

Ground Segment Reliability Through Coordinated Operations

Charles D. A. Nokes¹, Michael Lipsett¹, Collin Cupido¹, Franz Newland², Zheng H Zhu³

¹Department of Mechanical Engineering, University of Alberta, Edmonton, Canada

²Department of Earth and Space Science and Engineering, York University, Toronto, Canada

³Department of Mechanical Engineering, York University, Toronto, Canada

ABSTRACT

Canadian universities are active in cubesat development. In many cases, there is little consideration given during system design of the possibility of improving ground segment reliability by coordinating with other groups. This paper describes a case study in which two universities were able to improve the reliability of operations through effective collaboration.

In November 2020 York University launched its first cubesatellite, DESCENT. The launch was successful; but soon after AlbertaSat was contacted by York to assist with communicating with their satellite by using the AlbertaSat ground station. This ground station is a radio system that was used for the first U of A satellite, Ex-Alta 1; and the ground station antenna is on the roof of the Electrical Engineering building on the North campus of the University of Alberta. The AlbertaSat ground station uses the same type of radio system as on board the York DESCENT system, which made implementing a back-up system possible, but still challenging. A number of people at both institutions contributed to the system recommissioning and testing, including local radio amateurs.

After a preliminary test of communication capabilities, AlbertaSat was granted a temporary licence by the federal government to operate the ground station in support of the DESCENT mission. AlbertaSat ground station operators then successfully communicated with the satellite, and then were able to implement a TCP/IP data transfer mechanism, which allowed the York team to conduct direct, real-time operations with their operations software.

The paper will provide more details, and offer recommendations about how ground segment design can yield more reliable operations by establishing back-up capability.

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