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SYMPOSIUM ON TECHNOLOGICAL REQUIREMENTS FOR FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS (A7)
Technology Needs for Future Missions, Platforms (3)

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SYSTEM DESIGN CHALLENGES OF HIGH-PRECISION PHOTOMETRY OBSERVATION FOR THE PLATO MISSION

Abstract

This paper presents OHB's current mission and system design for the ESA PLAnetary Transits and Oscillation of stars (PLATO). PLATO is a high-precision photometry mission and aims to detect terrestrial exoplanets in the habitable zone of solar-type stars and to characterise their bulk properties. It is currently studied in a phase B1 under ESA contract after its selection as the M3 mission in ESA's Cosmic Vision Programme in February 2014. The selection was based on the recommendation of the Space Science Advisory Committee. One of the three parallel industrial studies is led by OHB. This paper focuses on the current Phase-B1 system concept for the PLATO mission addressing system design and operational scenarios. Special focus is placed on system level impacts of the driving pointing requirements and payload protection as well as on the system level trade-offs performed to optimise the science return.

PLATO will be launched on a Soyuz launcher from Kourou in early 2024, into a transfer trajectory to the Sun-Earth L2 point. The observing plan over six years nominal operations consists of a combination of two long-observation target fields and a step-and-stare phase where a large number of different fields are observed. Analyses of the light curves enable the detection of transiting planets, radius measurement and characterization of the parent star. The payload consists of 32 normal and 2 fast dioptric telescopes with support electronics, which are provided through a consortium of science institutes and represent CFIs to the system activity. The system phase B1 study focuses on the so-called Service Module (SVM) and payload module (PLM). The latter denotes the optical bench required for camera mounting, as well as the harness and thermal control for the payload module. The SVM supports the PLM during launch and provides all avionics support required to perform the mission objectives.

This paper shows how the OHB consortium plans to overcome the challenges posed by this unique mission scenario.