

IAF SPACE OPERATIONS SYMPOSIUM (B6)
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METOP-SG MISSION ROUTINE DUMPS OPERATION PREPARATION

Abstract

The second Generation European Polar System (EPS-SG) mission is the continuation of the current European Polar System (EPS) mission and is composed of three pairs of satellites, Metop-SG A and B. Launch of the first satellite Metop-SG-A1 is planned in March 2025. The satellites will store mission data and full orbit data will be dumped via Ka-band to the Northern Ground station at Svalbard. In addition, a half orbit of the stored data will be dumped to the Southern station at McMurdo. To be able to monitor the spacecraft's health status, recorded full orbit House-Keeping Telemetry (HKTM) will be dumped via S-band over Svalbard.

This paper's main purpose is to present the preparation of Routine S-band and Ka-band Dump Operations. The planned dump operations are implemented using a combination of several Packet Utilization Standard (PUS) services: TC Sequencer, Orbit Position Scheduling (OPS), and Large Data Transfer services. In this dump operation plan, Multi-Repeat Cycle (MRC) commands for 412 orbit repeat cycle are stored permanently into the On-Board Computer (OBC) Mass Memory (MM) as Onboard TC Sequences (OBTS), which are uplinked via PUS S13. The advantage of this approach is that there will be no need to re-uplink the dump commands after spacecraft contingencies. The loaded OBTSs can be executed anytime to re-populate the OPS subschedules with the relevant MRC commands thanks to the implementation of the Central Software (CSW) algorithm which re-computes the MRCs orbit tag, an orbit tag in the past with respect to the current position are inserted into the next repeat cycles in the future.

For S-band operations 4 OBTS, and for Ka-band 5 OBTSs were created. A specific python based tool was developed to generate MRC commands Saved Stack File (SSF). An automated procedure was created to convert it to the format which is used for uplink via PUS S13. This procedure was divided into two parts to be able to uplink several OBTS files at once instead of one by one. The first part is used to prepare several ground OBTS files to make them ready for the uplink and can be run outside of the pass to give the user enough time to perform the necessary checks before the pass. The second part is used to be run during the pass just for the uplink.

The presented dump operations have been successfully validated during Operational Scenario Validation (OSV) tests.