

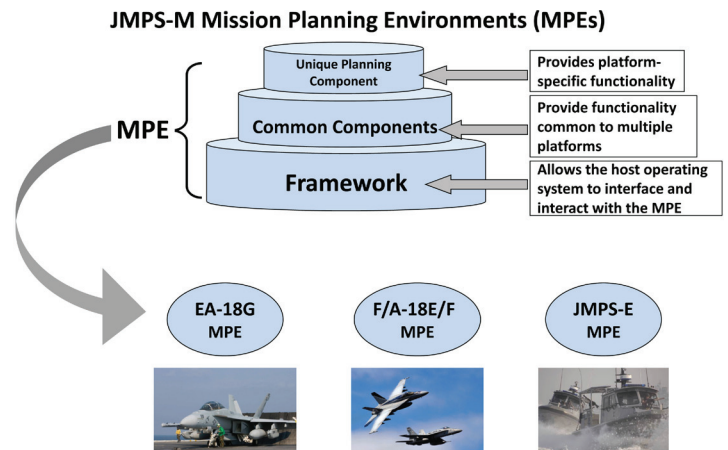
Joint Mission Planning System – Maritime (JMPS-M)

Executive Summary

- The Navy Joint Mission Planning System – Maritime (JMPS-M) Program Manager, PMA-281, is deploying JMPS Framework 1.3.5, which will replace Framework 1.2 to enable JMPS-M software to transition to Windows 7.
- Operational testing of the F/A-18E/F portion of the JMPS-M Mission Planning Environment (MPE) version 2.3.1 demonstrated that the MPE was operationally effective and suitable.
- Operational testing of the EA-18G portion of MPE version 2.3.1 demonstrated that the MPE was operationally suitable, but not effective for operational planning and reconstruction in support of the aircraft's mission.
- Operational testing of the Joint Mission Planning System – Expeditionary (JMPS-E) MPE indicated that it was operationally effective and suitable for supporting expeditionary and amphibious operations.

System

- JMPS-M is a Windows XP, PC-based common approach for aircraft mission planning. It is a system of common and host-platform-unique mission planning applications for Navy and Marine Corps aircraft.
- Using a “building block” approach, developers integrate and assemble a JMPS-M 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 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-M MPE might operate on stand-alone, locally networked, or domain controlled



Windows XP computers, or a mixture of all three operating environments.

- JMPS-M Framework 1.3.5 corrects defects in Framework 1.2, and will transition both the Navy and Air Force to Windows 7. Windows XP support expires in April 2014.
- Although portions of the JMPS-M software are being co-developed among DoD components, JMPS-M is not a joint program.
- JMPS-E is a unique MPE, developed by the Navy, which uses JMPS-M functionality to support Navy and Marine Corps amphibious planning.

Mission

- Aircrew use JMPS-M MPEs to plan all phases of their missions and then save required aircraft, navigation, threat, and weapons data on a data transfer device that they load into their aircraft before flight. Aircrew can also use the JMPS-M information to support post-flight mission analysis.
- Amphibious planners use JMPS-E to plan the movement of personnel, equipment, and logistics support between the amphibious fleet and the shore.

Major Contractors

- Framework 1.4 / JMPS-E: BAE Systems – San Diego, California
- Framework 1.3.5: Northrop Grumman – Carson City, California
- FA-18E/F UPC: Boeing – St. Louis, Missouri

Activity

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

Framework 1.2

- The Naval Air Warfare Center Weapons Division at Point Mugu, California, conducted developmental testing of the F/A-18E/F and EA-18G JMPS-M MPE version 2.4.0.2. This testing was conducted to assess the current state of MPE development and to reduce risk in moving forward towards future operational testing.
- Commander, Operational Test and Evaluation Force (COTF) conducted operational testing on MPE version 2.3.1 in December 2010 through March 2011 at Naval Air Weapon Station, China Lake, in conjunction with operational testing of platform System Configuration Set H6E.
- PMA-281 conducted (and COTF monitored) enhanced developmental testing of the JMPS-E MPE version 1.0.0.7 at a contractor facility in San Diego, California, in January 2011. DOT&E approved the COTF JMPS-E IOT&E test plan in March 2011.
- The Navy Information Operations Command completed Gold Disk and Retina Scans on JMPS-E in February 2010 and penetration testing on JMPS-E aboard the USS *Bataan* in March 2011. COTF conducted the JMPS-E IOT&E aboard the USS *Bataan* in March 2011. Real-world events in the U.S. Africa Command Area of Operations dictated the USS *Bataan* deployment shift from the original plan of July 2011 to April 2011. This schedule shift truncated the test period; however, COTF collected sufficient data to support the DOT&E-approved test plan.
- The Navy released JMPS-E to the Fleet in July 2011 and it is currently being employed aboard the USS *Bataan* in support of real-world operations.

Framework 1.3.5

- JMPS-M is transitioning to Windows 7. Framework 1.3.5 will be used by the Navy to transition their aircraft to a Windows 7 Framework.

Framework 1.4

- The Navy JMPS-M Program Manager, PMA-281, is continuing development with the Air Force on a new JMPS Framework 1.4, which will replace Framework 1.2.

Assessment

Framework 1.2

- The Take-Off and Landing Data (TOLD) modules in the Navy 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. Inability to calculate TOLD data negatively affects the operational effectiveness of the various MPEs.
- Developmental testing of MPE version 2.4.0.2 highlighted that the increasing capabilities of the F/A-18 and EA-18 platforms are resulting in increased mission planning complexity. Users

experienced multiple errors in attempting to download mission data from the planning computer to a Data Transfer Device. Downloading Standoff Land Attack Missile - Expanded Response Automatic Target Acquisition images from the Precision Targeting Workstation was slow and unreliable. The High-speed Anti-Radiation Missile (HARM) UPC does not contain all needed planning parameters. Users encountered numerous software errors, particularly when planning Airborne Electronic Attack missions.

- Operational testing of the F/A-18E/F portion of the MPE version 2.3.1 demonstrated that the MPE was operationally effective and suitable. Users experienced no significant difficulties in planning their missions, transferring the mission data to data transfer devices, and then loading the data into the aircraft. The average time to complete this process was 0.94 hours, which was well within the 6-hour requirement. One mission failure occurred during 74 hours of testing versus a user requirement of 30 hours. The TOLD functionality remains inoperative in MPE 2.3.1, as it has in all Navy and Marine Corps aircraft MPE 2.XX series of JMPS software.
- During operational testing, the EA-18G portion of MPE version 2.3.1 was operationally suitable, but was not effective for operational planning and reconstruction in support of the aircraft's mission. The average time to plan a multi-platform interdiction mission was 7.3 hours, which exceeded the 6-hour requirement. Suitable electronic intelligence information was not available for some threats. User selection of the HARM's Unique Planning Component, with other mission planning files open, caused mission planning failures. Opening an F/A-18 Mission Load file, with an open Airborne Electronic Attack Mission File, corrupted the Mission Load file, and electrostatic discharge can cause the JMPS-M computer to crash during the loading of a Data Transfer Device. JMPS-M does not collect and store all data required for full HARM post-flight mission analysis. The TOLD functionality remains inoperative in MPE 2.3.1, as it has in all MPE 2.XX series of JMPS software.
- Because the IOT&E was compressed, there were not enough test hours to calculate JMPS-E reliability with 80 percent confidence from IOT&E data alone. However, if integrated testing is included in the reliability calculations, then JMPS-E met the 72-hour mean time between operational mission failure requirement with 97 percent confidence.
- JMPS-E was effective for supporting expeditionary and amphibious operations. Fleet operators were successfully able to use JMPS-E to produce amphibious operations tasking messages, graphical representations of the operations areas and the possible effects of different types of supporting fire on battlespace geometry, and courses of action briefings for senior leadership. Planners used these products in daily briefings to senior leadership aboard the USS *Bataan*.
- JMPS-E is suitable for supporting expeditionary and amphibious operations. During the course of operational

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testing, JMPS-E experienced no operational mission failures during more than 257 hours of testing for an operational availability of 99.96 percent. It also met or exceeded all maintainability requirements. There were minor human factors interface problems revolving around MPE access to aeronautical database information (Digital Aeronautical Flight Information File data) as well as outdated documentation for utilizing the software.

- COTF determined that JMPS-E did not have any major information assurance deficiencies and was capable in the areas of protecting fleet planners' data and information; detecting and reacting to threats to that data; and restoring fleet planners' data and information following a cyber-attack.

Recommendations

- Status of Previous Recommendations. The Navy is satisfactorily addressing the FY10 recommendations.
- FY11 Recommendations. The Navy should:
 1. Demonstrate that users can transfer mission planning data from JMPS computers to powered F/A-18 and EA-18

platform flight computers during developmental testing prior to entrance into operational testing.

2. The Navy 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.
3. Before allowing fleet release of the EA-18G portion of MPE 2.3.1, conduct Verification of Correction of Deficiencies testing on the MPE to demonstrate that problems identified during the operational test have been corrected.
4. Incorporate all Digital Aeronautical Flight Information File information into the JMPS-E MPE.
5. Continue to monitor mean time between operational mission failures aboard the USS *Bataan* to ensure that JMPS-E continues to meet required reliability.
6. Update the JMPS-E MPE system documentation to support V1.0.0.7.

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