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PLATO: A SATELLITE DESIGNED TO FIND THE SECOND EARTH. SPACECRAFT STATUS
AFTER PDR.

Abstract

PLATO (**PL**Anetary **T**ransits and **O**scillations of stars) aims on detecting earth-like planets around sun-like stars. To do so, the light intensity of stars during occultation by the planet need to be monitored with unprecedented accuracy. PLATO will be placed in an orbit 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. 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.

This paper presents the baseline Spacecraft design evolution and detailing from Project start in 2018 until it has been confirmed by a successful PDR process at different levels: Mission, Payload, Spacecraft, and subsystems. Special focus is placed on

1. System level impacts of the driving pointing requirements (thermoelastic distortions, AOCS and microvibrations), payload accommodation and payload protection. Insight will be given into the subsystem design, requirements derivation and PDR process.
2. The confirmed PLATO pointing performance: In particular We will outline the general control process of the pointing performance and the results of the PDR analysis.
3. The PLATO pointing verification approach: The verification of in-orbit performance is partly based on a combination of transfer functions between possible disturbance sources and the TED performance of the Optical Bench. A demonstrator bread board model (DMBB) was built to represent a cut-out of the OB, and tested with a high accuracy interferometry setup and videogrammetry setup. The results of the tests match the predicted TED behaviour and show very good correlation. The next step of the verification approach with the full STM OB Model currently under manufacturing will be also presented.