

IAF SPACE PROPULSION SYMPOSIUM (C4)
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Author: Dr. Sam Dakka
University of Nottingham, United Kingdom

DESIGN AND PERFORMANCE ESTIMATION FOR MPD POWERED SPACECRAFT

Abstract

Interplanetary space missions will require more advanced propulsion systems than current operational space systems. A promising electric propulsion system is the magnetoplasmadynamic (MPD) thruster with its simplistic architecture featuring two metal Electrodes separated by an insulator. The injected propellants are ionized by the high current electric arc driven between electrodes, the interaction between the magnetic field and the plasma generated electric current therefore producing a high specific impulse. The aims and objectives of the study is to estimate and optimize the design of MPD thruster in the context of a specific interplanetary mission. From the design point view, the performance will consider a variety of propellants at different mass flow rate. Also, the design will investigate the impact of nozzle shapes into the performance of the MPD thruster. A trade-off study with other commissioned state of the art thrusters will be compared tailored for a specific interplanetary human space mission.