SPACE PROPULSION SYMPOSIUM (C4)
New Missions Enabled by New Propulsion Technology and Systems (6)

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ALL-PURPOSE LIGHTWEIGHT PROPULSION MODULE FOR DEEP SPACE EXPLORATION

Abstract

The capability of interstellar transfer is the key for entering the stirring domain of deep space exploration. In this paper, an all-purpose and lightweight propulsion module with excellent performance will be introduced for the countries pursuing their deep space exploration dreams. The propulsion module can accommodate relatively high capacity of carry-on mass, implement interstellar transfer from Earth to Mars/Venus/NEA and the necessary orbital control manipulation and finally put the explorer into the nominal orbit. Consisting of structural, propellant, thermal and electronic sub-modules, this propulsion module could render characteristics that benefit the costumer: (i) the interface with launch vehicle can change on demand without losing any reliability; (ii)multi-thruster configuration is adopted and thrusters with different thrust ranging from 490N to 2500N are in stock, the Isp of these thrusters can exceed 312s and all thrusters can restart for over 30 times; (iii)over-all lightweight technique is applied, resulting in a dry-mass rate of 7% and (iv) all the electronic sub-modules is developed on the basis of SoC technology and optional standard modules are available.The capabilities of the recommended propulsion module include, but not limited to, long range cruising, powerful orbit manipulating, lightweight structure designing and integrating, as well as short period manufacturing, implying practical applications in future Mars/Venus/NEA missions.