

IAF SPACE PROPULSION SYMPOSIUM (C4)
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HT100 PROPULSION SYSTEM, FLIGHT MODEL INTEGRATION

Abstract

HT100 propulsion system has been developed in the past few years and has been fully qualified in the framework of the ASI/ESA funded programme uHETSat. The system is based on HT100, which is a low power Hall Effect thruster that operates efficiently between 100 and 250 W. The thruster unit has been entirely designed within Sitael and consists in an anode unit and two external cathode units. The anode unit design is based on permanent magnets in order to minimize both, thruster mass and size. The cathode is based on BaO emitter and includes a heater that can withstand over 5000 cycles and is designed to minimize the power consumption during the warm-up phase. Besides the thruster unit, the other two main sub-systems are the PMA (Propellant Management Assembly) and the PPCU (Power Processing and Control Unit), both developed by Sitael and ground qualified with reference to uHETSat mission scenario. Following the completion of the ground qualification a proto-flight model of the propulsion system has been procured and integrated. The whole system has been tested in relevant environmental conditions in the large Thermal Vacuum chamber at Sitael premises in Pisa. The present paper describes the phases of the qualification and integration processes, reporting the main experimental results that were obtained along the process. On this specific aspect, it is very interesting to comment the thruster test in our refurbished vacuum chamber: thanks to the improved pumping capability, the thruster has been operated with a background pressure that was in the order of 10^{-7} mbar, showing a behaviour that was slightly different than what has been observed in previous tests carried out in other facilities.