

SPACE OPERATIONS SYMPOSIUM (B6)
Mission Operations, Validation, Simulation and Training (3)

Author: Mr. Ian Mok

Defence Research and Development Canada(DRDC), Canada, ian.mok@drdc-rddc.gc.ca

PREPARATION AND VALIDATION OF DEFENCE RESEARCH AND DEVELOPMENT CANADA'S
(DRDC) MICROSATELLITE GROUND STATION

Abstract

Budgets for satellite missions are typically dictated by bus, payload, ground station, launch cost and operational staffing considerations. For traditional “big” space missions this means space-grade hardware, full operations staff, and multiple redundant systems which will drive these costs higher in comparison to those of “microspace” missions.

The Maritime Monitoring and Messaging Microsatellite (M3MSat) is a Canadian maritime surveillance satellite that seeks to apply this low cost microspace approach. M3MSat's operations station at Defence Research and Development Canada (DRDC) was developed with the same philosophy. Planned for launch into a 635 km, near sun synchronous orbit in June 2014, this satellite will afford DRDC's single ground station approximately 10 passes per day. DRDC is preparing a ground station that will operate the microsatellite with a small mission team. An emphasis on ground station and satellite control automation to conduct operations with M3MSat is a key pillar of DRDC's implementation.

This paper will document how DRDC designed, implemented, built and validated their mission operations center and ground station as well as the training of their operators for this microsatellite mission. In addition it will detail the automation techniques that are expected to enable operations with minimal operator intervention. It is also anticipated that it will be possible to limit operator intervention to regular business hours while still performing all required operations within the available contact periods. More importantly, this paper will explore aspects of the ground station design where non redundant chains were implemented and the rationale for such a design. Ultimately this paper will capture the low cost approach taken for designing and implementing the ground segment as well as DRDC's experience with an eye to further defining the acceptable level of risk for a government run microspace mission.