

SPACE OPERATIONS SYMPOSIUM (B6)
New Operations Concepts (2)

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AUTOMATION OF OPERATIONAL ROUTINE TASKS IN ESOC EARTH OBSERVATION MISSIONS

Abstract

The European Space Agency (ESA) has a long and successful history in mission operations. As all satellite missions have similar fundamental operation requirements, ESA provides a common infrastructure for Mission Control Systems (MCS). Furthermore, ESA is exploiting commonalities between the Earth Observation Missions. Over the years, a very stable MCS Kernel for Earth Observation Missions has evolved. Spacecraft become more and more autonomous and the cost and complexity of mission operations becomes an increasing concern. So it becomes more important for new missions to consider the automation of routine operational tasks in order to save operator time and restrict operations to normal working hours. The Earth Observation Mission Aeolus is taking the lead in specifying and developing a mission automation concept for routine ground operations. In order to avoid having to redevelop existing functionality for automation, ESA has introduced a generic middleware layer to its MCS software. It publishes services of the existing infrastructure to be published in a form that they can be accessed by an external automation tool. Thus, existing and established MCS functions can be automated. Since Aeolus is the first mission to plan to use the new automation tools operationally, a very conservative approach has been followed when deciding which operational aspects shall be automated. Currently, a subset of routine operation procedures has been selected: opening and closing of communication links to ground stations and replaying of offline telemetry files. As experience and confidence with the automation tools grow it can be expected that more procedures could be considered to be safe for automation. This paper presents all aspects of automation of operational routine tasks: the technical challenges as to how existing items can be controlled for automation, how automation schedules are generated and controlled and which operational tasks are thought to be fit for automation on the example of the Earth Observation Mission Aeolus. All components of the automation systems are in place for the Aeolus Mission Control System by now. They are undergoing detailed validation and verification. First experiences with the application of the automation system are presented in the paper. A short outlook on how mission automation concepts can evolve for future missions is pointing out the further capabilities of mission automation.