SPACE DEBRIS SYMPOSIUM (A6)
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A.R.T.I.C.A. DEORBITING SYSTEM: THE NEW DESIGN AND PROTOTYPE OF A COMPACT DEORBITING SAIL ON BOARD CUBESAT "URSA MAIOR"

Abstract

ARTICA (Aerodynamic Reentry Technology In CubeSat Application) is a compact deorbiting system applicable even in 1U Cubesat, in order to make available an efficient solution for space debris mitigation and satisfying the need of small, user-friendly and reliable subsystem for cubesat. It represents the evolution of the payload previously designed for the cubesat mission Polyorbite, properly improved and modified to be integrated in URSA MAIOR Cubesat. Thanks to the new constraints present in the mission it has been necessary to modify part of the system introducing solutions that significantly improved the whole system: with respect to the previous version in fact the system size has been reduced while the versatility of the system and the compatibility with other subsystems of the satellite have been increased, then without limiting the possibilities in the design phase of the mission. Beyond that, the possibility to exploit almost all the external surface of the deorbiting system for satellite sensors and eventually solar cells has been introduced. A new concept of plug--play sail in a plug--play subsystem has been implemented to make the system more versatile: the same whole architecture (mechanical retainer, electronics, etc..) can be integrated in the satellite in advance while the sail technology can be changed according to the needs. In this way it has been possible to test a secondary technology with respect to the one designed for the previous version of ARTICA that permits to increase the efficiency of the sail. The result of the review led to a smaller system, more flexible, more reliable and more efficient system: current prototype for URSA MAIOR satellite occupies a volume of 0.3 U (35mm height from the top of satellite) for the complete system (including the standalone power system) with a sail surface up to 2 m2. Results, details and images of the system are presented in the paper.