HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Human Spaceflight Young Professional Virtual Forum (9-YPVF.2)

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TOWARDS AN OPERATIONAL SATELLITE - CANADIAN SPACE AGENCY'S APPROACH TO OVERCOMING CHALLENGES FACED IN THE OPERATIONS OF NEAR EARTH OBJECT SURVEILLANCE SATELLITE.

Abstract

The Mission Operations Centre at the Canadian Space Agency(CSA) started with the advent of Radarsat-1 in 1995, Canada's first commercial Earth Observation mission. Then in 2003, Scisat-1 an Earth atmosphere observation satellite was added, soon followed by the next generation commercial radar satellite – RadarSat2 launched in 2007, making it a multi-mission Operations Centre.

In February 2013, Near Earth Object Surveillance Satellite (NEOSSat), the first microsatellite was added to the mix. The satellite was launched with partial on-board software and starting from the Launch and Early Orbit Phase (LEOP) it experienced unexpected thermal issues. This was only the beginning of a series of technical problems faced over the course of the next few months, with the main issue concerned with the attitude control system. The payload of the satellite requires fine pointing for it to gather images, and getting to a stable fine pointing mode has been a significant challenge for the Operations team.

The importance of this satellite lies in the embodiment of many firsts in the advancement of space technology. It is a joint product of two missions – Near Earth Space Surveillance (NESS) and High Earth Orbit Space Surveillance (HEOSS). The NESS mission funded by the CSA aims to find and track the near earth asteroids and comets within the inner solar system making NEOSSat the first space based telescope for this task. The HEOSS mission funded by the Defence Research and Development Canada(DRDC) aims to use NEOSSat to demonstrate the ability of microsatellites to perform the tracking of Resident Space Objects (RSOs). These data will be Canada's contribution to the Space Surveillance Network.

This paper highlights the Engineering challenges faced by the Operations team, the efficient steps taken and innovative techniques followed in the face of safety critical anomalies. It also highlights the streamlining of the processes and the amalgamation of the immense knowledge gained via the lessons learned. These findings will be of value for the future Canadian missions such as the upcoming M3Msat and the longer-term Radarsat Constellation Mission and can be useful for other missions around the world.