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DESIGN AND ANALYSIS OF DRAG SAIL DEPLOYMENT MECHANISM OF SRMDEORBITER

Abstract

With growing number of technologies of nanosats, has allowed the development of constellations which result in the increasing number of launches of these satellites. The near-earth space is turning hostile at an exponential rate every time a new satellite is launched into the orbit. When these satellites are non operational or malfunctioned, have potential chances of colliding with other functional satellites, results into increased debris in the space. Hence, debris mitigation demands research that needs careful evaluation to reduce extreme space weather. In response to these satellites, a module has been proposed that is completely independent of the satellite it host. This module consists of simple, affordable, and reliable design which in turn reduces the constraints for module to be governed in the host satellite. In this module, Drag Sail is placed externally on one of the faces of satellite, attached to the extension arm, joint at the vertices of that face and in the middle is supported by the mechanical arrangement which also holds the Solar PV dedicated to actuate the deployment mechanism. The module has ability to fit into CubeSat constraints, thus addressing the issue of volume and mass constraints which is a major shortcoming in Nanosats. SRMDeorbiter is an end-of-life deorbiting solution under development at SRMSAT Space System Laboratory, SRMIST KTR, India. The mission is to demonstrate the end-of-life disposal of Nanosats in LEO. SRMDeorbiter is a system consists of the Tesla Valve and Drag Sail to increase drag for reentry of the satellite in Earth's Atmosphere.