

SPACE PROPULSION SYMPOSIUM (C4)  
Electric Propulsion (4)

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INFLUENCE OF INPUT ENERGY INCREASE ON THRUST PERFORMANCE OF COAXIAL  
PULSED PLASMA THRUSTER**Abstract**

Pulsed Plasma Thruster (PPT) is one of the electric propulsion devices, and it is expected to apply to a propulsion system for small satellite by the following three characteristics; 1) by using solid propellants, PPT has simple structure, lightweight, and high durability, as it were, PPT is a plug-in thruster. 2) by generating accurate and small pulse-thrust at optional time interval, PPT can control precise total impulse, 3) PPT can operate at low power consumption. In our laboratory, coaxial PPT has been studied for a 50kg class small satellite mission such as formation flying and precise attitude control. Principally we have studied about the trends of thrust performance on various cavity geometries at input energy of approximately 10J and developed the propellant feed mechanism using the Disk Feed PPT. However, the development of the small satellite requires the various/high propulsive functions in accordance with its mission. Therefore we have started to achieve average impulse bit of 2mNs, specific impulse of 500s and total impulse of 1000-10000Ns for a 100kg class satellite mission. These thrust performance is used for de-orbit. At high input energy that means 50J-75J the thrust performance has been evaluated on various cavity geometries in the experiments of 500shots operation. Impulse bit of 6.4mNs has been obtained in the initial operating state then. But it is obvious that the thrust performance will vary gradually through the continuous operation. So we evaluated the thrust performance at 50J-75J in the experiments of 60000shots operation or more. In addition, new propellant feed concept was contrived for the increase of total impulse. As a result bread board model of PPT with feed mechanism was developed. In this study, we describe the obtained thrust performance in the experiments of PPT's continuous operation with one propellant and with new propellant feed mechanism at input energy of 50J-75J.