

IAF SPACE OPERATIONS SYMPOSIUM (B6)
Virtual Presentations - IAF SPACE OPERATIONS SYMPOSIUM (VP)

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SAASST GROUND STATION: SATELLITE TRACKING AND CONTROL FOR HIGH DATA RATES

Abstract

In recent years, nanosatellites have experienced rapid development in light of the launch of hundreds of them in Low-Earth Orbit (LEO). As part of the research investigations conducted in spacecraft operations, the Sharjah Academy for Astronomy, Space Sciences, and Technology (SAASST) is currently developing SharjahSat-1. The 3U X-ray Detector CubeSat is set to launch in the first quarter of 2021.

A Ground Station control system is essential for communicating with SharjahSat-1 to facilitate receiving telemetry and sending commands. In support of such a mission and future ones, a full-fledged ground station has been built, which can be useful for multiple satellite missions. The ground station is currently operating on UHF/VHF frequency bands with high gain. An S-band dish antenna system is planned to be installed soon to augment ground station capability to support ongoing CubeSat operations. The Ground Station's hardware is composed of several components, i.e., an SDR transceiver, a suitable Rotator with Elevation-Azimuth dual controller, and a Rotator control interface. As for the software employed, it is mainly the Ham Radio Deluxe package that consists of an HRD satellite tracking, HRD rotator control, and an HRD rig. With the implementation of this system, the ground station is fully automated while

tracking and can also be remotely controlled. Besides its satellite tracking use, the ground station will provide practical training for university students in anticipation for future small satellite operations.