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Author: Mr. Davy Vrancken
QinetiQ Space nv, Belgium, davy.vrancken@qinetiq.be

EP PROPELLED SMALL SATELLITES: VERSATILE IN OPERATIONS

Abstract

Electric propulsion (EP) is becoming a more commonly used technology on modern spacecraft. Missions like SMART-1, GOCE and Bepi-Colombo are clear examples where the success of the mission is based on the performance of the propulsion system. Also in the commercial telecom market, EP is finding its way as primary means to perform station keeping. Although EP was previously only used on bigger S/C with high power capability, QinetiQ has investigated the usage of its T-5 engine on a PROBA platform. The T-5 EP system is an ion thruster which was previously used on the GOCE mission. The subsystem provides a high specific impulse (and as such a high delta-V for a relatively small amount of propellant) while still compatible with the power generation capabilities of the PROBA platform. The usage of this high performance EP system on a PROBA platform provides the end users a variety of benefits. First of all, the high delta-V capability can be used to maintain the satellite within the desired orbit for a longer period, and as such extends the useful mission lifetime of the satellite. Another benefit is the flexibility in the launcher selection. Since small satellites are often launched as secondary passenger, one is bound to the orbit, determined by the primary passenger. Using the high delta-V capacity of an EP system, the small satellite is able to make larger orbit corrections, and as such more viable flight opportunities arise. Furthermore, a number of new applications for small satellites have been identified, based on the high delta-V performance of the satellite. This paper describes the EP propelled PROBA satellite, its performance and the envisaged applications for this new platform.