IAF SPACE OPERATIONS SYMPOSIUM (B6)
New Space Operations Concepts and Advanced Systems (2)

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ERMES: A NEWSPACE MISSION CONTROL SW SUITE

Abstract

Space scenario has been changing over last years, a number of small missions and constellation made of tens to hundreds of micro and pico-satellites are now common. The NewSpace reduced barriers to space and enabled a new generation of satellite operators. As a side effect of the approach has been that a set of consolidated tools were no longer able to fit the needs. Mission management and control SW, that had been based on big and costly SW and HW infrastructures, needed to be deeply changed. Many new, small solutions were implemented from scratch on very specific requirements case by case. But custom implementations are no more an efficient approach. The need for tools supporting NewSpace mission operators is widely shared and justifies a market for commercial solutions. The ermes SW suite was borne from Planetek's practical experience inside the ground segments: starting on ground support equipment and scientific mission, ermes is now able to provide a set of tools (along with a full development framework) intended to satellite integrators and operators.

Ermes has been designed preserving the compatibility with traditional ground segments (based on SCOS2000 mission information base and CCSDS protocols, as PUS, TMTC and SLE) and provides all the standards functionalities and interfaces, implementing a lightweight approach, integrating reliability with scalability and adopting a state-of-art technological stack. The system can be deployed in a cloud-based environment and its functionalities and graphical user interfaces are available both on a native SW client and via a web interface.

Ermes fits to support routine tasks in the ground segment's operational phase. It supports procedures (and telecommands) preparation and execution, provides systems monitoring capabilities, custom panels highlighting real time TM reception, parameters change and alarms. The on-going integration with an automated smart telemetry checking module (CASTeC by SATE amd Planetek) adds predictive capabilities learning from reference telemetries and evaluating system status, highlighting critical values, trends and un-expected behaviors, for mission operators support.

Ermes is a tool fitting to needs of different user's roles and different phases in the frame of small (to large) space missions and allows for costs optimization in design and operations. It is now adopted for the Solar Wind Analyser instruments suite (onboard Solar Orbiter) monitoring, in the Space Data Gateway project, in STRIVING IOD/IOV mission ground segment and will be also part of the ground segment of PLATiNO 1 and PLATiNO 2 missions from the Italian Space Agency.