

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Upper Stages, Space Transfer, Entry and Landing Systems (3)

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STATUS OF THE MPCV EUROPEAN SERVICE MODULE PROPULSION SUBSYSTEM AFTER
PRELIMINARY DESIGN REVIEW

Abstract

The Multi-Purpose Crew Vehicle (MPCV) is a vehicle designed to support missions beyond low earth orbit. In addition, as a backup to crew commercial vehicles, the MPCV is also planned to support cargo and crewed missions to the International Space Station (ISS). MPCV will be launched by the Space Launch System (SLS).

The MPCV vehicle includes:

- Crew Module (CM) • Crew Module Adapter (CMA) • European Service Module (ESM) • Launch Abort System (LAS) - prior to jettison • Spacecraft Adapter (SA) • Spacecraft Adapter Jettisoned fairings (SAJ)

The European Service Module provides translational and 3 axis attitude control for the spacecraft, stores life support consumables for the crew module (oxygen, nitrogen and water), and provides thermal control and power. NASA, ESA, European and US Industry have teamed to develop the MPCV. ESA is responsible for the European Service Module and awarded a contract to Airbus Defence Space for the development and production of the first flight unit.

The objective of the present work is to present the status of MPCV ESM Propulsion Subsystem (PS/S) development activities after the Preliminary Design Review (PDR). Also an outlook on the main development steps up to qualification is given.

The selected baseline Propulsion Subsystem configuration is a pressure-fed, bi-propellant system using the same feeding system for the orbit change and reaction control engines and using hypergolic and storable propellants (MON-3 and MMH). The main elements of the Propulsion Subsystem are:

- High Pressure Vessels • Pressure Control Assembly (PCA) with separate pressurization branches between Oxidizer and Fuel • Propellant Tanks • Propellant Isolation Valves (PIV) • Twenty four Reaction Control System (RCS) Thrusters (thrust level of 220 N per thruster) • Eight Auxiliary Thrusters (thrust level of 490 N per thruster) • One Main Engine Assembly (MEA) (thrust level of 27 kN)