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LITESAT MISSION CONTROL CENTER –COMPREHENSIVE GROUND STATION SOLUTION FOR SATELLITE CONSTELLATIONS

Abstract

The challenge of tasking and handling a multi-sensor multi-satellite constellation is a known issue in ground station management. Multiple functions and algorithms are needed to facilitate easy command and control of each satellite and the entire overall constellation, as well as distinct features in mission management from tasking to imaging exploitation and products dissemination.

We present the LiteSat Mission Control Center (MCC) as comprehensive and flexible ground station solution for the multi-sensor satellite constellation. The MCC is the ground mission control and command station for the planned LEO LiteSat Earth Observation Microsatellite System. The MCC is uniquely designed to provide the customer with an easy flow process, automated and comprehensive, from tasking to image exploitation and product dissemination.

The MCC incorporates many of the RAFAEL IMILITE's distinct features to enable application-based architecture and interchangeable workstations. In the design we have included advanced automated features that will improve the exploitation and analyzing capabilities so that it will expedite the constellation management while keeping the overall ground station required personal to a minimum. The MCC is based on modular design, so it can be part of a complete end to end system or an addition to existing ground station facilities.

Based on the RAFAEL heritage in multi-sensor mission planning, the Automatic Satellite Mission Planning System (SMPS) module can create an optimized mission plan for the multi sensor satellite array, creating an optimal image gathering plan which takes into account satellite autonomous orbit corrections. The SMPS can handle large imaging requests from multiple imaging directions and different product parameters to tasking the constellation for optimized coverage of entire countries. We will present an example of such image tasking for the overall constellation.

In addition, the MCC utilizes RAFAEL's heritage in image processing and photogrammetric products and imagery intelligence products to provide complete response to the client. Using several tools to help analysis on site, and even change detection alerts can be reinserted to the mission planning as priority photo requirement. The request product analysis can be integrated with additional existing data sources. Examples of products will be shown.

In conclusion, the LiteSat MCC is a flexible and comprehensive ground station solution for satellite constellations that provides constellation management, optimized mission planning and a variety of image processing capabilities for efficient exploitation process.