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BIRDS-X SATELLITE PROJECT “DRAGONFLY”.

Abstract

The BIRDS-X satellite project is a 2U CubeSat based on the BIRDS Open-Source Bus design, with external dimensions of 100 mm x 100 mm x 227mm, dedicated to radio communication, the satellite is developed at the Kyushu Institute of Technology (Kyutech) by a multinational team composed of students from different backgrounds and grade levels. The project's objective is to bring diversity to the space sector and democratize the usage of space while following a Lean Satellite approach. This paper presents a general overview of the satellite subsystems and its 4 main missions. The first mission is a global APRS (Automated Packet Reporting System) payload design competition whose objective is to increase the users of the amateur radio community, as well as to provide an opportunity for students, engineers, space enthusiasts, and amateur radio operators to integrate and launch their designed payload with the BIRD-X satellite, the competition is open to everyone. Five final APRS payloads will be selected through a series of competition phases. The payload designs if selected will be launched into space and will be able to provide services to the amateur radio community through APRS digipeating and Store and Forward (SF) mission of the satellite. The second mission is a Ground Terminal (GT) competition whose objective is to promote APRS by creating a series of contests that involve successful communication between the payloads of the satellite and ground terminals that can be developed by the amateur radio community. The third mission is the development and on-orbit validation of a new low-cost UHF transceiver that is being developed by one of the members of the team, the objective is to achieve the same or better performance, data rate, power consumption, and lower cost than the commercial UHF transceiver that

is used on the BUS system. The fourth mission is a volcano monitoring mission, using the satellite as a platform to store and forward volcanic data by using the APRS protocol. This mission also includes the creation of a ground terminal with sensors located close to a volcanic area. The data then can be post-processed at Kyutech.