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SENTINEL-3 PAYLOAD DATA GROUND SEGMENT ARCHITECTURE AND OPERATIONS

Abstract

Sentinel-3 is one of the families of Sentinel missions specifically designed for Copernicus, the European programme for the establishment of a European capacity for Earth Observation. It will provide medium-resolution and high-accuracy optical, radar and altimetry data with adequate revisit frequency, coverage and timeliness for marine and land applications. Sentinel-3A was launched from the Plesetsk Cosmodrome on 16th February 2016.

The Sentinel-3 Payload Data Ground Segment (PDGS) is responsible for acquisition, processing, archiving and dissemination of the Sentinel-3 mission data. The PDGS is currently implemented by ESA in conjunction with EUMETSAT, with Telespazio VEGA Deutschland as prime contractor for the implementation of the Core PDGS.

The architecture of the PDGS is essentially driven by the mission operational concept, relying on (a) systematic acquisition fully driven by pre-defined plans based on events; (b) systematic generation of all mission products; and (c) dissemination to the users based on a subscription mechanism, whereby the users subscribe to data sets, which are then automatically and systematically delivered within strict timeliness constraints.

The Near Real Time (NRT) products are made available to the users within 3 hours from sensing based on the auxiliary data available at this stage. The Short Time Critical (STC) and Non Time Critical (NTC) improved products are provided within 48 hours and 1 month respectively.

The large amount of data generated by the mission combined with the strong timeliness constraints have required the development of a highly automated system with full data-driven production and dissemination relying on a mechanism of pipelining.

The launch version of the system was completed in 2015, and deployed at the Core Ground Station at Svalbard (Norway), and at the processing and archiving centres at EUMETSAT in Darmstadt (Germany), DLR at Oberpfaffenhofen (Germany), ACRI in Sophia Antipolis (France) and CLS in Toulouse (France). In addition a Mission Performance Centre and a Payload Data Management Centre was deployed at ACRI. The final version of the system will be deployed at the end of the commissioning phase and include additional functionality essentially in the domain of mission performance monitoring.

The paper will provide an overview of the implementation of the Sentinel-3 PDGS, concentrating on the architecture and deployment of the successive versions, and discuss the lessons learned during the first months of operations.