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SPACE PROPULSION SYMPOSIUM (C4)
Electric Propulsion (4)

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ELECTRIC PROPULSION AT SAFRAN

Abstract

Benefiting from this vast experience in electric propulsion, Safran currently propose a broad range of thrusters in a wide power range in agreement with the identified market needs. The PPS products are designed with the objective of reducing manufacturing costs and increasing robustness with respect to varying mission constraints, i.e., with design objective consistent with operations over a wide range of operating conditions. This paper reports the development status of Safran HETs :

- - For LEO applications, the 500W-class PPSX00 is under development in the framework of the CHEOPS (Consortium for Hall Effect Orbital Propulsion System) Project. The development program of the whole Electric Propulsive System (EPS) is led by Safran : SAE is in charge of the thruster, SITAEL the cathode and the PPU, and Bradford the FMS. The objective is to reach a very low cost target for mass production with lifetime suitable for the future mega constellations.

- - The 1.5 kW-class PPS1350-G is qualified since 2006 for NSSK maneuvers and is currently used on board the Alphasat platform, (GEO comsat). An improved version, the PPS1350-E with increased power capacity up to 2.5kW, is under qualification for partial orbit transfer and NSSK. The capability of the thruster for steady-state operation at 167% of its design operating point is permitted by the very robust thermal design of the PPS1350-G

- - The PPS 5000 (5 kW-class) aims at meeting the short-term need of the Telecom market, in particular in the field of all-electric satellites, ensuring orbit transfer and NSSK maneuvers. This HET is currently under qualification, with firm orders for the production of flight models. In the frame of the CHEOPS project, an evolution of the thruster and of the sub-systems will enable to provide a Dual Mode propulsion system capable of a wide range of power and discharge voltage (2 to 7 kW; 250 to 800 V), more powerful and more flexible at a lower cost.

- - The CHEOPS Program also aims at developing a large thruster able to provide 1N for exploration missions. The laboratory model of the PPS20K already demonstrated Safran knowhow in terms of thruster design: performance is in the range of the state of the art. The program includes the optimization of this model to reach performance and competitiveness objectives, the development of a new electronic based on the Direct Drive approach, and the consideration of using cheap propellants.