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PLATO PASSES ITS CRITICAL MILESTONE REVIEW: GREEN LIGHT FOR PRODUCTION OF FLIGHT HARDWARE, SPACECRAFT STATUS AND OVERVIEW

Abstract

PLAnetary Transits and Oscillations of stars (PLATO) is being built to detect a large number of terrestrial exoplanets in the habitable zone around solar-like stars. With this medium class ESA mission of the Cosmic Vision program, it will be possible to characterize these exoplanets and their host stars.
PLATO will be orbiting around the Lagrangian point L2 of the Sun-Earth system. 26 cameras (24 normal cameras and 2 fast cameras) are accommodated on the satellite to perform long (3.85 days), high precision

observations of large samples of stars.
The detection and characterization of planetary transits that alter the observed light curves reveal the required information about the transiting planets.
The characterization of the light curves coming from these long, uninterrupted and highly stable observations is the key to the scientific goal of the PLATO mission.

As such, demanding long term pointing performance requirements (3.85 days) as well as short term pointing requirements (25 seconds) need to be fulfilled to achieve the PLATO scientific goal.
Due to this large frequency range of the pointing requirements (3 Hz to 40 mHz) the satellite disturbance sources that need to be considered range from thermo-elastic effects at low frequencies to attitude control stability and microvibrations at medium to higher frequencies.

PLATO has successfully passed the critical milestone review in January 2022. This milestone was established specifically for PLATO at the time of the mission adoption review to take place between PDR and CDR. The main reason for this milestone being to overcome development risks associated with the series production of the 26 newly developed cameras. Were the milestone objectives specifically stated for the Spacecraft comprise a robust and credible consolidated project schedule as well as Payload to Spacecraft interfaces that have reached CDR level and the demonstration of the TED performance on breadboard level as well as successful testing of the structural model Optical bench for thermo-elastic effects.

This paper presents the baseline Spacecraft design after the Critical Milestone and an overview of the technical and programmatic progresses is provided.
In particular we address the highly demanding satellite pointing performance where special focus lies on the presentation of a novel test technique to measure extremely small thermo-elastic deformations using interferometric techniques. Results of the tests on the structural model of the Payload Module (PLM) will be shown in this article.