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AUTOMATIZATION OF THE STATION KEEPING MANEUVERS OF THE GEOSTATIONARY
SATELLITE EDRS-C

Abstract

Geostationary satellites are affected by non-keplerian forces, such as the gravitational forces of the Sun and the Moon and the not homogeneous gravitational field of the earth. These forces must be countered by station keeping maneuvers in order to remain within the control box in geostationary orbit. In 2019 the second geostationary node of the European Data Relay System (EDRS), also known as SpaceDataHighway, has been launched into orbit. The SpaceDataHighway is a public-private partnership between the European Space Agency (ESA) and Airbus, with the laser terminals developed by Tesat-Spacecom and the DLR German Space Administration. Commercial services for the SpaceDataHighway are provided by Airbus, which owns and operates the System. The satellites' operations of EDRS are conducted by the German Space Operations Center (GSOC) at Oberpfaffenhofen. With the control box of EDRS-C being limited to a 0.05 degree sector, instead of the typical 0.1 degree, the number of required station keeping maneuvers is higher than on typical geostationary missions. In order to accomplish these increased operations, an existing capability of the advanced EDRS satellite control center will be utilized: The automatic execution of satellite operations. The high command load to accomplish up to 400 optical inter satellite links is beyond the capabilities of a classical operational concept with manual operations. Therefore an automated system has been implemented, with human interaction only necessary in case of an anomaly either in the ground processing or the space segment. This paper will present the new component ViPER that has been added to the design to automate the station keeping maneuvers of the satellite. The new component is utilizing the existing automatization system of the Satellite Control Centre (SCC) to execute prepared Flight Operations Procedures. Based on a schedule delivered by the SCC's Flight Dynamic System, it conducts the preparation of the maneuvers, monitors the execution and process the result for the remaining lifetime estimation. The design of the process, its implementation as well as first experiences in flight will be presented.