



Europlanet – A Distributed Research Infrastructure Building an International Community in Planetary Sciences



31st May – June 1st 2022

A stylized graphic of a solar system on a dark blue background. At the top left is a large yellow sun. Several planets of various colors (orange, blue, white, yellow) are shown on elliptical orbits. A satellite is depicted in the middle. At the bottom right, there are two teal-colored planets, one with a ring system. The overall style is clean and modern.

eur  **PLANET 2024**
Research Infrastructure



First congratulations on your first birthday



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 871149.



We now have a series of astronomy/space infrastructures





Challenge is to work together and meet EU/EC expectations

Horizon Europe

Work Programme 2023-2024

3. Research Infrastructures

**HORIZON-INFRA-2023-
SERV-01-02: Research
infrastructures services
advancing
frontier knowledge**

Astronomy and Astroparticle physics;

A brief history..

Europlanet – founded in 2004 to support planetary research in Europe.

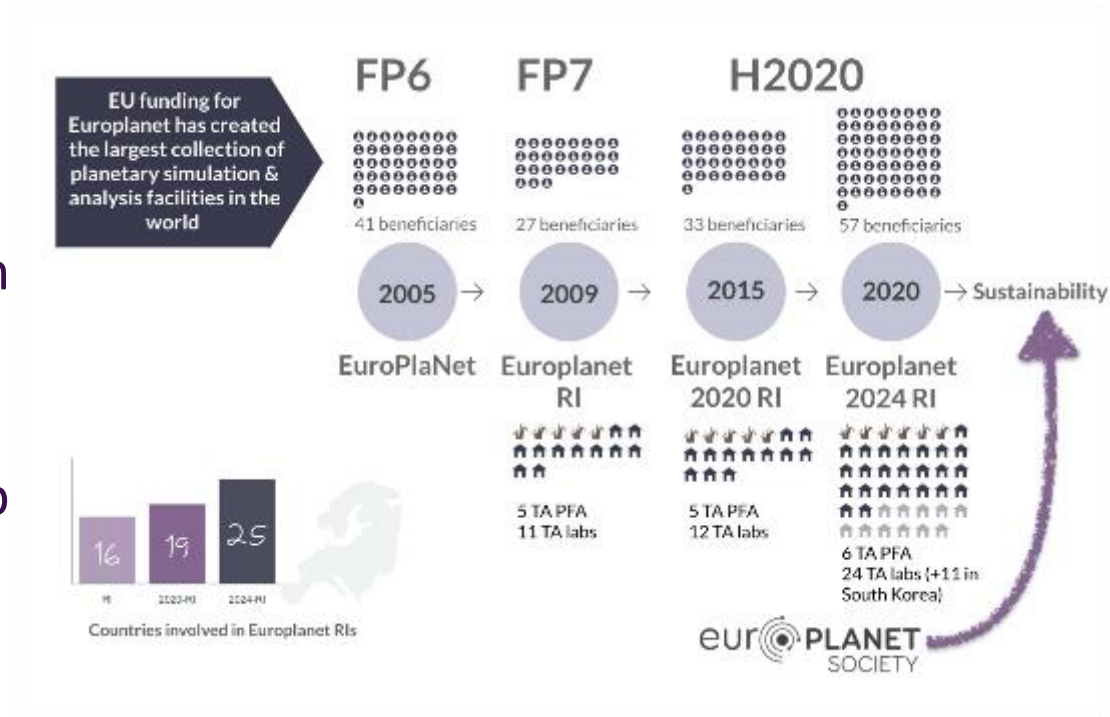
NASA/ESA/ASI Cassini-Huygens mission to Saturn from July 2004 to September 2017.

Huygens: 1st European spacecraft to the outer planets; designed to land on icy moon, Titan.



Development of Europlanet

- Created a pan European and international community.
- Europlanet Society & AISBL
- Created a unique international distributed infrastructure.
- Performed world leading research by mobilising European research/innovation base.



Part of the European 'Space' Triangle

Missions



Academia

Industry

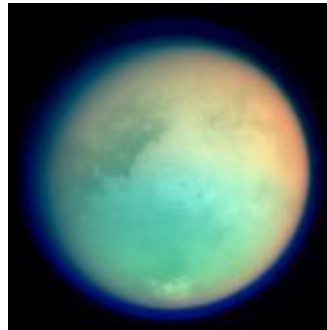
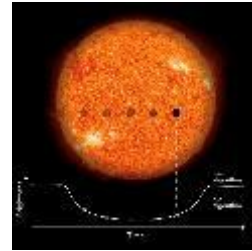
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Research Infrastructure

Europlanet RIs 2009 -2022 supporting European planetary science

- **Community support and development (NA programme)**
Industry, Global Collaboration, Early Career Network, Media, Policy, Education (spinout company), Outreach, Europlanet Telescope Network.
- **Access to facilities for benefit of wider community (TA programme)**
Planetary Field Analogues, Laboratories – simulations and analytical tools.
- **International infrastructure for OPEN data sharing/analysis (VA programme)**
VESPA – over 50 simulation tools/models/databases; **SPIDER** – planetary space weather services; **GMAP** – geological mapping; **Machine Learning**-developing tools for planetary science.

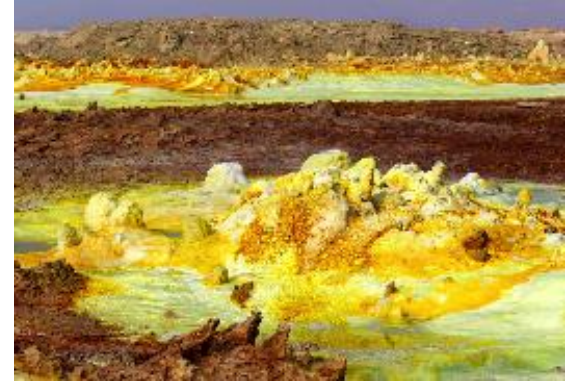
Europlanet – The Science

- Astrobiology
- Comets and Asteroids
- Early Earth
- Exoplanets
- Meteorites
- Planetary atmospheres and surfaces
- Space exploration and exploitation



Europlanet – The Science

Studies of microorganisms that live in extreme salty environments with volcanic origin at Danakil Depression, Ethiopia, analogous to conditions on Mars. Observation of lakes with **NO life**



Isolation of salt-tolerant extremophilic algae that make lake in Spain **turn pink** (*Dunaliella salina* (EP-1) *Europlanet-1*).



Planetary Field Analogue sites

Europlanet – The Science

- Looking for clues about water circulation on Mars in the Makgadikgadi salt pans of Botswana



Europlanet – The Science

Investigations of dust in martian atmosphere and testing of instrumentation for rovers (Perseverance, ExoMars etc).

Wind Tunnel Facility Aarhus

Simulations and calibrations to support spectroscopic data from missions (Tianwen-1, TGO, BepiColombo, EnVision etc)

DLR and IPAG Spectroscopic Lab Facilities



Europlanet – The Science



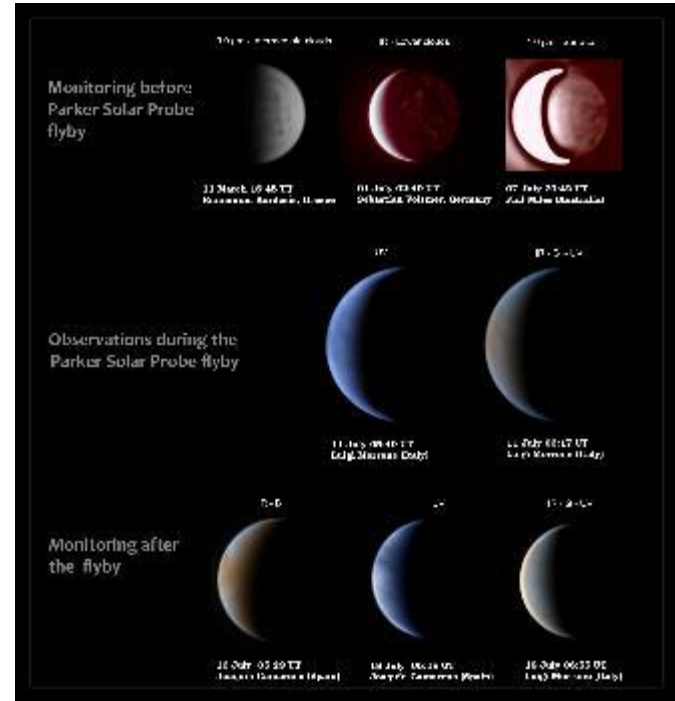
Researchers from the Know-Center and the Space Research Institute Graz are developing a prediction tool, funded through Europlanet 2024 RI, that determines the strength of solar storms.

Europlanet – The Science

Techniques for non-destructive or minimally invasive characterization/analysis of meteorites/returned samples.

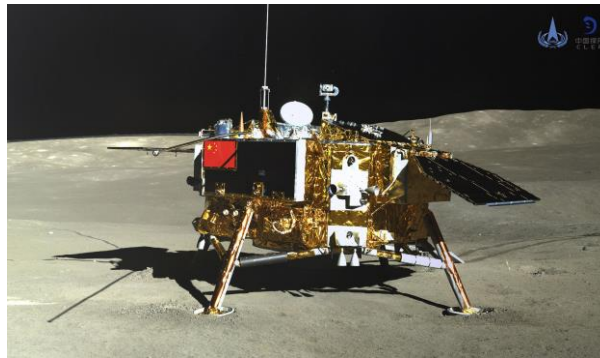
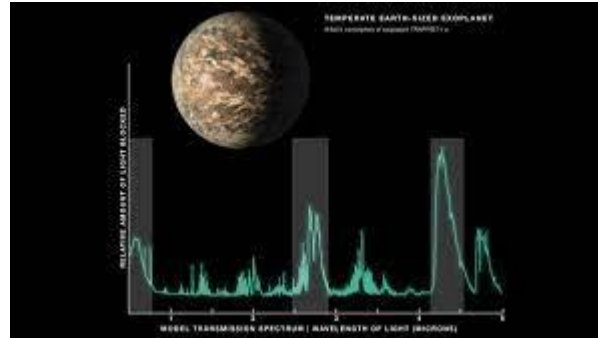
NHM, VU Amsterdam, ETH Zurich, OU

Ground-based observation campaigns in support of missions (BepiColombo, Parker Solar Probe, Akatsuki) enable multi-level studies of the atmosphere of Venus.



Euromlanet – The new science

- Exoplanet atmospheres – models
- The moon – return to explore



Europlanet – The **new** science

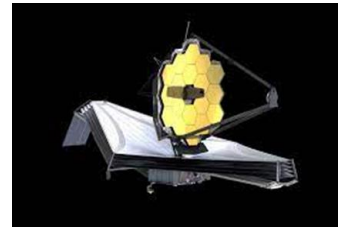
Space exploitation

- Development of new materials in space (no g, clean)
- Materials for space habitats lunar bases
- Drug development in space
- Space mining



Compatibilities with ChETEC-INFRA

- Chemistry in the Universe – JWST



- Meteorite analysis = Mass Spectrometry Network

- Ground based telescope network share
Rozhen/Moletai - work with Opticon pilot



- ATOMKI ion beam facility shared accelerator.

Collaborations with ChETEC-INFRA

- Outreach and Dissemination
- Education
- Databases (and data protocols)
- Policy, industry and future proofing.
- New Horizon Europe calls 2023

The Integrated model

- Star formation
- Nuclear synthesis
- Creation of elements

Studies of ISM
Molecular synthesis
Complexity

Planetary formation
Solar system studies
Exoplanets & Habitability

Evolution of life
Terrestrial example

Astrophysics

Astrochemistry

Planetary Science

Origins of Life

ChETEC-INFRA

JWST/ALMA ECLA

Europlanet

EAI

And recall

- ESA Decadal review – Ministerial November 2022
- Human and Robotic Space Exploration focus on **space exploitation** as well as exploration



ESFRI Roadmap 2021

Astronomy and Astroparticle Physics

- understand the origin of the universe, its main constituents;
- understand the extreme conditions the Universe hosts;
- understand the formation of galaxies and their evolution;
- understand the formation of stars and planets;
- search for planetary systems in our galaxy, study the Solar System and extrasolar planets, search for life and understand the conditions enabling life.
- The domain relies on a combined approach of observations, theoretical work and modelling, and more and more on laboratory experiments.



So lets work together

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Thank you!

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