

IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)
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STANDARDIZATION OF CUBESAT PLATFORM FOR MASS PRODUCTION APPLICATIONS

Abstract

In contrast to the standardized interface between CubeSats and launch vehicles, the interface between CubeSats' internal subsystem and structure has not been fully standardized, as different CubeSat vendors frequently offer customized solutions that are more appropriate to some structural designs. Recently CubeSats are increasingly being utilised for commercial purposes, with more advanced and sophisticated missions that necessitate greater efficiency in development. One of them is the mass production mission, which entails a streamlined development approach to save both resources and time. The satellite integration process is critical to speed up the development. The complexity of assembly during the early stages of development may introduce human error while also taking additional time. In contrast, a greater number of structural parts has a greater impact on the time of integration during the mass manufacturing phase. As a result, an efficient CubeSat platform with a standardized interface between subsystems and the structural platform is critical. To overcome this issue, the Kyushu Institute of Technology is working on standardizing CubeSat electrical and mechanical interface. This study demonstrates the development and standardization of an efficient 1U structure based on a slot-based interface and a backplane board type electrical interface for mass production CubeSat applications. The design employs a unique way for mounting internal subsystems in order to ease integration while minimizing the number of structural parts. To determine its suitability for a mass production use, important design parameters that influence efficiency are assessed against the conventional structural design. Furthermore, all strength and stiffness analyses have been performed to ensure that the design can survive the launch loads. Eventually, complete satellite integration testing with actual satellite hardware is conducted.