IAF EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Sensors and Technology (3)

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EAGLEEYE TELESCOPE FOR VLEO APPLICATIONS

Abstract

This paper describes the on-going development process of Imaging Payload for an Earth Observation mission which is meant to be integrated into the microsatellite platform as part of the EagleEye mission. The EagleEye will serve as an In-orbit demonstration (IOD) of both the platform and payload at the end of 2023. The main novelty of this payload is the ability to acquire 1 m resolution (Ground Sampling Distance – GSD) from 350 km very low Earth orbit (VLEO) in both VIS and NIR. To ensure that the desired operational parameters will be achieved and the orbit will be maintained through the mission's lifetime, the platform – develop by other entities working in consortium with Scanway – will be equipped with an engine for orbital corrections. Telescope itself will be based on Ritchey-Chretien design and while maintaining a circular aperture of about 200 mm it will have a relatively small depth (along the optical path) for better integration with the platform. Such design constraint translates to different approach to designing optical path, individual optical/structural elements and what is most important – their position relative to each other. The payload will be developed to ensure simultaneous imaging in both VIS and NIR through the same telescope aperture using two separate CMOS area-scan sensors. The whole concept of the optical payload is aiming to uphold optimal imaging capacity by implementing concepts of athermal structure by the careful use of modern bespoke composites materials, titanium alloys or Invar components in highly optimised and compact design. Dual sensor idea will allow for upholding of advanced functionality despite the use of COTS and ITAR-free sensors, what is positively influencing both budget and timeline of the project and will be a baseline for future scalability of the concept. This paper focuses on challenges of the design process both in optical and mechanical domain and describes various trade-offs that needed to be done to get the design and breadboards ready for the preliminary

design review (PDR).