

45th STUDENT CONFERENCE (E2)
Student Team Competition (3-GTS.4)

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TECHNICAL DEMONSTRATION OF A GROUND STATION USING OPEN MCT FOR
COMMUNICATIONS WITH LEO CUBESAT AND HIGH-ALTITUDE BALLOON**Abstract**

The mission of Space Concordia's Ground Station is to establish communication with its main 3U CubeSat, Aleksandr, winner of the 2016 Canadian Satellite Design Challenge (CSDC) and currently in the process of becoming launch-ready. The Ground Station combines traditional analog transceiver technology with the implementation of a Software Defined Radio (SDR) to promote its integration into a global open source network of ground stations. Existing networks such as SatNOGS or the European Space Agency (ESA) affiliated GENSO network require not only a standardized hardware installation, but also software that is straightforward to implement. To answer these software needs, Space Concordia has utilized Open MCT, a mission control software developed by NASA. Based on a web framework that ground station operators can tailor to process and visualize mission-specific telemetry, it offers the potential to provide a common software stack to be used across a relayed network of ground stations. However, to date, Open MCT has not been used publicly in a space mission outside of NASA. As an evaluation of the technology, Space Concordia has utilized it for communications with a Low Earth Orbit (LEO) CubeSat and with Space Concordia's high-altitude balloon. Additionally, several libraries have been created under open source licences to facilitate the use of Open MCT by other ground stations. Furthermore, the distribution and application of these libraries as part of a networked communication system is proposed. This work demonstrates the benefit of an inclusive platform involving a systematic approach to mission management, thus engaging the global community in a collaborative effort to maximize scientific value from satellite missions.