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

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LOW POWER PLASMA THRUSTERS FOR CUBESATS

Abstract

Micro and nano-satellites with on-board propulsion systems are considered for various space missions both in LEO [3] and beyond the earth orbit [1,2]. These sophisticated and high precision missions require a propulsion system with strict constraints on input powers and long duration performance. Additionally, a propulsion system on-board a small satellite can lengthen the mission life of the satellite, increase maneuverability of the system and also be used to de-orbit such small systems near the end of their mission life.

Low power electrical propulsion systems posses suitable characteristics for small satellite application. While electrical propulsion systems have already been used on large satellites [4,5], the implication of their use in smaller satellites and CubeSats require further study.

In this work, after review of the low power electrical propulsion systems, development and operational safety of such systems throughout a lifecycle of CubeSat is assessed. Advanced low power ion engines,pulse plasma thrusters and stationary plasma thrusters were found to be among the most attractive for CubeSat missions. This paper identifies some of the specific requirements for such systems and constraints imposed on them for small satellite missions, including power efficiency, operational lifetime and input power.

Reference

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