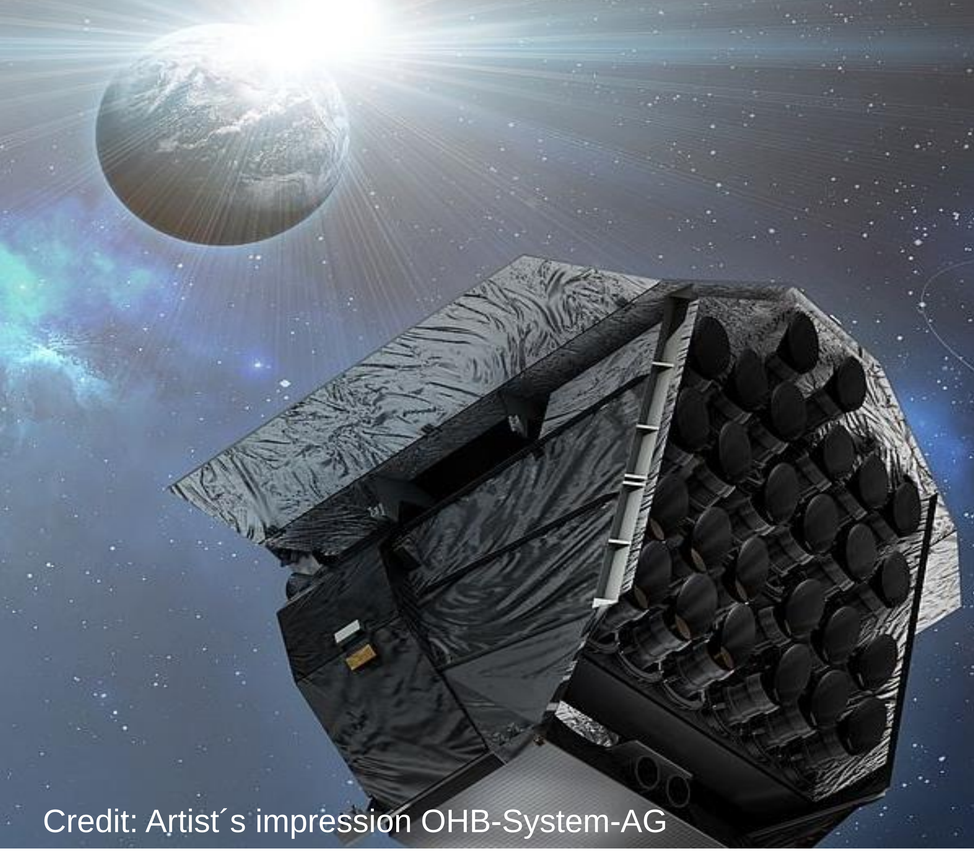
# IAA-SCIENCE



Credit: Artist´s impression OHB-System-AG

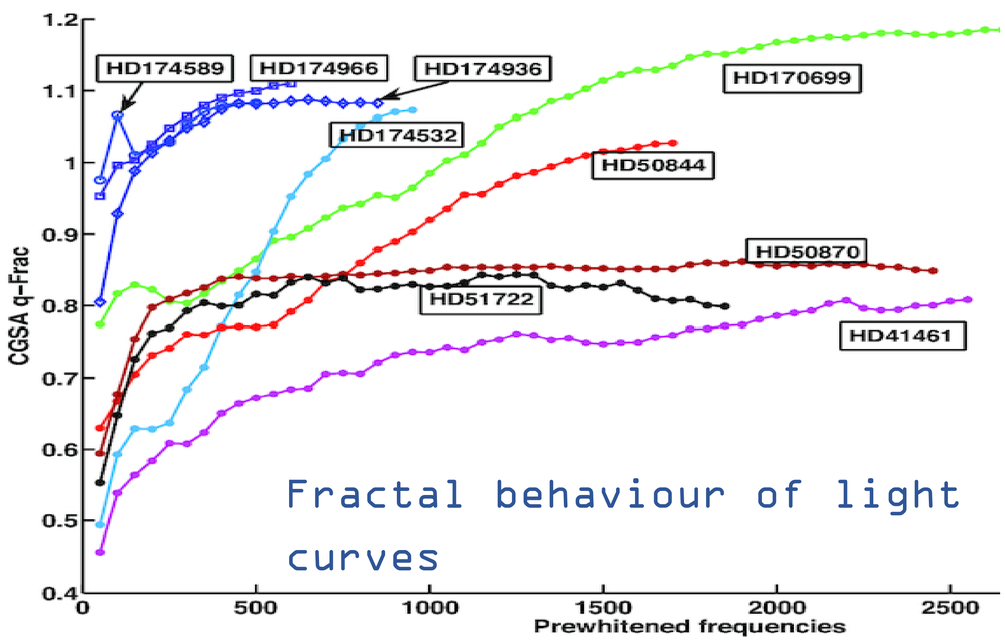
**PLATO comprises 26 telescopes with an on board data processing: 24 “Normal” Cameras and 2 “Fast” Cameras.**
**The normal cameras are grouped into four groups of 6 cameras. Every group has the same field of view deviated 9.2 degrees from the Z axis. The total field of view is about 2232 degrees$^2$ per**

# HUNTING TERRESTRIAL EXOPLANETS WITH PLATO 2.0 MISSION

**PLATO 2.0 (PLANETARY TRANSITS AND OSCILLATION OF STARS) IS THE M3 CLASS MISSION OF THE ESA. ITS GOAL IS DETECTING AND CHARACTERIZING TERRESTRIAL EXOPLANETS IN THE HABITABLE ZONE OF SUN-LIKE STARS.**

## SCIENCE

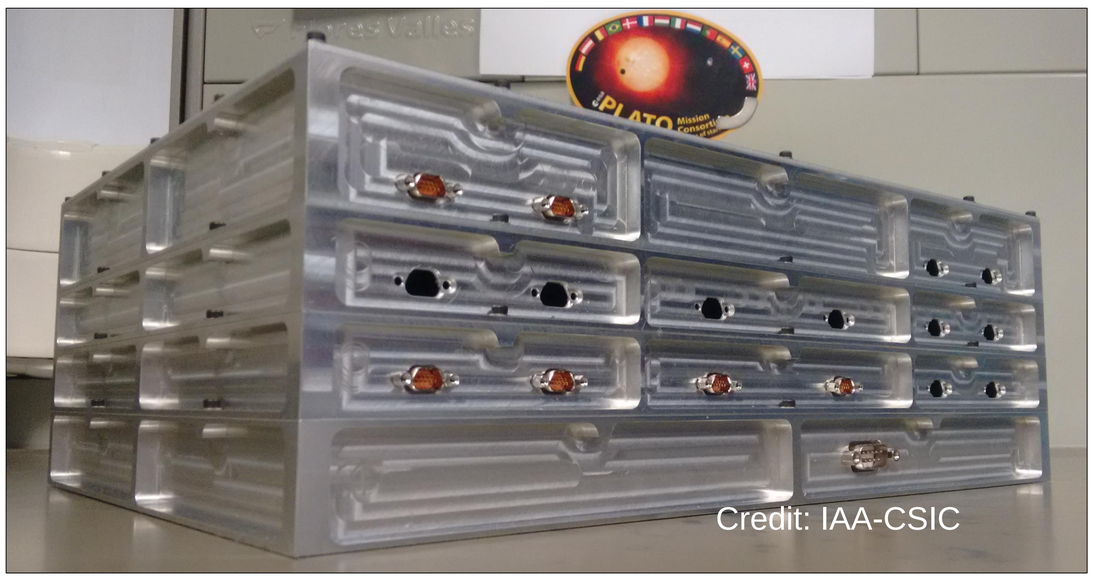
PLATO2.0 will fully characterize exoplanets around nearby stars, determining the mass, radius and mean density in a wide range of systems, and the correlation of planet properties with stellar global parameters (e.g. stellar metallicity, overshooting,...). The technique involves asteroseismic tools, fully compliant with IVOA (International Virtual Observatory Alliance) standards.
Asteroseismology use case is based on the analysis of time series, more specifically light curves of pulsating stars, in order to derive internal structure parameters of stars and how they evolve with stellar age. Development of specific numerical codes for the treatment and analysis of "big data" generated by photometric space missions like CoRoT and Kepler has been a task assumed by our team. This study includes standard harmonic analyses and non standard fractal time series analyses, possible related with stellar rotation effects on the pulsations. The numerical techniques can be also extended to spatial series.




Fractal behaviour of light curves

## INSTRUMENT

The MEU (Main Electronics Unit) receives the raw images from the normal cameras, and performs an in situ processing to extract the centroids and fluxes constituting the light curves that will be sent to the ICU (Instrument Central Unit).
The ICU is responsible for receiving, processing and compressing the data besides to the control of the instrument and communications with the spacecraft.
There are 2 MEUs in PLATO, each MEU consists basically in 6 N-DPUs to control 12 cameras. IAA is responsible of the MEUs and IAC (Instituto de Astrofísica de Canarias) is responsible of the power supply of the MEUs. Up to now, IAA has passed some reviews of the ESA, and currently the Engineering Model, for 4 cameras, are nearly ready to deliver to the Consortium at DLR and after to ESA. One model extra has been delivered to LESIA Team for Software Development and another one will remains at IAA for further possible modifications.
IAA has tested a complete MEU to verify the functionalities and power supply requirements with successful results.
The companies Thales Alenia Space Spain and Airbus-CRISA are the industrial partners in the manufacturing and co-designing of these units.




Credit: IAA-CSIC

**MEU Engineering Model tested at IAA facilities for 12cameras. MEU Engineering model to deliver to Plato Consortium, in April 2020.**

## REFERENCE:

*Monthly Notices of the Royal Astronomical Society*, Volume 487, Issue 3, August 2019, Pages 4457–4463,
https://doi.org/10.1093/mnras/stz1571
**A fractal analysis application of the pre-whitening technique to δ Scuti stars time series** de Franciscis, S. et al.

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