E report.
- Planned testing of the 400 Amp RTRU slipped significantly in FY13. Without the enhanced RTRU, the MC-130J will not be able to support intended future upgrades such as a terrain-following radar and the aircraft modified to the AC-130J configuration will not be able to operate all necessary systems in certain scenarios.
- Based on current data and documentation, JITC cannot issue an interoperability certification for the T-1 modified HC-130J. ACC has not updated the Information Support Plan for the HC-130J to reflect the T-1 modification. Furthermore, JITC was unable to collect operationally relevant data on the modification during observation of the Angel Thunder exercise. There were also anomalies in part of the SAMS/ESA software that the Air Force must correct.
- As of the recent TEMP update, AFSOC had not defined specific software capability requirements for the Increment 3 special mission processors, so there was insufficient detail in the TEMP to assess any planned FOT&E.

Recommendations

- Status of Previous Recommendations. The Air Force has made progress toward all previous recommendations.
- FY13 Recommendations.
 1. ACC should address interoperability shortfalls in the HC-130J T-1 modification and present a detailed test plan to DOT&E no later than 60 days prior to the start of any follow-on operational test activities.
 2. The program should submit a TEMP addendum that describes a robust statistical test design for Increment 3 once specific capability requirements are defined and no later than 180 days prior to the start of any follow-on operational test activities.