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# CHEOPS: towards exoplanet characterization

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## Abstract

The CHaracterising ExOPlanet Satellite (CHEOPS) is a joint ESA-Switzerland space mission dedicated to search for exoplanet transits by means of ultra-high precision photometry. It is expected to be launch-ready at the end of 2017.

CHEOPS will be the first space observatory dedicated to search for transits on bright stars already known to host planets. It will have access to more than 70% of the sky. This will provide the unique capability of determining accurate radii for planets for which the mass has already been estimated from ground-based spectroscopic surveys and for new planets discovered by the next generation ground-based transits surveys (Neptune-size and smaller). The measurement of the radius of a planet from its transit combined with the determination of its mass through radial velocity techniques gives the bulk density of the planet, which provides direct insights into the structure and/or composition of the body. In order to meet the scientific objectives, a number of requirements have been derived that drive the design of CHEOPS. For the detection of Earth and super-Earth planets orbiting G5 dwarf stars with V-band magnitudes in the range  $6 \leq V \leq 9$  mag, a photometric precision of 20 ppm in 6 hours of integration time must be reached. This time corresponds to the transit duration of a planet with a revolution period of 50 days. In the case of Neptune-size planets orbiting K-type dwarf with magnitudes as faint as  $V=12$  mag, a photometric precision of 85 ppm in 3 hours of integration time must be reached.

The CHEOPS mission payload consists of only one instrument, a space telescope of 30 cm clear aperture, which has a single CCD focal plane detector. The total required duration of the CHEOPS mission is estimated to be 3.5 years (goal: 5 years).

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