

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

Author: Mr. Kevin Dickens
NASA Glenn Research Center, United States

Dr. Stephen Barsi
NASA Glenn Research Center, United States

Mr. Matthew Bielozer
NASA Glenn Research Center, United States

Mr. Jon Millard
NASA Glenn Research Center, United States

Dr. George Schmidt
NASA Glenn Research Center, United States

DEVELOPMENT OF THE EUROPEAN SERVICE MODULE PROPULSION SUBSYSTEM FOR THE
MULTI-PURPOSE CREW VEHICLE

Abstract

In 2012, the National Aeronautics and Space Administration (NASA) and the European Space Agency (ESA) entered into an international partnership to develop the European Service Module (ESM) for use on the NASA Multi-Purpose Crew Vehicle (MPCV). The MPCV, alternately referred to as Orion, will be utilized for future human space exploration beyond low earth orbit. The ESM Propulsion Subsystem (PSS), is a pressure-fed, bi-propellant propulsion system, being developed by Airbus Defense and Space under contract to ESA. For this development activity, the NASA Propulsion team is responsible for the traditional role of insight/oversight to ensure that the PSS delivered by Airbus meets all MPCV Program requirements. In addition, the NASA Propulsion team also has some unique responsibilities that are a result of the Implementing Agreement (IA) between NASA and ESA for the development of the ESM. These responsibilities include: (1) Providing the main engine and Thrust Vector Control (TVC) assembly for the Propulsion Subsystem. This is being accomplished through the delta qualification and re-use the Space Shuttle Orbital Maneuvering System (OMS) engine and TVC assembly. (2) Procurement of the Auxiliary engines (R-4D's) for the PSS. These engines are being procured by NASA from Aerojet-Rocketdyne via Lockheed Martin, the prime contractor for the MPCV, per an Airbus-provided specification. (3) Conducting the integrated systems hot-fire test which will qualify the end-to-end Propulsion Subsystem for flight on MPCV. This test is being conducted at the NASA White Sands Test Facility (WSTF) using an Airbus-provided test article known as the Propulsion Qualification Module (PQM).

This paper provides an overview of the ESM Propulsion Subsystem, including a status of the project's current and future development activities.