

IAF SPACE PROPULSION SYMPOSIUM (C4)
New Missions Enabled by New Propulsion Technology and Systems (9)

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DESIGN OF PROPULSION SYSTEM FOR CUBESAT: AN OVERVIEW ON GREEN PROPELLANTS

Abstract

With the development in Rocket Science and growing technology, human's fascination for the development of smaller (micro, nano, and picosatellites) lighter, more power efficient and economic spacecraft for space missions have always been imbibed. Among this class of spacecraft, are CubeSats. CubeSats provide a cost-effective possibility to perform scientific and technological studies in LEO(Low Earth Orbit). Due to their affordability, CubeSat technologies have been used by various educational institutions and space organizations all over the world. The propulsion system is a system of a spacecraft that can help to change orbit and assist attitude control. This paper proposes a design of a new propulsion module for a 3U CubeSat that will be used for collision avoidance and for deorbiting the spacecraft. One of the unique features will be a propulsion system using green propellants. We propose a bi-propellant, a mixture of Ethylene and Nitrous oxide which has zero toxicity. The bi-propellant system used does not need an additional pressurizing system and will ignite automatically when the mixture will enter the combustion chamber. Due to these features our propulsion module uses only 1U space of the CubeSat saving 2U for other systems. This propulsion system aims at higher efficiency and can provide specific impulse larger than 300 seconds.