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Multiple Spacecraft Adaptability for Small Satellite Ground Operations

The Multiple Spacecraft Adaptability for Small Satellite Ground Operations research involves analysis of MSU's Space Science and Engineering Laboratory's current small satellite ground operations and mission procedures, and adapting those procedures for compliance with upcoming multiple-spacecraft missions. With the recent successful launch of Montana's first satellite, HRBE, currently in Earth orbit collecting and down-linking science data to MSU, there is a fundamental need to examine lessons learned and ground operations efficiency, in advance of the upcoming FIREBIRD satellite launch and mission, which involves multiple spacecraft. The Space Science and Engineering Laboratory is currently configured to run in-house ground operations of spacecraft, including down-linking of science data, up-linking commands to the spacecraft, and monitoring the spacecraft systems health from the space telecommunications operations center located within the lab. With the upcoming FIREBIRD mission slated to launch in 2013, which involves two spacecraft, fundamental changes and new configurations regarding the ground station operations need to be researched and implemented. Research involves antenna-tracking capabilities for multiple spacecraft, data-download and transmit paths using multiple ground station computers, as well as current equipment feasibility and compatibility to handle multiple transmit/receive functions simultaneously from two spacecraft. The research will provide fundamental configuration options for future missions.