

IAF SPACE PROPULSION SYMPOSIUM (C4)  
Electric Propulsion (1) (5)

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DEVELOPMENT STATUS OF THE XENON PROPULSION SUBSYSTEM FOR THE  
ITAL-GOVSAATCOM PLATFORM**Abstract**

Thanks to their versatility of operation, high efficiencies and power-to-thrust ratios, Hall thrusters can be considered as one of the most promising options for in-space electric propulsion. From a commercial perspective, thrusters of power levels neighboring 5kW are particularly interesting due to their employment in the electric orbit raising and station keeping phases of telecommunication GEO satellites. In the past three years SITAEL has designed, manufactured and tested the HT5k, a 5 kW-class Hall thruster, and the HC20, a 20 A-class hollow cathode. Recently, the thruster unit (TU5k) composed by the HT5k and the HC20 was selected to embark on a qualification and flight campaign for the Ital-GovSatCom (I-GSC) programme, an awarded national programme led by an alliance between Thales Alenia Space Italy and Telespazio with the goal of designing, realizing and putting into service an innovative platform for GEO applications. In this context, SITAEL is responsible of developing the entire xenon propulsion subsystem (XPS). The XPS comprises a propellant management assembly (PMA), based on space-qualified components, a reaction control system (RCS), based on eight cold-gas thrusters, and an orbit control

system (OCS) that relies on four independent propulsion strings, composed by the HT5k thruster unit (TU), SITAEL's 5 kW power processing unit (PPU), and a xenon flow control (XFC) unit. Necessary information to advance towards qualification of the propulsion subsystem are acquired by performance and environmental tests of the TU engineering qualification model (EQM), by a cycling test of the HC20 EQM in stand-alone configuration, and by coupling tests between the TU EQM, a PPU elegant breadboard model (EBB), and an XFC engineering model (EM). After the EQM phase, the HT5k and HC20 qualification models will go through a qualification plan according to the I-GSC requirements, complying with all the applicable standards. This paper presents an overview of the overall I-GSC propulsion subsystem design. Moreover, the ongoing development activities of the TU5k are presented, including the foreseen qualification strategy and the results obtained from the EQM tests.