30th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Small Earth Observation Missions (4)

Author: Mrs. Viktoriya Dimov
EnduroSat AD, Bulgaria

Mr. Emmanuel Sauzay
Airbus Defence & Space, France

THE BALKAN CONSTELLATION - COPERNICUS CONTRIBUTION MISSION WITH REGIONAL IMPACT

Abstract

Earth Observation infrastructure is one of the most valuable assets for humanity. Data produced by Earth Observation satellites is crucial to track climate change, improve agriculture, weather forecasting and disaster management. However, the currently available space-based sensors do not provide the required temporal resolution to achieve advanced monitoring system at a national and regional scale.

To address this issue, EnduroSat is launching a cutting-edge Earth Observation data delivery service – the BALKAN constellation. The constellation will consist of multispectral and hyperspectral sensors hosted on EnduroSat's small satellite platforms. The BALKAN constellation will start with a pilot phase of two satellites, with the first satellite to be launched in 2024. These two satellites have been selected as one of the Copernicus Contributing Missions by the European Union and ESA. In a second step, EnduroSat is going to expand the constellation by adding more satellites and sensors in orbit. The plan is to deploy a total of 120 satellites with multispectral and hyperspectral imagers between 2024 and 2027.

The core innovation of the spacecraft is that they are software-defined, plug play platforms, capable of in-orbit configurations and updates. The cutting-edge multispectral cameras can provide a native GSD of 1.5 m in 7 bands. The powerful on-board processing device allows execution of complex AI algorithms, enabling automatic detection and download of data based on pattern recognition. It will allow customers to deploy apps running directly on the satellite, monitoring unprecedented surfaces from space. The mission is intended as a show case of continuous real-time processing on high-resolution optical data. The processing will rely on image equalization on board and simplified Deep Neural Networks. The innovative concept for a software-defined platform with exceptional resolution, on-board processing and GEO-relay message transmission capabilities would enable unprecedented European data intelligence service.

The BALKAN constellation will provide incomparable revisit time and scalability, as well as unmatched operational flexibility, facilitated by the short time to launch and streamlined in-house satellite development. A constellation of 120 satellites will bring revisit times from once a week to several minutes, complementing large satellites' data and substantially reducing spatial and temporal aliasing in prediction models. The BALKAN constellation has the potential to provide up to 20-30% overall increase of Earth Observation data and complement the Copernicus database with unrivalled local information and temporal resolution. The data service will vastly improve digital governance and data-driven decision making in the Balkan region.