Lehrstuhl für Raumfahrttechnik (Prof. Walter)

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Titel des Beitrags:
Real-Time Earth Observation via Data-Relay Satellites for quick Response Services

Abstract:
The focus of the Institute of Astronautics (LRT) at the Technical University Munich (TUM) is to analyze concepts and to develop technologies for real-time data link functionalities (a.k.a. telepresence) in space. In a typical telepresence scenario a satellite in low earth orbit (LEO) is interactively and continuously teleoperated by a ground operator via geostationary data relay satellite (DRS). Utilizing only one DRS, teleoperation times can be extended to 45-50 min. every orbit, while classical ground station passes are limited to about 10 minutes, roughly twice a day. Teleoperation times can be enhanced up to nearly continuous operation using two DRSs. However, low latency data handling and high data rate transfer is essential for such a scenario. In the past, LRT’s measurements involving ESA’s ARTEMIS as DRS have shown that roundtrip delays in the order of physical constraints resulting from the distance between Earth and geostationary orbit (about 0.6 s) can be achieved and are practicable for real-time teleoperations. This paper presents the potentials and limitations of continuous, long duration real-time applications for Earth observation and robotics in space focusing on technological requirements and architecture considerations giving an overview of current technology development.

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