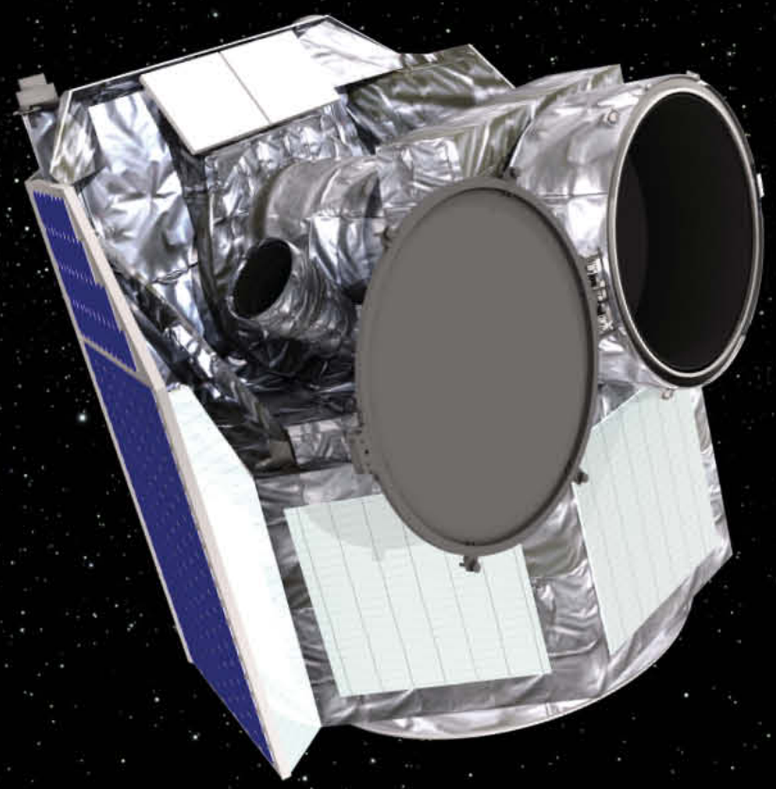
The CHEOPS Mission Consortium

CHEOPS

CHARACTERIZING EXOPLANET SATELLITE



CONSORTIUM PROGRAM

Cheops mission is

3.5 yrs nominal lifetime
Corresponding to 16 500 orbits (100 mins)

(10 years equivalent full access ground-based tel.)

GTO 80%

GO 20%

Due to the follow-up nature of the mission,
CHEOPS has a “mosaic” of program,
organized by groups of scientific “**themes**”

GTO “protected” target list known
6 months prior launch

Science Theme

Program

Program

Target 1
.
.
Target N

Target 1
.
.
Target N

Science Theme

Program

Program

Target 1
.
.
Target N

Target 1
.
.
Target N

Search for a transit configuration in known planetary systems that have been discovered by other techniques, in particular radial velocity.

(20 ppm accuracy (6 hours) for G-type stars V < 9, with less 50% orbit interruptions)

Science questions:

Structure of the nearest, brightest transiting super-Earths and Neptunes

Targets:

RV targets: small planets and giant stars
Early attempt with Spitzer by Gillon et al 2017 on 19 targets

CHEOPS targets carefully chosen.
Targets in TESS catalogue as well

To Improve the determination of the mass-radius relationship for exoplanets in the low-mass range (sub-Saturn), and to relate it to planet formation and evolution models.

85 ppm accuracy (3 hours) for K-type stars V < 12, less 20% interruptions

Science questions

Low-density planets and Super-Earths
gas-poor vs gas-rich planets, evaporation

Targets:

candidates from TESS/NGTS with radius betwwen 1.5 - 3.5 Rearth and the goal to measure it down to 5%

Caveat

mass must be accurately known (about 20%)
Relies on surveys and follow-up works efficiently executed on time

Detect new planets around stars already
known to host a planetary system, or detect Trojan, or look for
planets on A stars, or detect dust inhomogeneity on debris disks
(Beta Pic transit…)

Science questions:

Planets of early-type stars,
Transiting Multi Planet Systems (inner planet, TTVs),
Debris Disks and Trojans

Strong Synergy with TESS !

Caveat:
Time greedy!

Precise analysis of stellar light curve shape during transit

“extreme SN requirement”

Science questions:

planet shape (love number), exo-moons or rings.

Continuous LC to measure the geometric albedos (secondary eclipses) and visible phase curves of hot Jupiters

“Stability of requirement is valid about 48h with expectation satellite photometric stability is better that stellar intrinsic variability”

Science questions:

Origin of Variability of the super Earth 55 Cancri e,
disintegrating atmospheres of ultra-short-period (USP)
Atmospheric study in preparation to infrared data from JWST

“Potpourri” of other small programs relevant for exoplanet science

Limb darkening measurement	- accuracy
Ephemerids recovery	- agility
Stellar variability (M and quiet stars)	- filler
Period of rotating stars	- filler
TNO/ Centaur stellar occultation	- cadence and agility
Planet on stellar remnant or sDB stars	- cadence and sampling

KEY ELEMENTS

- GTO target list published 6 months before launch
- Information available in the meantime

- (1) Scientific themes (Now)
- (2) list of programs (end 2018)
- (3) 22-23 May 2019, AWG
- (1) June target list frozen until October