Paper ID: 36914
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MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Structures I - Development and Verification (Space Vehicles and Components) (1)

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ESTCUBE-2 STRUCTURE DEVELOPMENT, ANALYSIS, TESTING AND VERIFICATION

Abstract

ESTCube-2 is a 3U CubeSat with its main mission to demonstrate a novel deorbiting technologies and serve as the testbed for the ESTCube-3 mission beyond Earth orbit. Despite the fact that market is offering satisfied off-the-shelf solutions for educational projects, a custom design is providing more flexible and efficient usage of the satellite space and cheaper manufacturing. Moreover custom design is necessary for thermal control and radiation shielding especially for the nanosatellite outside magnetosphere. This paper presents detailed structure characterisation that consist of primary and secondary components. Primary structure consists of U-shaped frames and deployable panels, secondary – two payload blocks and miniaturised bus (0.5 U) developed in-house. Highly integrated bus includes all subsystems, three reaction wheels, star tracker, batteries and sun sensors on side panels. Among payloads' substructures are deorbiting module, two independent Earth observation instruments and butane-based propulsion with a partly external tank. In this paper also presented comparison between vibration simulations using FEMAP software and preliminary physical testing results. ESTCube-2 is planned to be ready by the end of 2017 and launched in first half 2019. Follow by that the ESTCube-3 satellite using slightly modified structure with removed magnetic coils and changed thrust direction will fly to the lunar orbit.