28th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Interactive Presentations: 28th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (IP)

Author: Prof. MENGU CHO
Kyushu Institute of Technology, Japan, cho.mengu801@mail.kyutech.jp

Dr. Yamauchi Takashi
LaSEINE, Kyushu Institute of Technology, Japan, yamauchi.takashi098@mail.kyutech.jp
Mr. Marloun Sejera
Kyushu Institute of Technology, Japan, sejera.marloun-pelayo148@mail.kyutech.jp
Dr. Sangkyun Kim
LaSEINE, Kyushu Institute of Technology, Japan, kim.sangkyun571@mail.kyutech.jp
Dr. Hirokazu Masui
Kyushu Institute of Technology, Japan, masui@ele.kyutech.ac.jp
Mr. Yukihisa Otani
Kyushu Institute of Technology, Japan, otani.yukihisa337@mail.kyutech.jp
Mr. Eyoas Ergetu Areda
LaSEINE, Kyushu Institute of Technology, Japan, areda.eyoas-ergetu811@mail.kyutech.jp

CUBESAT INTERFACE STANDARDIZATION TO ACHIEVE FASTER DELIVERY, MISSION SUCCESS AND MASS PRODUCTION

Abstract

It has been said that the advantage of CubeSat is low-cost and fast-delivery. Many CubeSat projects, however, are taking longer than two years from the project kick-off to the launch. One key factor to delay the satellite development is interface incompatibility. There are various commercial CubeSat products available worldwide, but their interfaces from different vendors are often not compatible. The datasheet provided by the vendors are not enough to identify the possible interface incompatibility before actual purchase. The time spent to solve the interface incompatibility consumes the time to be spent other verification activities to ensure the mission success. Clear definition of interface and its documentation, from mechanical interface such as the board size, mounting methods, etc to electrical interface such as the pin assignment, the in-rush current, etc. help shortening the satellite delivery time and increase the mission success rate. As CubeSat is now entering the era of mass production, simple interface suitable for mass production is also desired. The increasing number of CubeSat projects, especially the new-comers, is now buying components from a single vendor. Sometimes, they are buying all the satellite bus components while focusing on development of mission payloads only. CubeSat vendors are also moving toward "platform provider" rather than selling individual components. Considering this recent trend, clear definition of interface between a CubeSat platform and mission payloads is also needed. In 2019, a new project to standardize the CubeSat interface started. The project is based on its heritage of the small satellite related standard activities, such as ISO-19683 (testing) and ISO-TS-20991 (requirements). IAA study group 4.26 started in October 2019 to collect inputs from wider sectors, especially academia, to the standard draft to be submitted by summer 2021. A survey was distributed to the CubeSat community to collect the satellite developers' experience and desires regarding the interface, and the CubeSat vendors' reality and desires. Also, three PC-104 based commercial components were acquired from three different vendors to investigate the interface compatibility in detail. Researches on software reconfigurable interface backplane board, slot-tray-type structure, universal translator access port, etc.

are underway. In the conference, those results are presented along with the standard draft to obtain feedbacks from the CubeSat community.