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Title

First operational tests with the optical ground station at Trauen

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Abstract

The market of Earth observation is about to boom and more and more data is transferred from space to ground. At the same time, the number of available bands in the microwave spectrum is a highly limited and for that a strictly regulated resource. Consequently, optical frequencies are operationally utilized for inter-satellite communications. By now, the European Data Relay Satellite (EDRS) System is one running example [1].

Not only in the space domain, laser-communication increases the link security, decreases signal interference, and relieves licensing procedures. Applying this technology to direct-to-Earth downlinks is a great opportunity for high-throughput nodes to reduce connection duration and operational costs per transferred data bit.

At the beginning of the year 2023, the RSC³ started the construction of LaBoT (Laser-Bodenstation Trauen), which is an optical ground station (OGS) based on a 70cm mirror telescope [2]. Our goal is to perform Laser-based communication with satellites in low-Earth orbits (LEOs) by utilizing the Small OGS Focal-Optics Assembly (SOFA) [3]. Particularly, the station will connect to terminals following the CCSDS standard for Optical On-Off Keying (OOK) such as OSIRIS [4].

Starting with the design of the station, we will show the current operational state of the OGS and discuss its ongoing commissioning. Eventually, the station will contribute to the overall link availability of the DLR ground station network. The deployable design of the ground station enables relocations to different places. The impact of regionally changing conditions in the atmosphere can be investigated and differences may be characterized as a consequence.

References

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