

IAF SPACE OPERATIONS SYMPOSIUM (B6)
Ground Operations - Systems and Solutions (1)

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MULTI-MISSION MSC & SDC: SHARED INFRASTRUCTURES, FRAMEWORKS AND FACILITIES
FOR GROUND SEGMENT

Abstract

The continuous expansion in the space economy over recent years has led to a notable increase in the demand for ground segments to be developed for the preparation and execution of mission operations. This growth introduces also heightened complexity, demanding the fulfilment of challenging requirements in performance, reliability and security.

In this context, ALTEC has chosen to embrace an innovative approach in the realization of ground segment, shifting from the traditional view of the ground segment as a product to the new paradigm of ground segment as a service. Various elements of the ground segment, spanning mission control and science processing, have been identified as valuable assets within ALTEC. This strategy fosters a culture of sharing, reuse and customization, essential for the development of ground segments for both mission control and science processing.

The ALTEC Multipurpose Mission Operations and Support Center (MOSC) provides ground control center functions for different mission in parallel, in a multi-mission platform based on consolidated virtualization technologies. A set of common infrastructure services and operational tools are shared and/or replicated though the different mission contexts, promoting re-usage philosophy with a cost-reduction effect. Equipped with an high-speed Internet connectivity and interconnected to ASI and ESA dedicated lines, to reach pivotal ESA and NASA mission centers. Ultimately, operations teams can leverage the MOSC services, either utilizing the Operations control room, which is equipped with operational consoles, a voice loop, video system, and all essential tools for efficient mission operations, or through secure remote access, when permitted.

The ALTEC Multi Mission Science Data Center (MM-SDC) is designed as a ground science center, integrating dedicated infrastructure within a unified framework. Unlike MOSC infrastructure, GAIA-DPCT and Euclid SDC-IT-OPS demand dedicated resources for their high computational and storage needs. However, MM-SDC employs a state-of-the-art cloud development platform for the project's initial phase. Additionally, the new Science Data Center within MM-SDC can utilise ALTEC data processing and management frameworks (i.e. ASDP and ASDTR) already tailored for space science and space weather data products. Lastly, MM-SDC operations room is configurable for new missions, featuring operational consoles, data access services and secure remote connectivity.

Both MOSC and MM-SDC are also equipped with a comprehensive security framework aligned with the ISO 27001 standard, providing usable services to proactively manage security measures.

This integrated approach reflects ALTEC's commitment to ground segment innovation, adaptability and evolution addressing the rapidly evolving landscape of space missions.