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MICROHETSAT READY TO LAUNCH: RESULTS OF SPACECRAFT QUALIFICATION AND PREPARATION OF THE ACCEPTANCE-FOR-FLIGHT TEST CAMPAIGN

Abstract

The MicroHETSat (micro- Hall Effect Thruster Satellite) is the first mission based on SITAEL's S-75 platform (microsatellite class, ¡75kg), designed to equip and operate a low power (100W class) Hall Effect thruster-based micro-propulsion system internally developed by the company in the frame of a dedicated IOD-IOV mission. The MicroHETSat platform completed its own environmental qualification both at unit (EQM, Engineering Qualification Models) and system (SM, Structural Model) level following the design activities required to match the demanding payload (HET propulsion system) and mission requirements (increased lifetime and platform reliability above all). Upon completion of the environmental qualification, each MicroHETSat platform EQM unit has been integrated in the satellite Flatsat model, which is setup to perform all the operating functional scenario test and simulation in view of the final integration. In parallel, all the payload (HET propulsion system) units have been also qualified and assembled to assess the capability of the entire micro-propulsion system to operate in the harsh operating environment. This paper focuses on the three major tasks achieved in preparation of the integration of the flight model and the successive acceptance test campaign, in view of the launch window on board Virgin Orbit's Launcher-One in Mid 2022:

- The final satellite (platform and payload) design implementation with some post-CDR improvements and HET IOV mission profile;

- The completion of the AOCS HIL (HW in the loop) and of the Mission Scenario test on the spacecraft Flatsat model, fully representative of the whole nominal mission operation, FDIR procedures verification and E2E verification;

- The fully integrated P/L qualification, including the firing of SITAEL's HT100 as part of the successful completion of the spacecraft structural model qualification and thermal vacuum testing.

The MicroHETsat model philosophy presented at the end of the paper shows the smart approach presented to the customer to compress the schedule, reducing the missionization time and costs in line with the paradigms of the upcoming new space economy, aiming to consolidate the re-use of S-75 platform for upcoming missions.