

Joint Mission Planning System – Air Force (JMPS-AF)

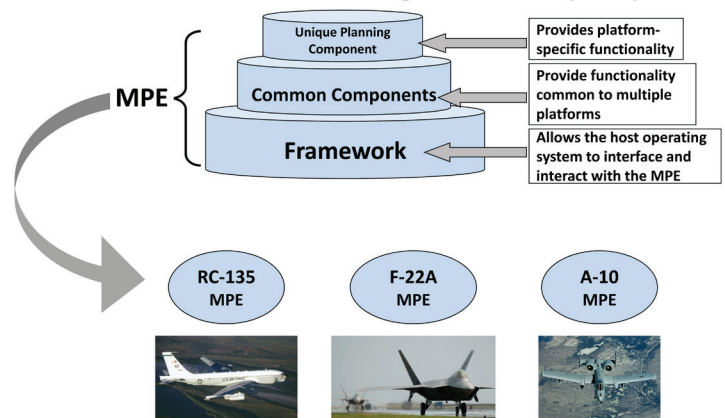
Executive Summary

- The Air Force completed operational testing of the RC-135 Mission Planning Environment (MPE) Spiral 2.1, the F-22 MPE Version 11.1, the A-10 MPE Version 7a, the E-3 MPE Release 1.0, and E-8 MPE Release 1.0. Each of these MPEs features tailored planning capabilities for their respective host platforms and any associated precision-guided weapons.
- The Air Force is leading Service efforts to develop the new common core Joint Mission Planning System Framework version 1.4. Once matured, all Services intend to adopt this new framework as a common core to build Service and host platform-specific MPEs.
- The Air Force is reviewing options for the development and programming required to achieve the Capability Development Document requirements for the nine tanker and special mission aircraft MPEs eliminated from the Increment IV program due to Air Force reprogramming of funds in December 2009.

System

- The Joint Mission Planning System – Air Force (JMPS-AF) is a Windows XP or Vista PC-based common solution for Air Force aircraft mission planning. It is a package of common and platform-unique mission planning applications.
- Using a “building block” approach, developers integrate and assemble a JMPS-AF MPE from a set of software sub-components to meet the needs of a particular aircraft type. An MPE consists of a framework, one or more common components/federated applications, and then a Unique Planning Component (UPC).
 - The foundation of an MPE is the framework, which allows the host operating system (Windows XP or Windows Vista) to interface and interact with the MPE.
 - The second level of an MPE consists of the common components and/or federated applications; these applications provide functionality that is common to multiple aircraft platforms (i.e. weather or GPS munitions).
 - The final level of software is the UPC, which provides platform-specific functionality and integrates the common component functions and the framework interface to produce the overall mission planning software environment for the platform.
 - When bundled, the three levels of software become an MPE that is specific to a single aircraft type. Depending on the aircraft model, a JMPS-AF MPE might operate on stand-alone, locally networked, or domain controlled Windows XP or Vista computers, or a mixture of all three operating environments.

JMPS-Air Force Mission Planning Environments (MPEs)



- The Air Force has split its JMPS-AF development process into two increments for administrative and programmatic oversight.
 - Increment III MPEs are based on legacy flight planning software programs and include platforms such as the RC-135, and early versions of the F-22A and A-10.
 - Increment IV MPEs are based on more advanced JMPS-AF versions, and include platforms such as the E-3, E-8, and later versions of the F-22A and A-10. The Air Force is currently developing a plan to incorporate the tanker and airlift aircraft classes into the Increment IV MPE system. Although the JMPS-AF framework software is being co-developed among DoD components, JMPS-AF is not a joint program. Each Service tests and fields its own aircraft-specific MPEs.

Mission

Aircrew use JMPS-AF to conduct detailed mission planning to support the full spectrum of missions, ranging from simple training to complex combat scenarios. Aircrew save the required aircraft, navigation, threat, and weapons data on a data transfer device that they load into their aircraft before flight.

Major Contractors

- BAE Systems – San Diego, California
- Lockheed Martin – Oswego, New York
- Northrop Grumman – Carson City, California
- Boeing – St. Louis, Missouri
- DCS Corporation – Arlington, Virginia
- TYBRIN Corporation – Fort Walton Beach, Florida

Activity

- The Air Force conducted all MPE operational testing in accordance with DOT&E-approved Test and Evaluation Master Plans and operational test plans.

Increment III

- The 28th Test and Evaluation Squadron (28th TES) conducted the Force Development Evaluation (FDE) of the JMPS-AF Increment III RC-135 Spiral 2.1 MPE in May 2011 at Offutt AFB, Nebraska.
- The 28th TES completed the FDE of the JMPS-AF Increment III F-22 MPE version 11.1 maintenance release in July 2011 at Eglin AFB, Florida.
- The Increment III system completed production and deployment and has transitioned into the Operations and Support phase of the Defense Acquisition Management System.

Increment IV

- The 28th TES conducted the FDE of the JMPS-AF Increment IV A-10 MPE version 7A in December 2010 at Eglin AFB, Florida, and in April 2011 at Nellis AFB, Nevada.
- The 28th TES conducted FDE of the JMPS-AF Increment IV E-3 MPE version 1.0 in November and December 2010 at Tinker AFB, Oklahoma.
- AFOTEC Detachment 2 conducted operational testing of the E-8 MPE version 1.0 in July and August of 2011 at Robins AFB, Georgia. The E-8 MPE is the representative test platform for JMPS-AF Increment IV mission planning functionality.
- The JMPS-AF Program Office conducted a Business Case Analysis from June through September 2011 to identify the most appropriate way ahead to complete JMPS-AF MPE development for the nine tanker, airlift, and special mission platforms de-scoped from the original Increment IV requirements list on account of Air Force re-programming in December 2009.

Assessment

- The Take-Off and Landing Data (TOLD) modules in the JMPS-AF MPEs evaluated to date do not generate accurate data and are not certified for flight use. Planners are required to revert to paper manuals or legacy mission planning systems to calculate TOLD data. The inability to calculate TOLD data negatively affects the operational effectiveness of the various MPEs.

Increment III

- RC-135 Spiral 2.1 MPE operational testing showed that the users' mean time to plan was 33 minutes per mission over a total of 70 missions, compared to the requirement of 120 minutes. Installation of the MPE on the host computer equipment was cumbersome due to inadequate installation documentation. Aircraft flight characteristics are not corrected for weather over the entire flight-operating envelope, requiring aircrew to manually input flight level winds in order to permit accurate JMPS-AF calculation of fuel consumption and time of flight. The MPE experienced

one critical failure in 38.2 hours of test. This exceeded the Air Force 2.0-hour mean time between critical failure (MTBCF) requirement for JMPS-AF systems.

- F-22 version 11.1 MPE FDE results showed that pilots can plan F-22 missions, generate mission-related products, and transfer mission data to a Data Transfer Cartridge. The average time to plan a representative mission was 1 hour and 4 minutes, which is within the 2.0-hour requirement. Operational availability of the software was 99.4 percent with no critical failures observed.

Increment IV

- Six experienced aircrew members conducted operational testing on the A-10 MPE version 7a. The aircrew were able to plan 64 missions well within the 120-minute requirement, with a mean time to plan of 53 minutes per mission. However, less experienced users are likely to need extensive training to effectively plan missions. The MPE uses A-10A rather than A-10C weight, drag, and fuel usage parameters, which in certain conditions can result in misleading flight characteristics. Importing a flight path that contains one or more points with an "unknown" elevation, results in the point being displayed to the planner as "zero" elevation; this could cause fuel consumption and timing errors when the route calculation function is completed. The MPE experienced no critical failures in 81 hours of testing; the MTBCF threshold is 2.0 hours.
- E-3 MPE Release 1.0 operational testing showed that the users' mean time to plan a mission was one hour and 20 minutes, well within the 4-hour requirement. Capabilities to calculate TOLD data were not included in the MPE, so aircrew calculated TOLD data manually. The MPE did not experience a critical failure in more than 60 hours of operation, satisfying the MTBCF threshold requirement of 4 hours.
- DOT&E is still assessing the E-8 operational test results; however, preliminary results to date indicate several discrepancies that should be corrected prior to fielding. These include incorrect magnetic variation calculations within the navigation functionality and inability to load certain missions that incorporate en-route delays in the flight plan onto the data transfer device.

Recommendations

- Status of Previous Recommendations. The Air Force completed the FY10 recommendation to update and gain approval for the draft JMPS-AF Increment IV Test and Evaluation Master Plan.
- FY11 Recommendations.
 1. The Air Force should develop and implement a dedicated process to implement required fixes to flight performance and monitor TOLD data within all MPEs in order to eliminate delays with certification/de-certification of TOLD data for operational use.
 2. Correct any critical deficiencies prior to fielding the JMPS-AF Increment IV representative MPE software for the E-8 aircraft.