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

Author: Mr. Thomas Kuch
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany

Dr. Nicolaus Hanowski
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany
Dr. Martin Wickler
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany

# THE MULTI-MISSION OPERATIONS CONCEPT AT THE GERMAN SPACE OPERATIONS CENTER

**Abstract**

The paper describes capabilities and activities of the German Space Operations Center (GSOC) which operates communication, navigation and earth observation satellites as well as Columbus, a human spaceflight mission. DLR offers its partners operations services for the different mission types on a modular basis. For many mission types DLR has the advantage to further offer the complete end-to-end services by additionally involving DLR's Remote Sensing Data Center and several DLR research institutes like the Remote Sensing Technology, the Microwave and Radar, the Robotics and Mechatronics and the Communications and Navigation institutes, that are all located at the same DLR site in Oberpfaffenhofen near Munich.

GSOC support the phases Operations Preparation, Training and Simulation, LEOP Operations, Commissioning Phase, In-Orbit-Tests and Routine Operations. Regarding the Operations Systems GSOC provides the Development, Configuration, Operations and Maintenance of Monitoring Control System, Mission Planning System and Flight Dynamics System. GSOC manages the Operations and Maintenance of Control Room Facilities, Computer Systems, Local and Wide Area Networks as well as DLR Ground Station and a Network of Ground Stations of our partner organizations.

The typical Earth observation mission is run at GSOC in a multi mission mode. A single multi-mission operations team controls 4-6 satellites on 24h/7days a week from the satellite control center. Currently the missions CHAMP, GRACE, BIRD and TerraSAR-X are supported. For Communication satellites like the SATCOMBw mission GSOC has a dedicated 1st level operations team which is supported by project dedicated 2nd level subsystem engineers. For Galileo, the new European Navigation Satellite System, another specialized team in the new Galileo Control Center building is going to manage and operate this mission. The future area of On-Orbit Servicing satellite missions will also require a dedicated 1st level operations team, but GSOC seeks synergies on the subsystem operations engineers' level with other missions. The demanding Human Spaceflight mission Columbus requires a dedicated 1st level support for the 24/7 operations of up to 70 people to cover at least 6 on-console positions at Col-CC at any time. They are supported by another team which is mainly responsible for facility operations and maintenance. In February 2008 the Columbus laboratory was finally attached to the ISS and the Columbus Control Center in Munich actively joined the ISS mission control centers.

The paper depicts the synergies of a multi mission control center but also shows the areas where the projects run on independent systems and teams.

The author is head of DLR's mission operations department and deputy director of the German Space Operations Center GSOC, the home of DLR's Satellite Control center, the Columbus Control Center and the German Galileo Control Center.