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SITAEL'S HIGH-POWER HALL PROPULSION SYSTEMS

Abstract

High power Hall thrusters offer a favourable combination of performance, reliability, and lifetime for a variety of space exploration and commercial missions. For these reasons, the attention of the electric propulsion community to the development of high-power models is constantly increasing. SITAEL is strongly engaged in the development of the HT5k and HT20k, respectively a 5kW-class and a 20kW-class Hall thruster.

The HT5k thruster unit is composed of the HT5k Hall thruster and the HC20 hollow cathode. Extensive test on the thruster unit prototypes allowed to demonstrate high performance, low erosion, direct-drive operations, as well as performance stability in high-vacuum conditions (pressure ¡1E-5 mbar). The HT5k was selected as the main propulsive unit for the orbit raising and station keeping of the Ital-GovSatCom programme in the frame of the Italian 'Space Economy' initiative, by ASI and the Ministry of the Economic Development. In this context, SITAEL is responsible of developing the entire Xenon Propulsion System (XPS). The HT5k-TU qualification is under way.

The HT20k thruster unit is composed of the HT20k thruster and the HC60 hollow cathode. Over the last years, SITAEL matured the thruster design in the frame of three development programmes: the European Commission H2020 CHEOPS programme (Consortium for Hall Effect Orbital Propulsion System); an ESA/GSTP programme; and a dedicated pre-development ESA programme. Recently, building on the successful outcomes of the CHEOPS programme, a consortium of European companies led by SITAEL has been awarded with the EU-funded ASPIRE project, which aims to increase the technology readiness level of the 20-kW Hall propulsion system to 6.

This paper presents the status of the activities in progress on SITAEL's 5kW-class and 20 kW-class

Hall propulsion systems, focusing on the development and qualification tests and on the upgrades of the large space simulator to make these tests.