Paper ID: 33593
student

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Space Communications and Navigation Global Technical Session (8-GTS.3)

Author: Ms. SNEHA VELAYUDHAN
Rochester Institute Of Technology, United States, sv4258@rit.edu

Prof. Miguel Bazdresch
Rochester Institute Of Technology., United States, mxbiee@rit.edu

A LOW-COST MOBILE GROUND STATION FOR SATELLITE COMMUNICATION IN VHF BAND

Abstract

In this paper, we present the architecture and performance of a low-cost, small, mobile and easily deployable ground station to track and receive signals from amateur band satellites which operate on the VHF-band (144 MHz to 147 MHz). The proposed ground station uses a 6-dB gain monopole antenna, and a small low noise amplifier with 23 dB gain. The rest of the analog front-end is a software-defined radio receiver with a USB interface to a laptop computer. The software-defined nature of the front-end gives the station the flexibility to target satellites with diverse power, modulation and error-correcting schemes. The system is completed by open-source and freely available software for tracking satellite positions and for signal decoding and processing.

We report performance evaluation results for outdoor operation. In addition, we also report our experience, performance analysis and link margin calculations for operation on an indoor environment with limited satellite visibility. These results would benefit ground station deployment in places with limited access to outdoor antennas, whether because of financial, regulatory or other restrictions. We also report results with a variety of amateur-band satellites, such as the FUNcube, Vellox-II, CANX 4 and 5, and AMSAT.