

SYMPOSIUM ON TECHNOLOGICAL REQUIREMENTS FOR FUTURE SPACE ASTRONOMY AND
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Technology Needs for Future Missions, Platforms (3)

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FROM PLANETARY TRANSITS TO SPACECRAFT DESIGN: ACHIEVING PLATO'S POINTING
PERFORMANCE

Abstract

In the last decades, several hundred exoplanets could be detected thanks to space-based observatories, namely CNES' COROT and NASA's Kepler. To expand this quest ESA plans to launch CHEOPS as the first small class mission in the cosmic visions program (S1) and PLATO as the 3rd medium class mission, so called M3 . PLATO's primary objective is the detection of Earth like Exoplanets orbiting solar type stars in the habitable zone and characterisation of their bulk properties. This is possible by precise light-curve measurement via 34 cameras. That said it becomes obvious that accurate pointing is key to achieve the required signal to noise ratio for positive transit detection. The paper will start with a comprehensive overview of PLATO's mission objectives and mission architecture. Hereafter, special focus will be devoted to PLATO's pointing requirements. Understanding the very nature of PLATO's pointing requirements is essential to derive a design baseline to achieve the required performance. The PLATO frequency domain is of particular interest, ranging from 40 mHz to 3 Hz. Due to the very different time-scales involved, the spectral pointing requirement is decomposed into a high frequency part dominated by the attitude control system and the low frequency part dominated by the thermo-elastic properties of the spacecraft's configuration. Both pose stringent constraints on the overall design as well as technology properties to comply with the derived requirements and thus assure a successful mission.