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IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
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PROJECT APTAS - LULEÅ UNIVERSITY OF TECHNOLOGY'S STUDENT CUBESAT: STATUS AND OUTLOOK

Abstract

The APTAS project (**A**tmospheric **P**olar **T**ransmission **A**lignment **S**atellite) is Luleå University of Technology's pioneering undertaking to let their students join Northern Sweden's space ecosystem by building its first student-led CubeSat.

Launched in 2019 in cooperation with EISCAT (**E**uropean **I**ncoherent **Scat**ter Scientific Association), the project will contribute to setting up and testing the EISCAT 3D, next generation geospace imaging radar in the European Arctic. For this purpose, the satellite is equipped with a transmitter to send out a 233 MHz signal, which will be used to calibrate and align the phased array antennas of the new radar system. As a secondary payload, the satellite carries a small commercial off-the-shelf camera to take pictures of Earth's surface.

Advancing in the project timeline, in 2023, the team has entered the test phase, during which all components and the assembled satellite are being tested for functionality. During the test phase, especially the payload team faced new challenges as all requirements of the primary payload could not be fulfilled as envisaged, particularly regarding the transmitter's signal strength. To resolve these challenges, a re-design of the payload was necessary to implement improvements to the signal strength and reliability.

The presentation will give an insight into the general project status and its most recent development and progress. On the side of mechanics and electronics, the team is testing the satellite's payload, dealing with a recurring power leakage in the power supply system, and integrating the camera into the satellite. The communications team is upgrading the satellite ground station at the LTU's Kiruna Space Campus in close collaboration with the university's staff and faculty. Furthermore, the software is also carrying out rigorous testing. The main activities include telemetry collection, satellite mode changes, and further test cases for software function verification.

During the presentation, technical concepts of the satellite will be outlined, engineering decisions will be explained and put into the context of managing a highly volatile team of students. For example, the payload re-design and ongoing testing will be discussed in more detail to give an idea of the challenges faced and the technical and managerial measures the team takes to overcome them.