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CHALLENGES OF TRANSFERRING THE HEMP-THRUSTER BASED ION PROPULSION SYSTEM FROM HISPASAT TO HEINRICH HERTZ

Abstract

In 2008 German Space Administration (DLR) initially contracted Thales Deutschland GmbH to develop, construct, qualify and deliver a novel type of an ion propulsion system based on High Efficiency Multistage Plasma Thrusters (HEMP-T). The HEMP-T Assembly is being developed in the frame of the HEMP-TIS project (HEMP Thruster In orbit verification on SmallGEO) by the Business Unit Electron Devices of Thales Deutschland in Ulm.

The HEMP-T Assembly consists of four HEMP-T Modules and one Power Supply and Control Unit PSCU which supplies the HEMP-T Modules with electric power and controls their operation. The HEMP-TIS project includes component development, system engineering, testing and qualification activities and the delivery of the respective flight units.

Originally the Assembly was to fly on the Small Geostationary Satellite (SGEO) in ESAs ARTES 11 program. The platform was developed by OHB System for the Hispasat AG1 mission. Currently the change of the integration of the HEMP-T Assembly to the new Heinrich Hertz Mission is in preparation, which also uses the SGEO as platform. The transfer from Hispasat to Heinrich Hertz caused several challenges in the project lifecycle, especially in the fields of requirements engineering, qualification testing and components obsolescence management.

The manufacturing and formal environmental qualification of all of the qualification units has been completed successfully. The units as well as the EQM power supply are currently being lifetime tested, which will be to an end by beginning of April 2018. The manufacturing of the flight units is completed and acceptance testing has been started. The respective PFM-PSCU has been delivered to Thales after successful acceptance testing, as well as the harness. All of these units have been subjected to End to End testing and confirmed the adequacy of the system design.

The paper will give an updated status of the program and will focus on the challenges of transferring the HEMP-T Assembly from Hispasat to Heinrich Hertz.