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PULSED PLASMA THRUSTER FOR DEEP SPACE EXPLORATION

Abstract

The growing microsatellite community can revitalize electrical thruster by PPT in low-power high-performance propulsion systems, especially suitable for Mars and deep space missions. The pulsed plasma thruster (PPT) is an electrically powered thruster suitable for wide range of applications like deep space explorations and robotic precursor. Pulsed Plasma Thrusters are simple, robust, compact electric power engines that using the shelf technologies can bring significant mass, size, and cost savings. This paper provides the detailed outline of the various favourable uses of the PPT. These encouraging results provide a good basis to continue the development with smaller electronics that will make a package appropriately sized for small satellites. The PPT has better features when compared to other kinds of electrical propulsion systems. It has limited sealing parts, simple structure and high reliability, which are the main benefits of using the solid propellant, mainly Teon (poly-tetrafluoroethylene PTFE). The thruster delivers high specific impulse with low thrust in the range of 10^{-5} to 10^{-6} N, with the specific impulse range of 800 to 1200 seconds. However, the overall performances of PPTs are relatively low when compared with other electrically propelled thrusters. The performance of low-energy PPT will be dominated by an electro thermal acceleration instead of the electromagnetic acceleration. This paper will discuss the salient features and its characterization, ground level testing and evaluation of PPT. It is also described the drawbacks and the limitations of the PPT. This review paper will enable to be a reference to all the researchers who is willing work in this research domain