Paper ID: 40295
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24th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Small Satellite Missions Global Technical Session (9-GTS.5)

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BIRDS PROJECT: DEVELOPMENT AND OPERATION SUMMARY OF A CUBESAT CONSTELLATION PROJECT

Abstract

The growth of CubeSats over the years has created a gateway for developing countries to venture into the development and more need driven satellite technology development. The BIRDS Project is a constellation of 5 CubeSats belonging to 5 countries and to be operated from 7 distributed ground stations all over the world. 15 students from Japan, Ghana, Mongolia, Nigeria, Bangladesh and Thailand developed these satellites at the Kyushu Institute of Technology in Japan applying innovative system Engineering methodology. The 5 identical 1U CubeSats shall execute 6 missions viz; capture homeland picture of participating countries, broadcast voice data from space to ham receivers, detection of Single Event Latch-up (SEL) in space, however because of the gravimetric and volumetric constraints of 1U CubeSat, the three other missions are: determination of precise location of satellite, atmospheric density measurement and demonstration of coordinated ground station network for CubeSats operation planned to be achieved using advantage of 7 distributed ground stations. It is a unique experience for a university to develop five identical CubeSats within a short time, 16 months. The lessons will be shared among the community and applied in future constellation system development. Presently, the satellite development is completed and awaiting launch and deployment from the International Space Station in spring 2017. This paper shall enumerate the system engineering aspect of the development of the satellites and initial operational results after the deployment.