

SPACE OPERATIONS SYMPOSIUM (B6)

New Operations Concepts, Advanced Systems and Commercial Space Operations (2)

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DEVELOPMENT OF ANYWHERE SATELLITE OPERATION SYSTEM

Abstract

We use automatic satellite operation system for daily operation of small satellite REIMEI. The automatic satellite operation system is developed to reduce human load and operation cost of its steady operation phase. In the automatic satellite operation system, a scheduler software as a substitutive operator manages all the operations through a unified procedure. The scheduler reads an XML-based schedule file of the operation sequences, which is a part of satellite operation procedure. The scheduler manages sending command, receiving telemetry, and driving antenna in accordance with an operation timeline which is prepared before the operation pass. The scheduler also performs diagnostics of satellite anomaly based upon the received telemetry data and status of the ground station. In case that some anomaly of the satellite or the ground station is detected, the scheduler initiates an emergency schedule that was prepared depending on the emergency level. If the emergency is serious, the scheduler calls up or mails to an appropriate staff for the emergency. The system automatically performs antenna drive, downlink signal lock-on, uplink acquisition, satellite health check, command uplink, data downlink, and lock-off during visible time. This approach is very effective to reduce psychological and physical load of operators in daily operation of REIMEI. To extend or complement functions of our automatic operation system, we are in progress to develop a system for remote operation of satellite using mobile gear, for example, tablet or smart phone, as well as personal computers. With this remote operation system, we call "Anywhere Satellite Operation System", operators can monitor status of satellite and ground station anywhere via internet especially via wireless environment. In addition, on receiving emergency call, operator can send appropriate commands or prepared operation plans by controlling automatic operation system via secure network. In this paper, we introduce the basic concept of our "Anywhere Satellite Operation System" as well as some experimental results of automatic and remote operations to show how our system is effective to reduce human load and operation cost.