Paper ID: 23999
oral
student

SPACE OPERATIONS SYMPOSIUM (B6)
Mission Operations, Validation, Simulation and Training (3)

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BRITE-AUSTRIA MISSION OPERATIONS PHASE - FIRST RESULTS AND LESSONS LEARNED

Abstract

In February 2014 BRITE-Austria celebrated its first year of operations in orbit. The satellite is in its routine operations phase, collecting photometric data of massive luminous stars with a small space telescope sensitive in the blue spectral range. Since October 2013 BRITE-Austria and its sister satellite UniBRITE, hosting a red sensitive instrument, started the first scientific observing campaign. During this campaign, image data of the 15 brightest stars in the Orion constellation, selected by corresponding regions of interest on the instrument's CCD, are collected for typically 15 minutes every orbit. The results provide clear evidence that the performance of the instruments as well as of the spacecraft's Attitude Determination and Control System (ADCS) is better than set in the mission requirements. The results are further augmented by occasional overlaps in the observations of targets with the MOST satellite, providing a good reference for performance evaluation of the BRITE instruments. In addition, the combined data are of high scientific value. This has been successfully demonstrated with one star in the Orion field during December 2013. The scientific output will be further increased once the full BRITE constellation with six satellites is operative.

The BRITE-Austria spacecraft is operated from its mission control centre at Graz University of Technology (Austria), co-located with its master ground station, which is part of the BRITE ground station network.

The paper presents the mission operations concept for the BRITE-Austria operations phase. First, mission planning processes are described. These include long term planning of observations by selection of targets, as well as scheduling of the nominal observation cycle under consideration of target visibilities and operational constrains. Subsequently, operations execution is illustrated, including satellite configuration (real-time and automated) as well as automated observation execution and data download. Next, evaluation processes of the mission are presented, including strategies for data storage and dissemination in near real time, as well as science data processing and evaluation. In addition, satellite housekeeping telemetry validation in real time and post-processing are presented. Finally, mission exploitation processes are described. In this respect, the BRITE Executive Science Team (BEST), consisting of an international group of scientists, acts as steering committee and is in charge for the dissemination, distribution, and publication of the scientific results and data products. Furthermore, support processes for operations are shown, including ground segment coordination among the different stations in the network, ground segment automation and scheduling, as well as routine maintenance tasks.