

IAF SPACE PROPULSION SYMPOSIUM (C4)  
Propulsion System (1) (1)

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MAIN RESULTS FROM ORION EUROPEAN SERVICE MODULE PROPULSION SUBSYSTEM  
QUALIFICATION TESTING**Abstract**

The ORION spacecraft is a multi-purpose crew vehicle designed to support missions beyond low Earth orbit. ORION will be launched by the Space Launch System (SLS).

NASA, ESA, European and US Industry are working together to develop the ORION spacecraft. ESA is responsible for the European Service Module (ESM) and awarded a contract to Airbus DS GmbH 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.

In January 2017 the Propulsion Subsystem Qualification (PSS) Model (PQM) was shipped from Sweden to the NASA White Sands Test Facility. After mounting of the test article to the sea-level test bench and performance of the acceptance test program the hot firing test program were started in August 2017 in blow-down mode operation. With the successful accomplishment of the acceptance test hot firings of the different thrusters the PQM was equipped with a Pressure Control Assembly (PCA). Such the hot firing test runs were re-started in pressurized mode operation in October 2018 considering un-saturated propellants.

The hot firing test runs will be completed by tests with saturated propellants, with operation of the He X-feed system and with passenger tests on the Auxiliary thrusters in the time frame from March 2019 to September 2019.

This paper presents the main results of the Orion ESM PSS hot firing qualification program with a brief summary of the main lessons learned. Also an outlook is given on the configuration changes for PSS w.r.t. ESM-2 and ESM-3 and the associated qualification approach.