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SYMPOSIUM ON TECHNOLOGICAL REQUIREMENTS FOR FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS (A7)
Technology Needs (Part 1) (1)

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EUCLID PAYLOAD MODULE: A 1.2M SIC TELESCOPE FOR HIGH ACCURACY SKY IMAGING IN VISIBLE AND NEAR INFRA-RED

Abstract

Euclid is the second "Medium" class science mission of ESA's Cosmic Vision 2015-2025 programme. It will be launched in 2020 on a Soyuz rocket from Kourou. With the ultimate goal to understand the origin of the Universe's accelerating expansion, the main objective of the Euclid mission is mapping the geometry of the dark universe to unprecedented accuracy. This is achieved by combining two independent cosmological probes, Weak Gravitational Lensing and Galaxy Clustering. Besides these primary probes Euclid incorporates several secondary probes and legacy science applications. Euclid will map the large-scale structure of the Universe over 15.000 deg of the extragalactic sky and will measure galaxies out to redshifts of z=2, in visible (550-920 nm) and near infrared (NIR) wavelengths up to 2 m. Euclid Payload Module (PLM) consists of a large telescope (1.2 meter pupil diameter) feeding two scientific instruments developed by a scientific consortium, the VIS for precise visible-light images of distant galaxies, and the NISP for near-infrared spectro-photometry. Late 2012, Astrium has been selected by ESA to develop the Euclid PLM. The design features a cold telescope with passive thermal control, a concept that offers simplified thermal architecture and increased reliability. Moreover, the absence of active thermal control cycling ensures a highly stable thermal interface to the instruments (in the 10 mK range) and in turn a stable image quality. All mirrors and structures are made of silicon carbide ceramic (SiC), a technology with unique specific stiffness and thermal factors of merit. Mirrors in SiC can be made very light thanks to this very high specific stiffness with high quality polishing and low bending during cool-down due to coating bi-metallic effect. The paper will present Euclid PLM design challenges, the key performances and its development validation plan.