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FIRST MEASUREMENTS AT THE OPTICAL GROUND STATION IN TRAUEN

Abstract

The market for data-intensive services is flourishing and more and more data is being transmitted from satellites to Earth. The huge amounts of data from earth observation and science missions are just two prime examples. As a result of large data transfers, the freely available bandwidth is constantly becoming scarcer and the frequency of connection issues is increasing. The use of free-space optical communication (FSOC) can fulfil these evolving and demanding requirements on bandwidth and interference tolerance of future satellite communication. Thereby, the integration of FSOC offers a flexible and scalable architecture that enables high-rate communication without licences. Those unique features are complementing conventional radio-frequency links because of the inherent interference tolerance. Current examples of functioning systems in use are the European Data Relay Satellite (EDRS) system for links in space and the miniature satellite PIXL-1, which was used last year to experimentally demonstrate complete end-to-end data transmission by laser, from image acquisition to evaluation on the ground.

This year, the RSC3 is starting the first experiments on optical data transmission with the optical ground station (OGS) in Trauen (Laser-Bodenstation Trauen, LaBoT). The paper presents the current status of the station and the first experimental data recorded with it. The first measurements serve as a starting point to characterise the optical channel and the local environmental conditions on site.

We aim to profile the performance of the optical ground station in real word scenarios that are typical for practical applications. Once this crucial step is completed, our ground station will be able to contribute as an active member to a larger network with a growing number of ground stations.