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ORBIS: EARTH OBSERVATION MISSION SERVICE FOR PROCESSING RAW TO
ANALYSIS-READY DATA

Abstract

In recent years, there has been a rapid expansion of satellite Earth Observation missions in the private sector through increasing affordability and accelerating adoption processes. While the almost serial production of payloads opens new opportunities in the EO economy, it should equally emphasize the accessibility, reliability and agility of data processing and distribution. In response, World from Space is developing Orbis, a cloud-based service for processing raw satellite imagery to standardized, analysis-ready EO products. The service is focused on NewSpace missions and targets agnostic accommodation of payloads and configuring tailored processing pipelines to account for the mission specifics.

The first phase of the development targets building a system prototype with abilities of novel data ingestion, mission setup, image processing, quality assessment and product distribution. An ingestion API will be provided to unify data flows to the system directly from a Mission Operation Centre. The processing will include rectification of sensing errors, radiometric, geometric and atmospheric corrections and higher-level processing operations to enhance usability and interoperability. The system will focus on lightweight processing by utilizing metadata and suitable reference data. The quality control will evaluate cal/val and performance datasets and connect them to processing results to improve the uncertainty budget and derive quality indicators. Resulting EO products will be generated in a standard-compliant way with consistent metadata. The distribution to customers will rely on cloud-native technologies and formats.

The service- and cloud-based model of Orbis means that its deployment, operations and upgrades can be fully managed by World from Space, so the mission is accompanied continuously throughout its lifetime. In future development phases, it is planned to extend services to advanced payload-related analyses, complete ground and in-orbit calibration/validation and adaptability to on-board data processing, including operations traditionally reserved for ground processing.

Orbis presents a technical response to the rapidly advancing EO domain in the NewSpace business. This requires (1) agnostic EO processing expertise while (2) being available to carry out results even with little input information or insufficient technical conception from the customer and (3) being affordable with flexible business models at various scales. These efforts make Orbis a relevant solution for contemporary and future space-based observation challenges.