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Space Debris Detection, Tracking and Characterization - SST (1)

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VISDOMS: VERIFICATION OF IN-SITU DEBRIS OPTICAL MONITORING FROM SPACE

Abstract

Optical Monitoring of Space Debris from Space has been considered since long to enhance our knowledge about small debris population, distribution and the temporal dynamics over time. ESA has therefore recently started the development of a small satellite mission to monitor space debris in the mm to cm range employing a dedicated optical telescope. The VISDOMS mission is based on a novel optical telescope concept also previously known as Space-Based Optical Component (SBOC) that is being developed by ESA under the industrial lead of Airbus Defence and Space. The development of the instrument has meanwhile almost passed its preliminary definition phase and is currently finalising its baseline design tailored towards a swift and affordable development before entering the detailed definition phase.

The VISDOMS Instrument (VI) development is considered to be compatible with a hosted payload approach having potential joint undertakings with other international players in mind. However, in order to ensure the development and implementation of the observational capability, the VI development is now embedded into a small satellite mission development for which the preliminary definition phase is about to start. The aim of this phase is on one hand to verify the compatibility of VI with flying it on commercial small satellite platforms and on the other to define the observing system necessary to fulfil the mission objectives. The mission concept is based on a small satellite injected into a dawn-dusk orbit at an altitude between 600 km and 900 km carrying the VI optical telescope with an aperture of about 20 cm. The proposed orbit will allow the telescope to monitor space debris in anti-sun direction with a field of regard close to 2*Pi thereby. It is expected that about 2000 objects will be detected annually. The

mission shall further explore the tracking of objects beyond LEO up to the GEO range, for which objects of less than 1m diameter are in reach.

The paper will describe the mission objectives, its architecture, the expected mission performance based on the current instrument design and detection methods, and it will give an outline of the preliminary definition of VISDOMS as far as it has progressed.