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EXPERIENCE IN COMMISSIONING AND OPERATIONS OF THE BRITE-AUSTRIA NANOSATELLITE MISSION

Abstract

The Bright Target Explorer (BRITE) mission observes the brightness variations of the brightest stars in the sky, including massive luminous stars in the solar neighbourhood. The mission is an international cooperation involving partners in Austria, Canada, and Poland. The space segment will consist of six nanosatellites called BRITE-Constellation, two of each country. The main payload of each satellite is a photometric instrument, a 3 cm aperture telescope with a CCD sensor in its focal plane. Each pair of satellites will have one instrument sensitive in a red and the other in a blue wavelength range, allowing differential photometry to enhance the understanding of the nature of the stars observed.

The first two satellites, BRITE-Austria and UniBRITE, will be launched on February 25th 2013 on the Indian PSLV-C20. A ground station network is used as ground segment, including ground stations in Austria (Graz and Vienna), Canada (Toronto), and Poland (Warsaw). The operations concept for the constellation is based on a primary mission control centre for each spacecraft, with the other stations serving as a backup. The first Austrian satellite, BRITE-Austria, will be commissioned and operated from its mission control centre in Graz.

This paper focuses on the planning and execution of commissioning and operations for BRITE-Austria, including impressions and lessons learned.

As the orbit of the spacecraft is a sun-synchronous dawn-dusk orbit at about 780km altitude, contacts with the ground station will occur in the early morning and in the late afternoon. The commissioning phase will require a substantial extent of human interaction, thus demanding shift operations. The generation of daily reports as well as record keeping of operations logs will ensure smooth handovers between the operators in different shifts. In addition, the commissioning of BRITE-Austria from Graz will benefit of the parallel commissioning of its sister satellite UniBRITE from Toronto. This allows operators to exchange experiences gained and lessons learned, as well as to develop possible countermeasures in case of unexpected behaviour.

In contrast to the large level of human interaction during commissioning, operations is foreseen to be performed fully automated. This is achieved by pre-configuration of the required setup parameters, serving the observation of the target stars with the use of time tagged commands. Besides, the ground station is configured to provide remote access for monitoring and control for the operators.