

SPACE PROPULSION SYMPOSIUM (C4)
Electric Propulsion (4)

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PLASMA PROPULSION SYSTEM FOR ORBITAL MANEUVERS OF SATELLITES.

Abstract

The need for a new method of propulsion system which is cost effective and also gives higher thrust at low fuel consumption (cost-effective) is the need of today.

The use of plasma thrusters for propulsion purposes of small satellites will be quite advantageous in comparison to chemical thrusters. An experiment was carried out at Institute of Plasma Research for determination and measurement of plasma flow with the flowing plasma system and also to see the variation of thrust and velocity of plasma within the confined system.

The gas used for the experiment was argon. The system generated plasma using RF power thus enabling in supplying different power (in watts) for different time intervals without major change in system parameters. From the experiment the presence of flow was established within the system. The flow velocity was found to vary sharply with the pressures. Also the density of the plasma medium played an important factor in flow establishment. The conclusions reached from the experiment were:

1) The flow speed of plasma increases with decreasing pressure. 2) At a given pressure value the speed increases exponentially on application of different power values. 3) The maximum flow velocity was measured as 2 Mach. 4) The thrust value calculated from the measure values were 14 micronewtons. 5) The main applications of such a system will be in position adjustments of satellites in orbit around any planet. 6) Also such a propulsion system can be used in satellites for easy orbit transfers. 7) Since the system can be started and stopped by changing the pressure or supply power it makes it as a more viable system in near future.