

30th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
24th Workshop on Small Satellite Programmes at the Service of Developing Countries (1)

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OPEN-SOURCING OF CUBESAT BUS FOR CAPACITY BUILDING AIMED TO ACQUIRE
INDIGENOUS SPACE DEVELOPMENT CAPABILITY

Abstract

The BIRDS Program of Kyushu Institute of Technology (Kyutech) is a series of five projects. Each project involved 3 to 5 nations, and each took two years to implement. Ostensibly, the main purpose of BIRDS has been capacity building. However, another goal was to assist emerging nations put into space their very first satellite, and to encourage them to build their second satellite by themselves based on their experience of first satellite which from concept design to operation. Through this program, we (Kyutech) aim to lower the hurdles of space technology and make space development accessible to everyone.

The first satellite project, BIRDS-1 started in 2015. When BIRDS-1 started, there was no idea of doing a series of satellite projects. But, as BIRDS-2 started in 2016, the viewpoint as a continuous satellite program gradually emerged. Eventually, the BIRDS program delivered multiple CubeSats roughly every year since 2017. In total, the program generated 17 CubeSats and deployed from International Space Station (ISS) into space in five generations as following.

BIRDS-1 ; 2017.7.7 (Deployed) ; Japan, Ghana, Mongolia, Nigeria, Bangladesh
BIRDS-2 ; 2018.8.10 (Deployed) ; Bhutan, Malaysia, Philippine
BIRDS-3 ; 2019.6.17 (Deployed) ; Japan, Nepal, Sri Lanka
BIRDS-4 ; 2021.3.14 (Deployed) ; Japan, Paraguay, Philippine
BIRDS-5 ; Fall 2022 (will be deployed) ; Japan, Zimbabwe, Uganda

To promote worldwide capacity building activities, Kyutech has decided to provide the bus design on an "open source" basis. The rationale for this is that this bus has tremendous heritage in space. Through the Open Sourcing Activity, the basic design of the BIRDS BUS extends beyond satellites for 1U of capacity building to include science and advanced technology demonstration missions.

For example, Kyutech is applying the BIRDS bus to other 2U, 3U CubeSats with some modifications and also to science mission like lunar and astronomy mission. The BIRDS bus is not only a good starting point for any emerging country who seeks to build satellites domestically without starting from scratch but also this asset has been expanded to simultaneously support the deployment of the second and third more advanced missions.

In this talk, I will introduce latest mission which is called BIRDS-X project which is competition type of project for the mission board and ground terminal opening for all of the world who want to join space technology. Also I will mention how heritage of BIRDS BUS has facilitated access to space technology and expanded it to various missions.