

IAF EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Systems (2)

Author: Dr. Andrew Carrel
Clyde Space Ltd., United Kingdom

Mr. Phillip Webster
Clyde Space Ltd, United Kingdom
Mr. Enes Erdogan
Clyde Space Ltd, United Kingdom

CYCLOPS: A NEW RAPID REVISIT, HIGH-RESOLUTION EARTH OBSERVATION
CONSTELLATION FOR LAND MANAGEMENT

Abstract

The Earth Observation (EO) data market is growing rapidly with EUSPA forecasting that the global market will grow to 6bn in EO data and value-added services by 2033. This growth is increasingly driven by SmallSat and CubeSat constellations that can be launched at relatively low cost, making the EO market more accessible and competitive.

This abstract presents the new Cyclops EO constellation that AAC Clyde Space will launch in 2025 to provide high-resolution, multi-spectral imaging capability using CubeSat technology but incorporating many of the features users are familiar with from more traditional, larger systems. This builds on AAC Clyde Space's 16U EpicVIEW Max platform, developed under the xSPANCION programme as part of ESA's ARTES Pioneer programme. The payload is provided by Simera Sense, who's innovative camera design is optimised to be accommodated in this size of platform.

The system is designed to provide VNIR spectral data for use in agriculture, forestry and other land management applications. The spectral bands are aligned to Sentinel-2, which will allow the wealth of research and development invested in algorithms to analyse this data to be applied at a higher resolution. In addition to good spatial and spectral coverage, the constellation will offer a daily revisit across the globe. For this to be achieved consistently, orbit control is required and the platform incorporates cutting-edge CubeSat electric propulsion. This is also envisaged to de-orbit the satellites in a controlled manner at end-of-life, making more sustainable use of the space environment. This paper will describe this and other key features that enable large volumes of high-resolution EO data to be provided with global coverage and daily revisit within the constraints of a CubeSat system that keeps costs to a minimum.

This mission will also incorporate some novel technology demonstration features that will be presented, including a payload computer for onboard data processing and an inter-satellite link that could be used to expedite image tasking in near-real time as the constellation expands.

The paper will also describe some of the applications that this new EO data supply will enable. These applications are targeted at enabling more sustainable use of limited natural resources and protecting ecosystems under threat from climate change.