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S-BAND COMMUNICATION SUBSYSTEM FOR A HYPERSPECTRAL CUBESAT MISSION

Abstract

The CubeSat standard allows for the development of fast space experiments by universities and companies. A recent initiative between the Colombian government and academic researchers seeks to develop LEOpar, a scientific Earth observation instrument to be the payload of an existing 3U CubeSat Kit-based bus architecture, LEOpar aims to detect deforestation and illegal logging, using hyperspectral imagery and processing onboard. The payload subsystem is expected to produce 600 MB/day, which will require a high throughput link between the spacecraft and the ground station. We present the selection of an

S-band communication subsystem to download LEOpar's data from space, taking into account space available (<0.2 U), low energy consumption, and hardware compatibility of the actual satellite bus. We also review the link budget requirements for this mission, including orbital parameters, attenuations, and other link impairments along the communication path. Finally, we use the energy per bit to noise power spectral density ratio to determine the link transmission capacity.