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DEVELOPMENT OF ORION EUROPEAN SERVICE MODULE PROPULSION SUBSYSTEM IN
FULL SPEED TOWARDS CRITICAL DESIGN REVIEW

Abstract

The ORION Multi-Purpose Crew Vehicle (MPCV) is a vehicle designed to support missions beyond low earth orbit. ORION will be launched by the Space Launch System (SLS).

The ORION 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)

NASA, ESA, European and US Industry have teamed to develop the ORION spacecraft. ESA is responsible for the European Service Module and awarded a contract to Airbus Defence Space for its development and production of the first flight unit. The European Service Module provides translational thrust 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.

The Propulsion Subsystem (PSS) has successfully passed its Preliminary Design Review (PDR) in 2014 and has started afterwards the detailed design loop. The Critical Design Review (CDR) is planned by late 2015.

The objective of the present work is to present the status of ORION MPCV ESM Propulsion Subsystem detailed design activities close to the Critical Design Review as well as the results of the Hydraulic Model test campaigns planned during the summer period and focused on transient effects in the propellant feed system respectively in the gas pressurization system. Further a detailed status of the PSS sub-assemblies and equipment design activities is presented. Finally an outlook is given on the planned activities up to the Qualification Review (QR) of the PSS.