IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Lift Off: Primary and Secondary Education (1)

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SPACE EDUCATION FOR HIGH SCHOOL STUDENTS THROUGH THE DEVELOPMENT OF SAGANSAT0 CUBESAT

Abstract

Saga prefecture in Japan began a space educational program in partnership with JAXA as its project in 2021. It aims to increase the students' scientific spirit and pride in their hometown. This program centers around students developing the 1U CubeSat SaganSat0. However, it is difficult for high school students to develop the CubeSat alone. Therefore, the Saga Prefectural Space and Science Museum "Yumeginga" supports project management, schedule adjustment, guidance, and government procedures. Also, the

Kyushu Institute of Technology (Kyutech) provides the BIRDS bus system and oversees its development. This support system makes it possible to establish an environment for the students to concentrate on developing mission payloads. The funding for this project is from the Saga local government.

As a first step, Yumeginga proposed giving the students classes on CubeSat development and the space environment. The students were tasked to answer what they could do in space and what they wanted to do in orbit. Then, eight high schools formulated mission ideas and competed in the Mission Definition Review. Finally, the following four missions were selected: "Taking images with an infrared camera," "Dice space voyage," "Space radiation measurement," and "Automatic Packet Reporting System." These missions are based on solving local issues and contributing to the students' lives. The teams not selected in the competition joined the mission payload development of the selected teams.

Local companies manufactured the PCBs and the satellite structure. Then, the students engaged in hands-on activities by assembly, integration, and environment tests. They faced issues but cooperated to find solutions as a team. Furthermore, the graduate students and professors at Kyutech gave lectures about satellite engineering. High school students could get technical knowledge not typically covered in regular classes. In parallel, the Yumeginga took the initiative in establishing the space education program in the Saga prefecture by involving high school teachers and professors specializing in remote sensing. Finally, the development of the flight model began in 2023, and it is now undergoing safety review. The SaganSat0 CubeSat will be launched and released from ISS in autumn 2024.

It is the initial case that the science museum leads satellite development in Japan. Yumeginga has stored know-how, best practices, and lessons learned for future projects. This conference will highlight the preparations needed by the supporting team, how staff can assist high school students, and the improvements required to enhance the effectiveness of future space education programs.