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SMALL SATELLITE LOW COST PROPULSION SYSTEM USING COTS COMPONENTS

Abstract

The development of a low-cost orbit raising and deorbiting propulsion system for small satellites is described. Utilizing primarily COTS components, this system can be integrated on a much shorter schedule and at a substantially lower cost as compared to systems that rely on traditional space components. A custom carbon fiber tank can be rapidly tailored for each mission's specific propellant requirements. The choice of carbon dioxide as a propellant allows for easy and safe handling, testing, transportation, and launch vehicle integration. This paper outlines how the design of the system was approached in order to fit within the envelope of readily available COTS components, and how these components were up-screened and qualified in order to achieve the required level of reliability. Qualification testing and performance measurements at the system level are also presented. A reference system capable of deorbiting a 100 kg class spacecraft from LEO in order to meet the IADC orbital debris mitigation guidelines has been integrated and accepted for launch.