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PLATO SATELLITE POINTING PERFORMANCE - GUARANTEEING THE SATELLITE PERFORMANCE THROUGHOUT DESIGN EVOLUTIONS APPROACHING SATELLITE PDR

Abstract

PLAnetary Transits and Oscillations of stars (PLATO) is a medium class ESA mission in the Cosmic Vision program. The goal of the PLATO mission is to detect a large number of terrestrial exoplanets in the habitable zone around solar-like stars. The planets will be characterized to determine their bulk properties as well as their age.

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. 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 high frequencies.

Towards the PLATO satellite PDR all of these potential disturbance sources for the satellite pointing during the payload operation time are monitored and controlled closely.

We are accompanying design evolutions of the spacecraft towards PDR with refined performance analyses and test planning, assembling results on system level to control the spacecraft performance.

The main focus of the article will be the general control process of the pointing performance towards PDR. We will present how the progress in detailing the satellite towards PDR improves the maturity of the satellite performance analyses in all related disciplines.