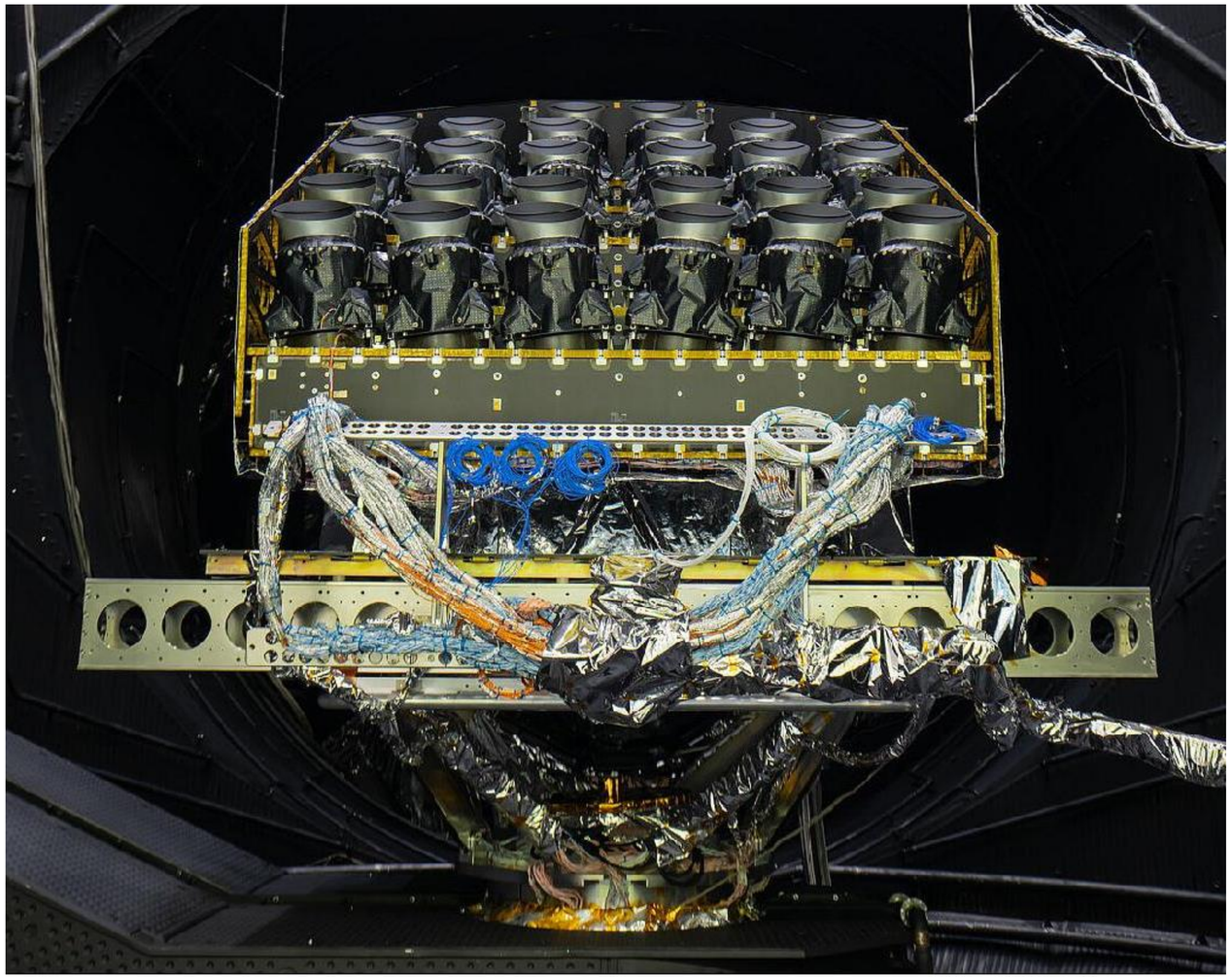
The PLATO project

Progress…

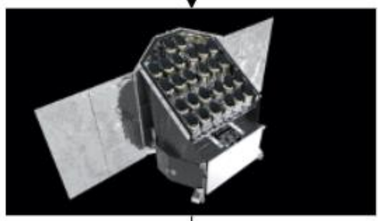


Vacuum test of payload module engineering model (June 2022)

The PLATO mission

PLATO Mission

Launch Segment



Space Segment

Ground Segment

Payload Module
(PLM)

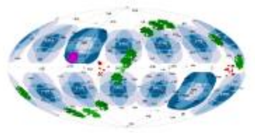
Science Payload

Optical Bench Assembly
(OBA)

Ground Station Network
(GSN)

Mission Operations Center
(MOC)

Science Operations Centre
(SOC)



PLATO Science Management
(PSM)

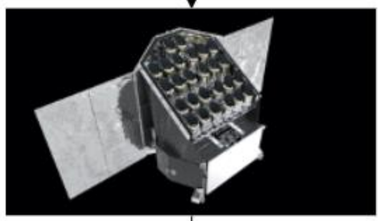
PLATO Data Centre
(PDC)

PLATO Calibrations
& Operations Team
(PCOT)

UK Involvement

PLATO Mission

Launch Segment



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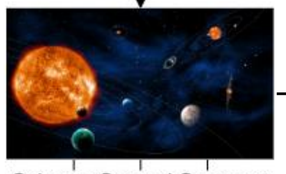
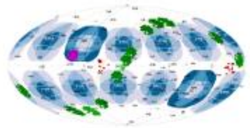


Science Ground Segment



PLATO Science Management
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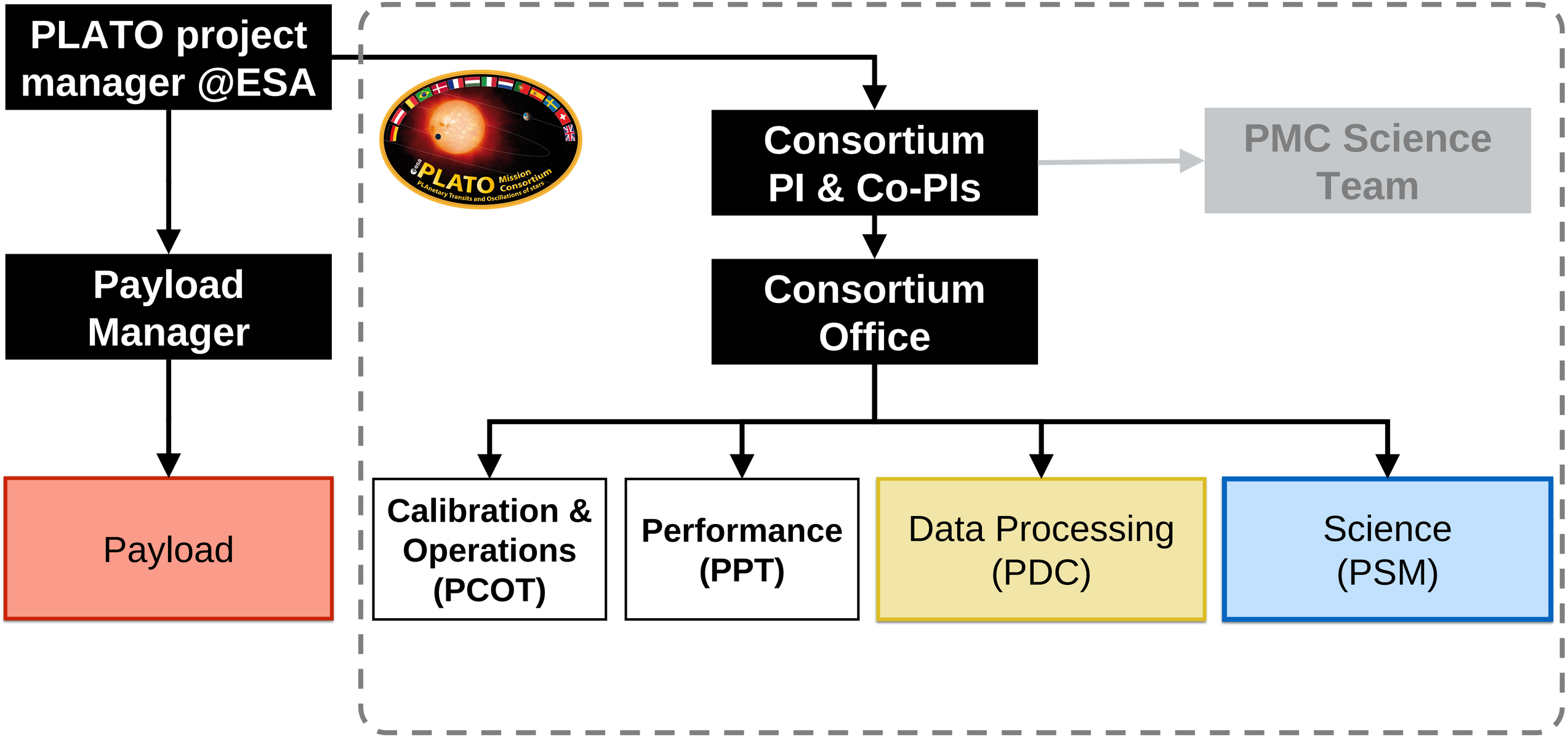
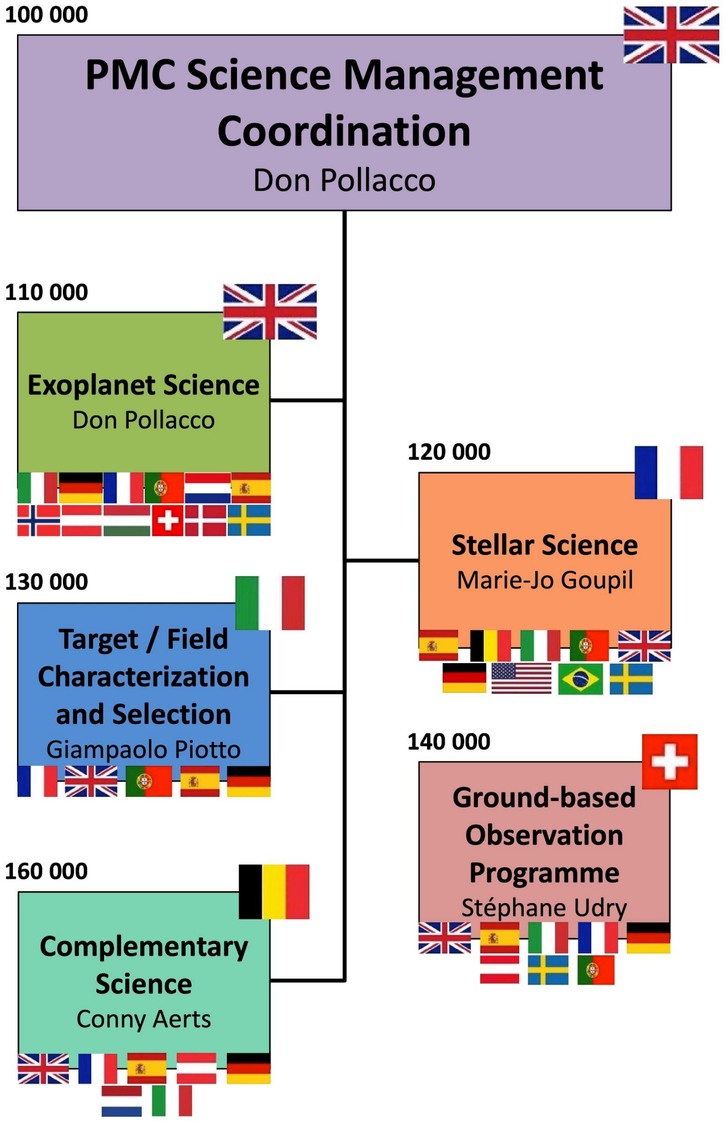
The PLATO project



The PLATO community

Credit: Heike Rauer

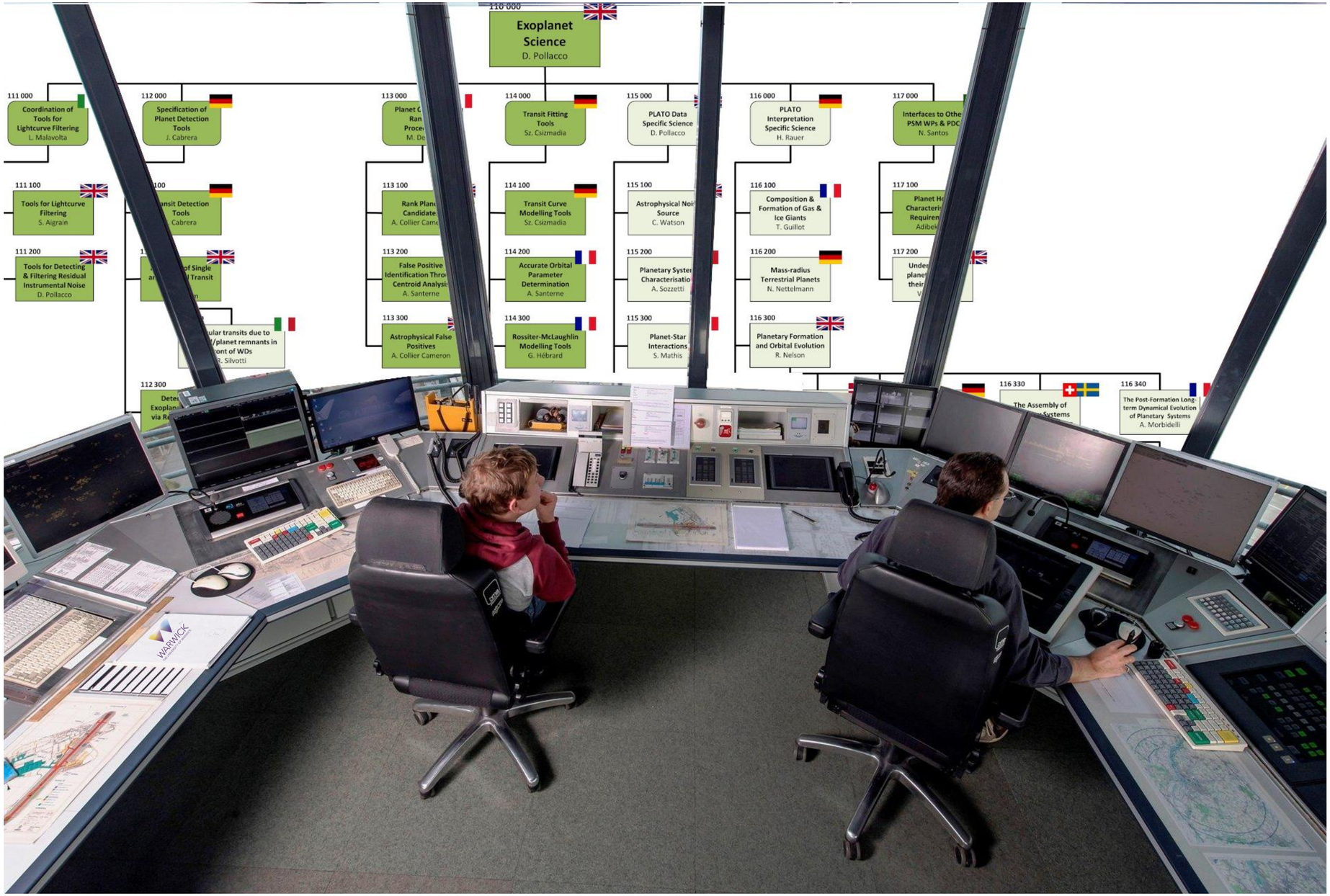
PLATO Science Management (PSM)



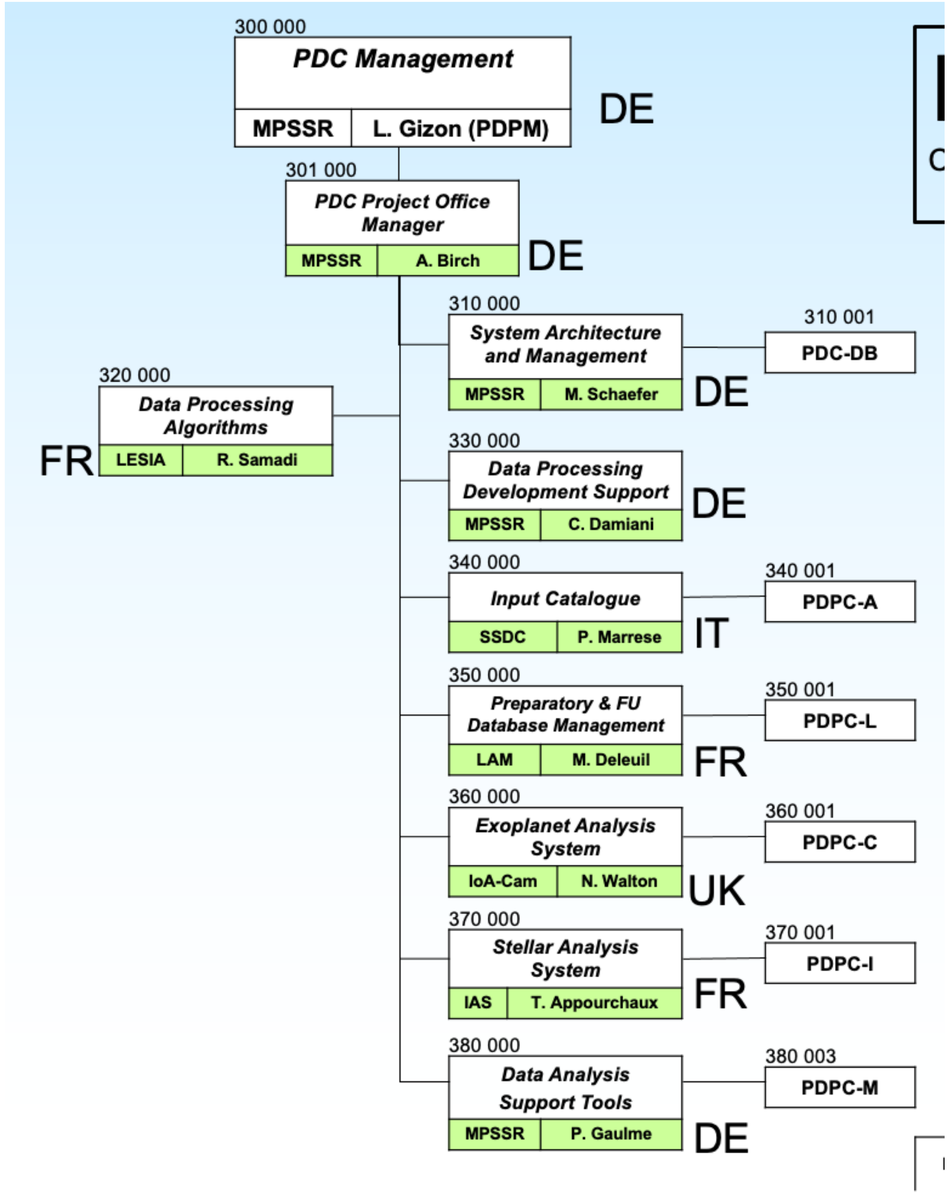
- Leadership based here at Warwick.
- Provides **scientific specifications** for exoplanet and stellar science data processing algorithms, methods, and tools.
- Performs **scientific validation** of the data processing pipelines, input catalogue, and data products.
- Organises, operates, and manages the **ground-based observation programme**.
- **Coordinates work** on topics outside the core science of the mission

- Currently has over 500 members (and growing!)

The PSM Office



PLATO Data Centre (PDC)



- Leadership based at MPSSR in Göttingen, Germany.
- **Designs and implements** the onboard and **on-ground data processing pipelines** to produce PLATO light curves.
- **Implements PSM specifications** for the exoplanet and stellar science pipelines.
- **Operates** the exoplanet and stellar science **pipelines** to produce data products.
- Produces the **Input Catalogue**.
- Provides **tools** to help PSM perform **scientific validation**.

Other teams

PLATO Performance Team (PPT)

- Based at DLR in Berlin.
- Provides **support** to consortium members regarding **technical and scientific performance**.
- **Assesses** overall **science performance** of the mission.
- Coordinates production of **simulations** for PLATO performance studies.
- Incorporates the team developing **PLATOsim**.

PLATO Calibrations & Operations Team

- Based at DLR in Berlin.
- Provides support to **calibration** and **operation** of the **payload**, including **health monitoring**.
- Provides the payload user's manual
- Provides calibration and characterization plans

ESA Science Operations Centre (SOC)

- Based at ESAC in Spain.
- **Leads overall design** and engineering of the science ground segment.
- **Supports integration and validation** of data processing pipelines to generate PLATO light curves and perform quality control.
- Organises and manages the **end-to-end testing** needed to validate the science ground segment

UK leadership

PLATO project manager @ESA

Payload Manager

Payload

UCL

Consortium PI & Co-PIs

PMC Science Team

Consortium Office

Calibration & Operations (PCOT)

Performance (PPT)

PDC

UNIVERSITY OF CAMBRIDGE

PSM

WARWICK
THE UNIVERSITY OF WARWICK

UK leadership

Payload

- Development and build of electronics that operate the ‘normal’ cameras

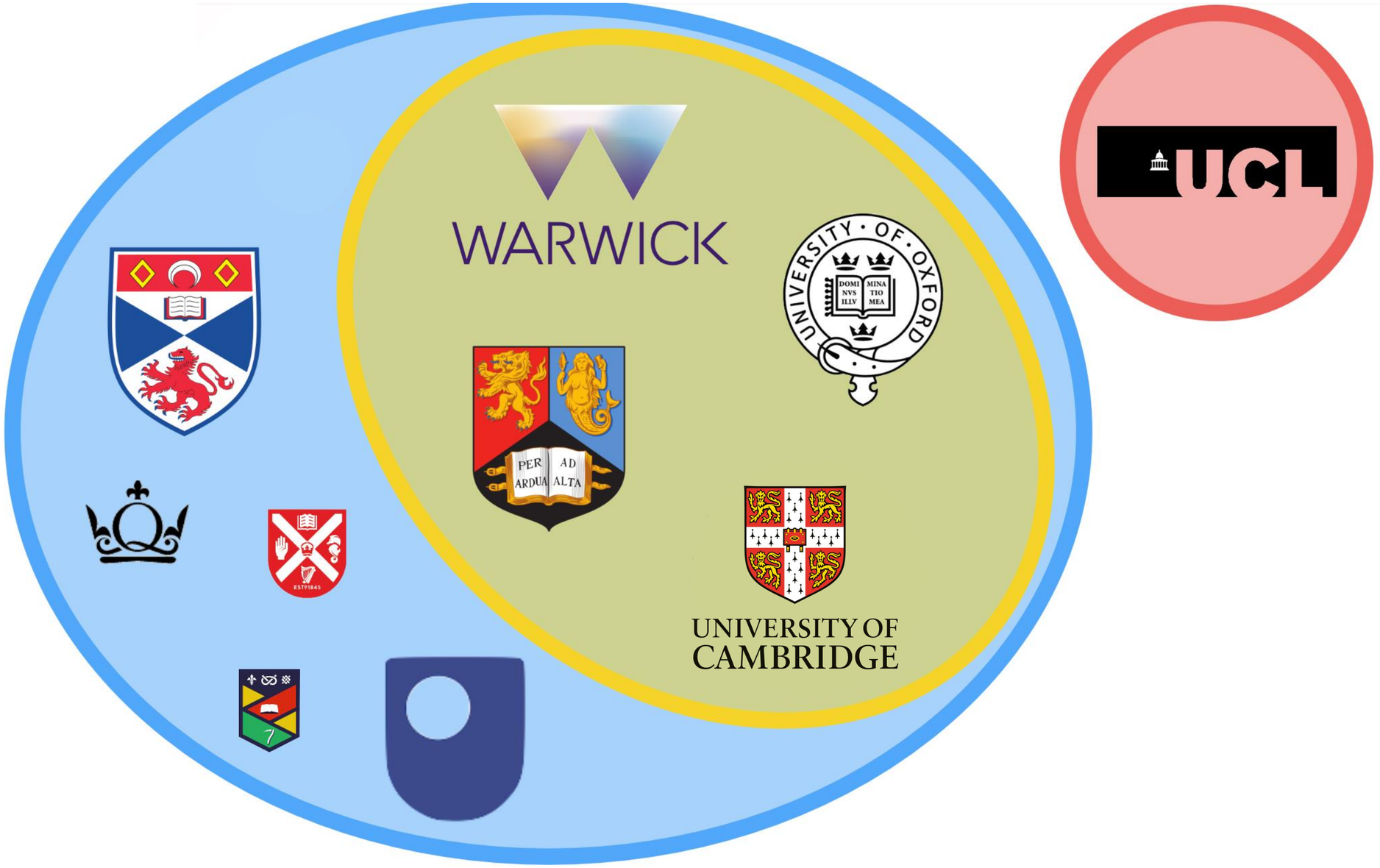
PDC

- Development and implementation of exoplanet data processing and analysis
- Running the exoplanet data processing pipelines

PSM

- PSM lead and coordination
- Coordinates scientific work on exoplanet data analysis

UK contributors



Other UK contributions

WARWICK
THE UNIVERSITY OF WARWICK

- Detection of single and unusual transits
- M-dwarfs as planet hosts
- Follow-up quality control
- Long-term detrending of light curves

UNIVERSITY OF OXFORD

- Light curve filtering for stellar noise.
- Light curve stitching
- Simulated light curves for pipeline development
- Modelling stellar activity
- Interface between exoplanet and stellar pipelines

UNIVERSITY OF BIRMINGHAM

- Scaling laws
- Seismology of evolved stars
- Power spectrum fitting for solar-type stars, inc. Multiple systems (inc. mode fitting)

- Candidate ranking
- False positive identification

Keele UNIVERSITY

- Benchmark stars
- Binaries and multiple stars

QUB: astrophysical noise and its impact on PLATO data and products

QMUL: planetary formation and orbital evolution, forward approaches to stellar parameter determination, young stars and planets

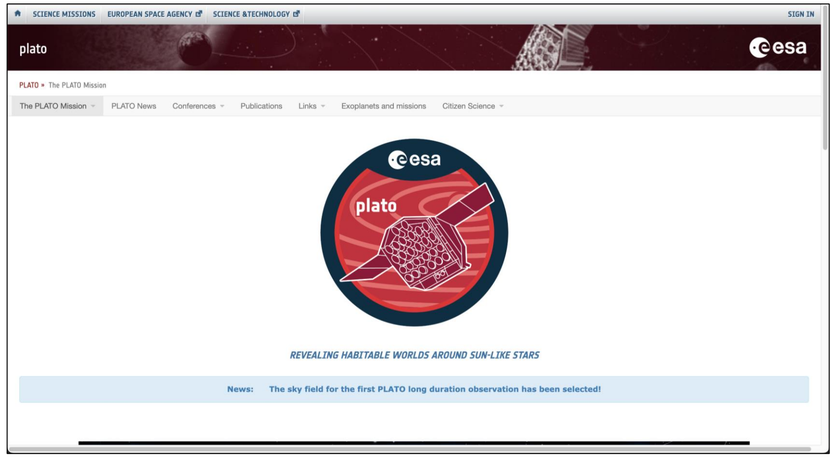
Cambridge: PMS evolution; use of Gaia photometry for target selection

UCL: Understanding planets through their host stars

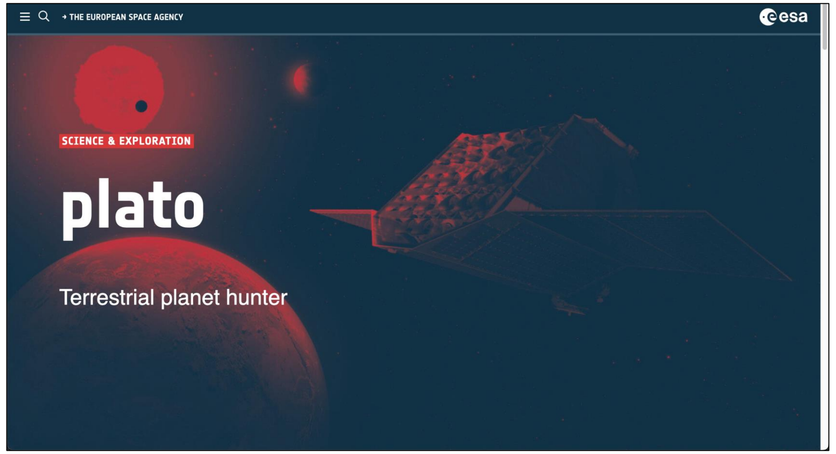
Open University: Analysis and modelling of contaminants using Gaia, false positive abundances, transits of close-in objects

Where to learn more

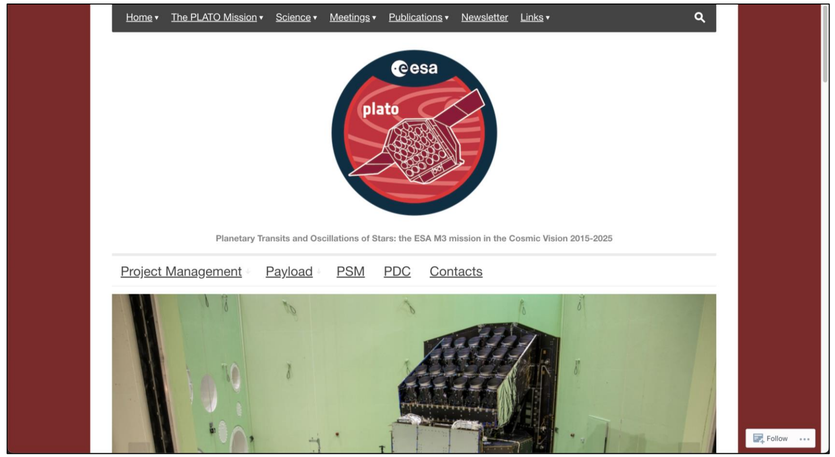
ESA's COSMOS website



ESA's main website



PLATO consortium website



PSM website

Click the images to follow the links

Summary

- PLATO is a large project, with contributions from many countries, institutes, and individuals.
- The PLATO Mission Consortium (PMC) covers a wide range of activities, from developing simulators to designing pipelines, and from processing data to running the follow-up programme.
- The UK has significant involvement, including leadership roles, in PLATO science, data processing, and payload aspects

Thanks!

psmoffice@warwick.ac.uk