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SPACE PROPULSION SYMPOSIUM (C4)
Missions Enabled by new Propulsion Technology and Systems (6)

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A MICRO PPT FOR THE UKUBE 1 MISSION

Abstract

Micro PPT development is ongoing at Mars Space Ltd and at the University of Southampton since two years, first with an ESA ITI study in 2009 and from late 2010 with an ESA ITT contract. During the ITI study a micro PPT for cubesat application has been designed, built and tested with the aim of doubling the lifetime of a cubesat compensating atmospheric drag. This PPT has a total system mass of about 160g including electronics and propellant (7 grams) and is able to provide an impulse bit of 34 μNs at 2J of shot energy with an Isp of about 600s. The thruster module designed during the ESA ITI has been proposed for flight on the UK Space Agency cubesat mission UKube1 with the aim of going from a prototype system to a flight qualified thruster and verifying the in-flight performance of the thruster and comparing them to the one measured on ground. The PPT will be initially used to induce a spin rate on the spacecraft that will be detected using the on board gyroscopes. From this spin rate the average thrust and hence impulse bit will be derived. At the end of UKube 1 life the thruster will be used to aid the spacecraft de-orbiting to comply with the 25 years de-orbiting requirement. In this paper the design of the propulsion module will be presented together with reporting data from the extensive testing campaign needed to assure the thruster subsystem will not also meet the performance requirement but also survive the structural and thermal loads relative to the launch and orbit environment.

The UKube1 final payload selection will be announced on the 14th of March hence after the 2011 IAC abstract deadline. Even if not selected we are planning on space qualifying the thruster module anyway hence please consider our abstract independently form the final UKube1 selection.