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DEVELOPMENT OF GROUND SENSOR TERMINAL FOR STORE & FORWARD MISSION OF
NANO-SATELLITE UITMSAT-1

Abstract

In this paper, the development of Ground Sensor Terminal (GST) for Store & Forward (S&F) mission of our first nano-satellite, UiTMSAT-1, is presented. The UiTMSAT-1 is a BIRDS-2 nano-satellite project involving Japan, Malaysia, Philippines, and Bhutan. There are six missions carried by UiTMSAT-1, where one of the missions is S&F. The objective of this mission is to collect data from GST, store the data on-boards of UiTMSAT-1, and to forward the data to the Mission Control Centre (MCC) located at Kyushu Institute of Technology (KYUTECH) in Japan or any BIRDS member ground stations. The main objective of the developed GST is to prepare the data, collected from the data-logger, in the format of AX.25 protocol and to transmit the formatted data to UiTMSAT-1 by using amateur radio frequency. The commercial off the shelf (COTS) components were used in building this GST, which are the control communication unit (CCU), very high frequency (VHF) transceiver and eggbeater antenna. In this work, the GST is connected with anisotropic magnetoresistance (AMR) magnetometer, a device that measures the H, D, Z components of Earth magnetic field. In our first attempt, the data transmitted by GST to the nano-satellite contains only the time and date the measurement occurred and the H component of the magnetic field. A dummy S&F payload was built to act as a receiver. A terminal emulator program was used in order to verify the received data at the dummy payload. The experimental result shows that the GST successfully collected the data from the AMR magnetometer, put the data in the format of AX.25 protocol, and successfully transmitted the data to the receiver.