

IAF SPACE PROPULSION SYMPOSIUM (C4)
Electric Propulsion (4)

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INPPS FLAGSHIP: CLUSTER OF ELECTRIC THRUSTERS

Abstract

This paper describes the results of the European-Russian DEMOCRITOS and MEGAHIT projects related to the electric thrusters on board the International Nuclear Power and Propulsion System (INPPS) flagship. INPPS flagship is a high power space transportation hybrid tug (power supply primary by nuclear power, by auxiliary solar power ring and chemical propulsion due to subsystems transport for assembly at high Earth orbit above 800 km) for Mars, Europa, Moon and asteroid exploration flights.

In dependence from the actual exploration mission, mission phases / trajectory and preferred international high power electric thrusters (about 20 - 50 kW) with different specific impulse, the results will be discussed in detail - also as a function of the transportable payload mass. Because of the 1 MWe nuclear reactor (successful test confirmed by Russia in 2018) as the power supply for INPPS a cluster of about 15 electric thrusters was studied in DEMOCRITOS project for MARS and EUROPA INPPS flagships. Issues related to power processing units for the electric thrusters were identified and will be discussed. In addition low power (kW) thrusters for an INPPS flagship orbiting small inspection satellite are sketched too.

Insofar the presentation is directly highlighting aspects of disruptive electric propulsion subsystems, within INPPS space system and applied to visionary Mars (including non-human and human) and Europa exploration and space transport tug flights.