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ESTABLISHING A NETWORK OF GROUND SENSOR TERMINALS (GSTS) FOR SATELLITE BASED GLOBAL STORE AND FORWARD DATA COLLECTION MISSION IN DEVELOPING COUNTRIES

Abstract

Kyushu Institute of Technology (Kyutech), Japan initiated and formed a network of ground sensor terminals (GSTs) with participants from 11 different agencies/institutions predominantly in developing countries for a CubeSat based store and forward (SF) data collection mission. Most of the participating countries have limited access to space technologies with emerging space programs. Involvement of these countries in this collaborative network has enabled the participating countries with access to space development and utilization without having to launch satellites using their own resources. The basic design for the GST was envisioned at Kyutech, each of these countries have customized the design based on material substitutes available locally, optimizing the design for that country. The participants from each country built their customized GSTs with applications that are most relevant in solving issues that arise

locally. A SF receiver payload was developed for a 6-unit CubeSat called KITSUNE at Kyutech. This paper states the challenges faced in these countries and the basis on which the sensors have been selected for the GST to solve these issues. Additionally, the paper describes the efforts undertaken by participants to build GST using local component substitutes while learning about the complexities and limitations of ground to satellite communications. The research aims to promote large scale space utilization and human capacity development in developing countries despite having constrained space programs. KITSUNE was launched on February 24th, 2022 and it is expected to be deployed in the spring of 2022. The country specific dataset collected by the satellite will be archived and analyzed for generating prediction profiles and monitoring variables as a basis to address local data collection problems faced in the respective countries.