

## Joint Cargo Aircraft (JCA)

### Executive Summary

- Resource Management Decision 802 transferred the Joint Cargo Aircraft (JCA) program to the Air Force. DOT&E approved the Test and Evaluation Master Plan in April 2010.
- The Army and Air Force Multi-Service Operational Test and Evaluation (MOT&E) occurred from May through September 2010. Full-rate production for the JCA is scheduled for February 2011.
- Preliminary results from the MOT&E show effectiveness and suitability deficiencies. DOT&E expects to publish a Combined Operational and Live Fire Test and Evaluation Report in 2QFY11.
- The survivability of the JCA against the threats tested and analyzed is comparable to other military cargo aircraft.

### System

- The JCA is a two-engine six-blade turboprop tactical transport aircraft.
- The aircraft is designed to operate from short (2,000 feet) unimproved or austere runways. It has a 2,400 nautical mile range and a maximum payload of 13,000 pounds. The JCA is to be capable of self-deployment to theater.
- The JCA can carry three standard pallets, six bundles for airdrop, 40 passengers, 26 combat-equipped paratroopers, or 18 litters for medical evacuation.
- The JCA incorporates a fully integrated defensive systems suite consisting of the AN/AAR-47A(V)2 (missile and laser warning system), AN/APR-39B(V)2 (radar warning receiver), and AN/ALE-47(V) (chaff and flare dispenser) onboard the aircraft.



### Mission

- Air Force units equipped with the JCA primarily transport time sensitive and mission-critical cargo and personnel to forward deployed forces in remote and austere locations.
- The Air Force intends to use the JCA to support their intra-theater airlift operations.
- Secondary missions for the JCA include performing routine sustainment operations, medical evacuation, support of Homeland Defense, airdrop of personnel and equipment, and other humanitarian assistance missions.

### Major Contractor

L-3 Communications Integrated Systems, L.P. – Greenville, Texas

### Activity

- Production Qualification Testing (PQT) took place from December 2008 through September 2010 at China Lake, California; Eglin AFB, Florida; Huntsville, Alabama; Fort Rucker, Alabama; Yuma Proving Grounds, Arizona; Fort Bragg, North Carolina; and Patuxent River, Maryland. The PQT accumulated a total of 519 flight hours.
- Multi-Service Operational Test Phase I (Air Drop) took place from May 4 through June 11, 2010, at Fort Bragg, North Carolina. The JCA flew approximately 61 hours. Test scenarios included static line and military free fall jumps and bundle and container delivery system drops.
- Multi-Service Operational Test Phase II (Air Land) took place from July 26 through August 31, 2010, at Peterson AFB, Colorado. The JCA flew approximately 147 flight test hours. Test scenarios included Air Land Delivery, Aerial Sustainment, and Aeromedical Evacuation.
- The Multi-Service Operational Test Self-Deployment phase took place on September 9-13, 2010, from Peterson AFB, Colorado, to Naval Station Rota, Spain. This phase evaluated the JCA's capability to fly an unrefueled distance of 2,400 nautical miles with a 45-minute fuel reserve while carrying the full aircraft crew and 2,000 pounds of cargo.
- The program completed Live Fire Test and Evaluation in FY09 and delivered several final test results reports in FY10.
- Testing was conducted in accordance with the DOT&E-approved test plan.

### Assessment

- The MOT&E consisted of operationally realistic missions, aircrews, and support. Operational test missions included time-sensitive combat delivery to austere airfields, aerial

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- delivery of cargo and personnel, medical evacuation, and troop resupply.
- Data analysis of the May through September MOT&E is ongoing. DOT&E expects to publish a Combined Operational and Live Fire Test and Evaluation Report to support the full-rate production decision scheduled for 2QFY11.
  - Preliminary results indicate the JCA can perform critical support missions across the spectrum of military operations with deficiencies in the following areas:
    - The JCA was unable to demonstrate the enhanced take-off and landing performance Key Performance Parameter due to Federal Aviation Administration (FAA) restrictions, service policy, and the operating manual. The climb gradient required by the FAA limits the maximum weight for JCA take-off. By relaxing the climb gradient, the JCA could take off with higher weights, perhaps meeting the KPP requirement. A wartime commander in theater would have the option of relaxing the FAA requirement to allow take-off with larger payloads.
    - During Phase II of the MOT&E, the loadmasters discovered that standard 463L pallets used for internal cargo delivery would not consistently load or unload when the rail locking mechanism was actuated. Often, the loads were dislodged from the aircraft with help from additional personnel and/or aircraft start/stop actions. The inability to consistently off-load cargo significantly degrades the JCA capability to accomplish the Air-Land delivery mission (specifically, the delivery of cargo on pallets). Analysis is ongoing.
    - The Heads-Up Display (HUD) often shifted during flight and resulted in vertical readings about 2-3 degrees off true horizon. This could be a potential safety issue if the pilots were following the HUD in Instrument Meteorological Conditions or using the HUD to land at a poorly marked airfield or unfamiliar landing zone.
    - The pilots reported that the Flight Management System (FMS) was not user friendly and “dumped” route information if the crew did not follow the exact route loaded into the computer. The pilots frequently had to rebuild flight plans and landing zones while en route to the intended destination.
  - Preliminary results indicate the JCA can communicate and is interoperable with required military, government, civil, and non-government organizations with the following shortcomings:
    - Subject matter expert support was required to set up the Blue Force Tracker through the electronic data module and for filling secure communications. The Blue Force Tracker was operational intermittently throughout the MOT&E.
    - The public service radio caused interference on the other aircraft radios even after it was powered down.
  - Preliminary results indicate the JCA has suitability deficiencies. In order to meet the 90 percent probability that the system could complete a 5.6 hour mission successfully without experiencing a system abort at an 80 percent confidence level, the system needed to demonstrate a Mean Time Between System Aborts (MTBSA) of at least 53 flight hours. During MOT&E, the observed MTBSA was 22.5 flight hours at an 80 percent confidence level. The following suitability shortcomings need improvement:
    - Poor reliability of Electronic Data Manager and Blue Force Tracker
    - Training of federated (not integrated) systems
    - Operators’ manuals and checklists need improvement
  - The survivability of the JCA against the threats tested and analyzed is comparable to other military cargo aircraft.

## Recommendations

- Status of Previous Recommendations. The program satisfactorily addressed the FY09 recommendation.
- FY10 Recommendations.
  1. Prior to fielding and deployment, the Air Force should reduce fit interference in the rail locking system and operationally evaluate the adjusted system’s ability to prevent the pallets from jamming.
  2. The Air Force Program Office should implement an aggressive reliability growth program and continue to monitor reliability improvements.
  3. Prior to fielding and deployment, the Air Force should improve the stability of the HUDs and evaluate those improvements during operationally realistic missions that include take-offs and landings at unimproved runways.