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THE SENTINEL-3 PAYLOAD DATA GROUND SEGMENT ELEMENTS – DESIGNED FOR SCALABILITY AND ADAPTABILITY

Abstract

The Sentinel-3 Payload Data Ground Segment (PDGS) in its current configuration includes a Core Ground Station, three Land Processing and Archiving centres with varying responsibilities, a Marine Processing and Archiving centre, a Payload Data Management Centre and a Mission Performance Centre. This paper focusses on the processing and archiving centres with their common and configurable elements.

The Sentinel-3 PDGS is charged with mission planning operations for instrument sensing and satellite downlink, the systematic and timely production and distribution of Sentinel-3 data products up to Level 2, the long-term data archiving, the products calibration and validation as well as instrument performance monitoring activities.

A particularity of the Sentinel-3 PDGS is the separation of the production into specialized centres for land and marine data processing. The Sentinel-3 PDGS software elements have been designed to be adaptable for these different centre configurations and to allow for a straightforward integration into the host organizations infrastructures with varying interfaces for reporting and monitoring and control.

In addition, several mission reconfiguration and resizing exercises have been supported by configuration of the Sentinel-3 PDGS elements, ranging from the initial operations during the Sentinel-3A satellite commissioning to the Sentinel-3A routine operations with extended processing scenarios and the launch and commissioning of the Sentinel-3B satellite unit.

The PDGS design provides flexibility with respect to the number of active core stations and processing or archiving centres and the allocation of storage, production and dissemination activity across the centres. Key flexibility features include the capability to load balance functionality across a configurable number of elements for many functions, dynamically reconfigurable rule-based production and dissemination control as well as configurable production cluster size and topology. Since its launch in February 2016, the Sentinel-3 PDGS has been handling the data stream from the satellites 4 instruments with anoverall incoming data rate of 0.5 TB/day and a production rate up to level 2 of about 4.2 TB/day.

This presentation focuses on the Sentinel-3 PDGS system production and data flow design with emphasis on the configurability and workflow control features. We present up-to-date production performance figures from the first two years of operation. Based on the figures and the operational experience it

is shown that certain software and hardware features and architectural patterns were instrumental in ensuring the flexibility and configurability that was needed to integrate the software in the various organizational contexts of the hosting organizations and to scale up for growth.