

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Interactive Presentations - IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (IP)

Author: Prof.Dr. Kentaro Kitamura
Kyushu Institute of Technology, Japan

Dr. Hirokazu Masui
Kyushu Institute of Technology, Japan

Dr. Shuji Abe
Kyushu University, Japan

Dr. Teiji Uozumi
Kyushu Institute of Technology, Japan

Dr. Teramoto Mariko
Kyushu Institute of Technology, Japan

Dr. Akiko Fujimoto
Kyushu Institute of Technology, Japan

Dr. Kei Sano
Kyushu Institute of Technology, Japan

Prof. Akimasa Yoshikawa
Kyushu University, Japan

Prof. MENGU CHO
Kyushu Institute of Technology, Japan

A FRAMEWORK FOR SPACE EDUCATION INTEGRATING SCIENCE AND ENGINEERING
THROUGH THE DEVELOPMENT OF 2U CUBESAT

Abstract

CubeSats have been utilized as the most practical educational tool in the aeronautical field since the first launch by University of Tokyo and Tokyo Institute of technology in 2003. Recently, CubeSat is used not only for educational purposes, but also for a wide range of scientific observation and commercial applications, which are revolutionizing the space industry. Also in Japan, many universities have developed such CubeSats, which have contributed to improving the abilities of students studying space engineering. However, most of the missions of CubeSat in universities in Japan has been focused on the technology demonstration and there are very few science missions using CubeSat. This might be because the development of CubeSat is mainly in the department of aerospace engineering, and thus there is little cooperation with science departments.

In this study, Laboratory of Lean Satellite Enterprises and In-orbit Experiments (LaSEINE) in Kyushu Institute of Technology (Kyutech) and International Research Center for Space and Planetary Environmental Science (i-SPES) in Kyushu University collaborate to start the mutual education program for undergraduate students through the development of 2U-size CubeSat with full-fledged science mission in 2021.

The YOTSUBE-KULOVER satellite is developed under the collaboration between the engineering students in Kyutech and science students in Kyushu Univ. to achieve the mainly three missions: (1) precise observation of the geomagnetic disturbances associated with magnetic storms/substorms, (2) capturing of the auroral images using COTS camera, (3) technology demonstration of the deployment panel for magnetic sensor. The engineering students in Kyutech are mainly in charge of development of BUS system

and the science students in Kyushu Univ. are responsible for mission systems. Such collaboration between mutually different disciplines requires students to proactively acquire the non-specialized knowledge. In this framework, the faculty members of Kyutech give some lectures of space systems engineering for the science students in Kyushu Univ., while the faculties of Kyushu Univ. give lectures of space weather sciences for the students in Kyutech.

This framework for mutual education has worked well, and CubeSat is currently in the process of completing FM development and conducting final testing. The CubeSat will be launched and released from International Space Station in the fall of 2024. In this paper, we will discuss more details of the evaluation of the student abilities obtained by this mutual education framework.