

Geoplanet Workshop on planetary missions



Overview of the Science Programme

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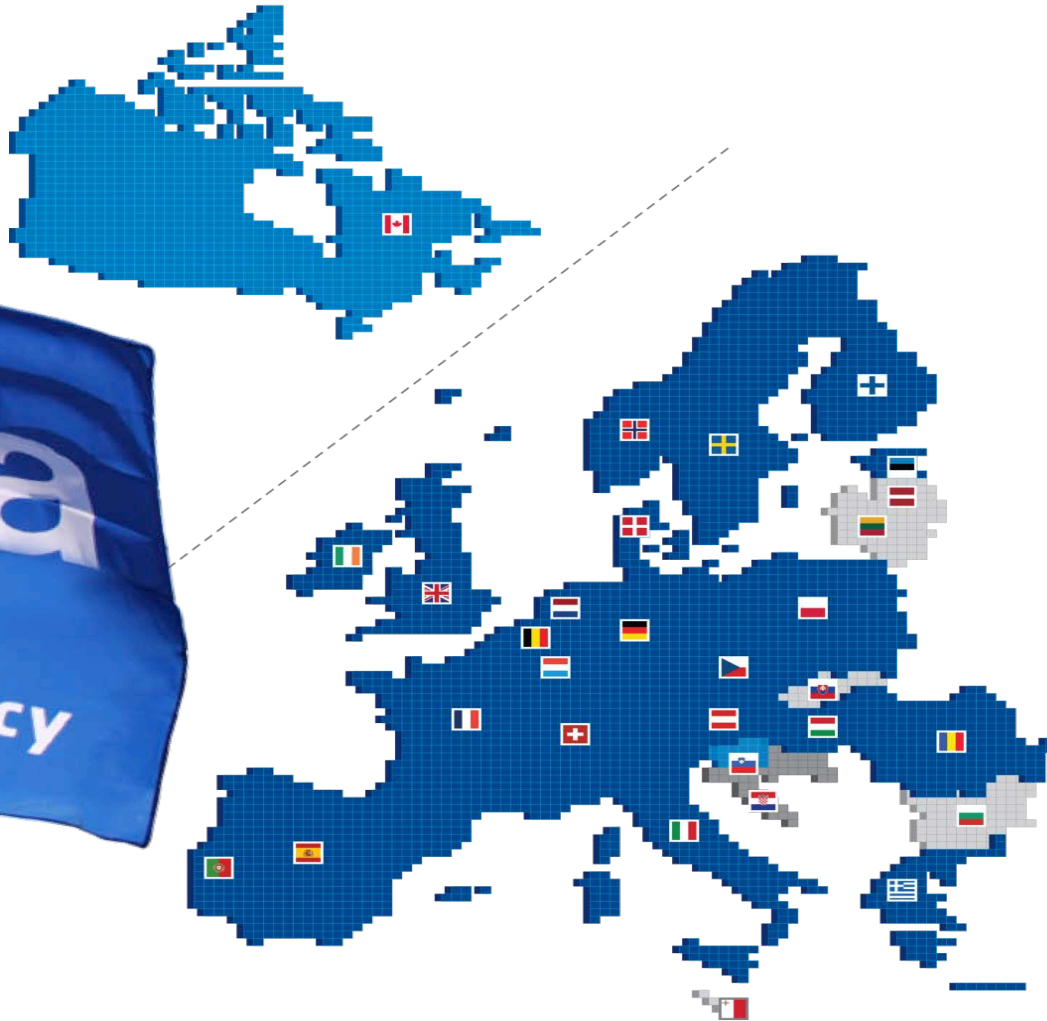
European Space Agency

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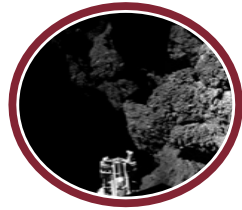




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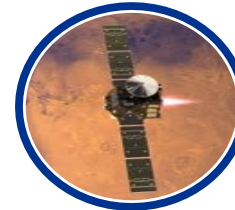




space science



human spaceflight



exploration



earth observation



launchers



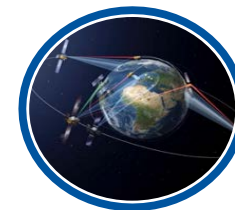
navigation



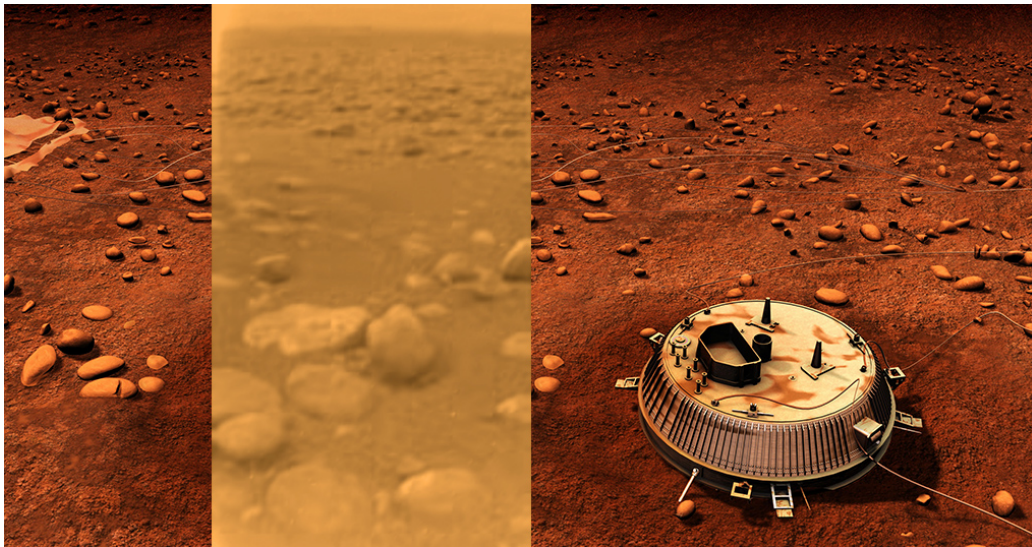
operations



technology



telecommunications



The Science Programme

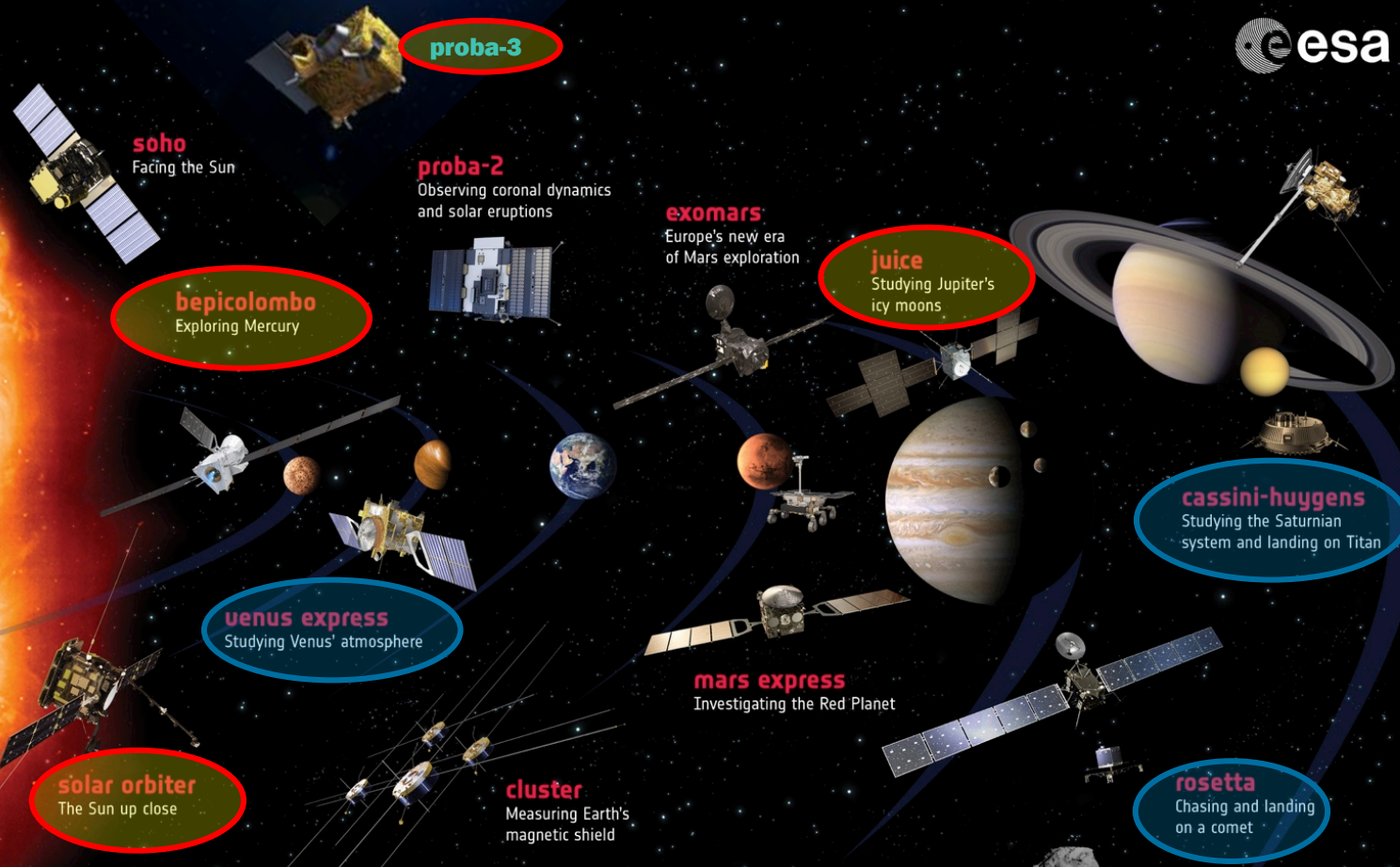


Science-driven

both long-term science planning and mission calls are bottom-up processes, relying on broad community input and peer review.

Mandatory

all member states contribute pro-rata to GNP providing budget stability, allowing long-term planning of its scientific goals and being the backbone of the Agency.

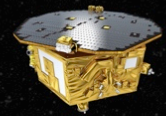


→ ESA'S FLEET IN THE SOLAR SYSTEM

The Solar System is a natural laboratory that allows scientists to explore the nature of the Sun, the planets and their moons, as well as comets and asteroids. ESA's missions have transformed our view of Mars, Venus, Titan and comets, and provided new insight into how the Sun interacts with Earth and its neighbours. The Solar System is the result of 4.6 billion years of formation and evolution. Studying how it appears now allows us to unlock the mysteries of its past and to predict how the various bodies will change in the future.

→ ESA'S FLEET ACROSS THE SPECTRUM

Thanks to cutting edge technology, astronomy is unveiling a new world around us. With ESA's fleet of spacecraft, we can explore the full spectrum of light and probe the fundamental physics that underly our entire Universe. From cool and dusty star formation revealed only at infrared wavelengths, to hot and violent high-energy phenomena, ESA missions are charting our cosmos and even looking back to the dawn of time to discover more about our place in space.



lisa pathfinder

Testing the technology for gravitational wave detection

herschel

Unveiling the cool and dusty Universe

just

Observing the first light

euclid

Exploring the dark Universe

cheops

Characterising exoplanets

plato

gaia

Surveying a billion stars

xmm-newton

Seeing deeply into the hot and violent Universe

hst

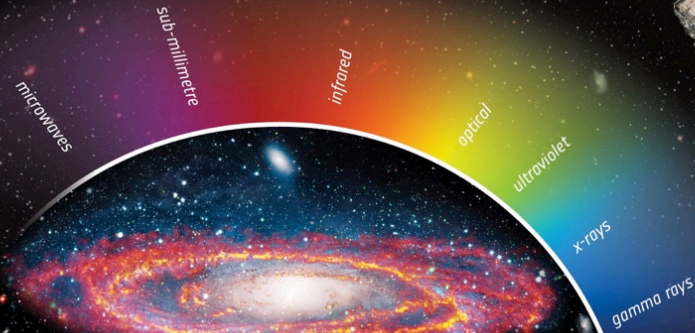
Expanding the frontiers of the visible Universe

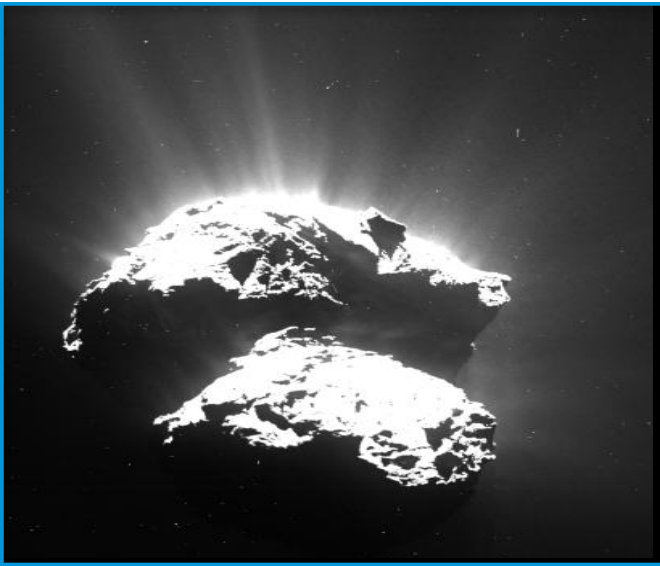
integral

Seeking out the extremes of the Universe

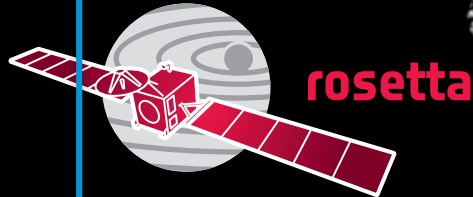
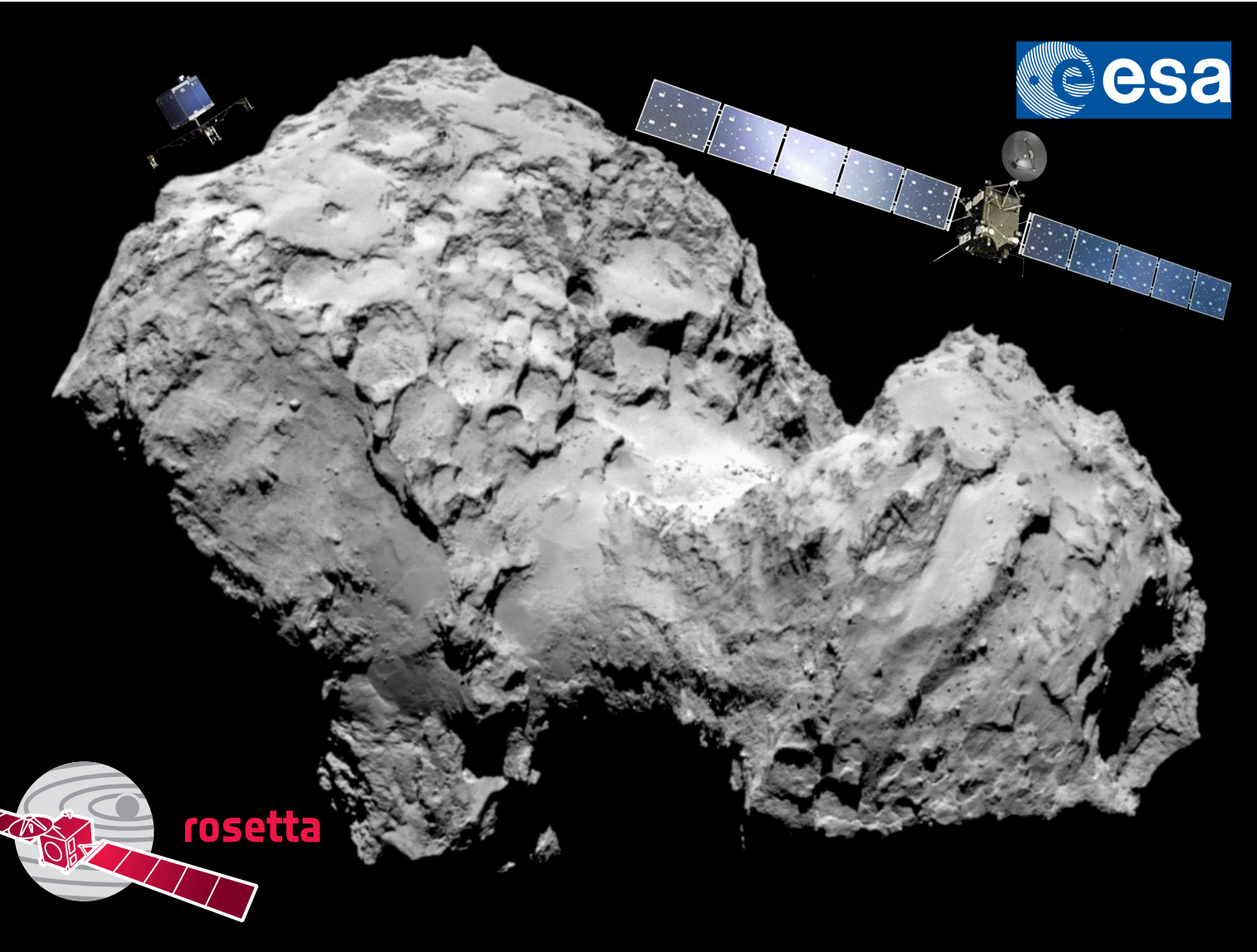
planck

Looking back at the dawn of time



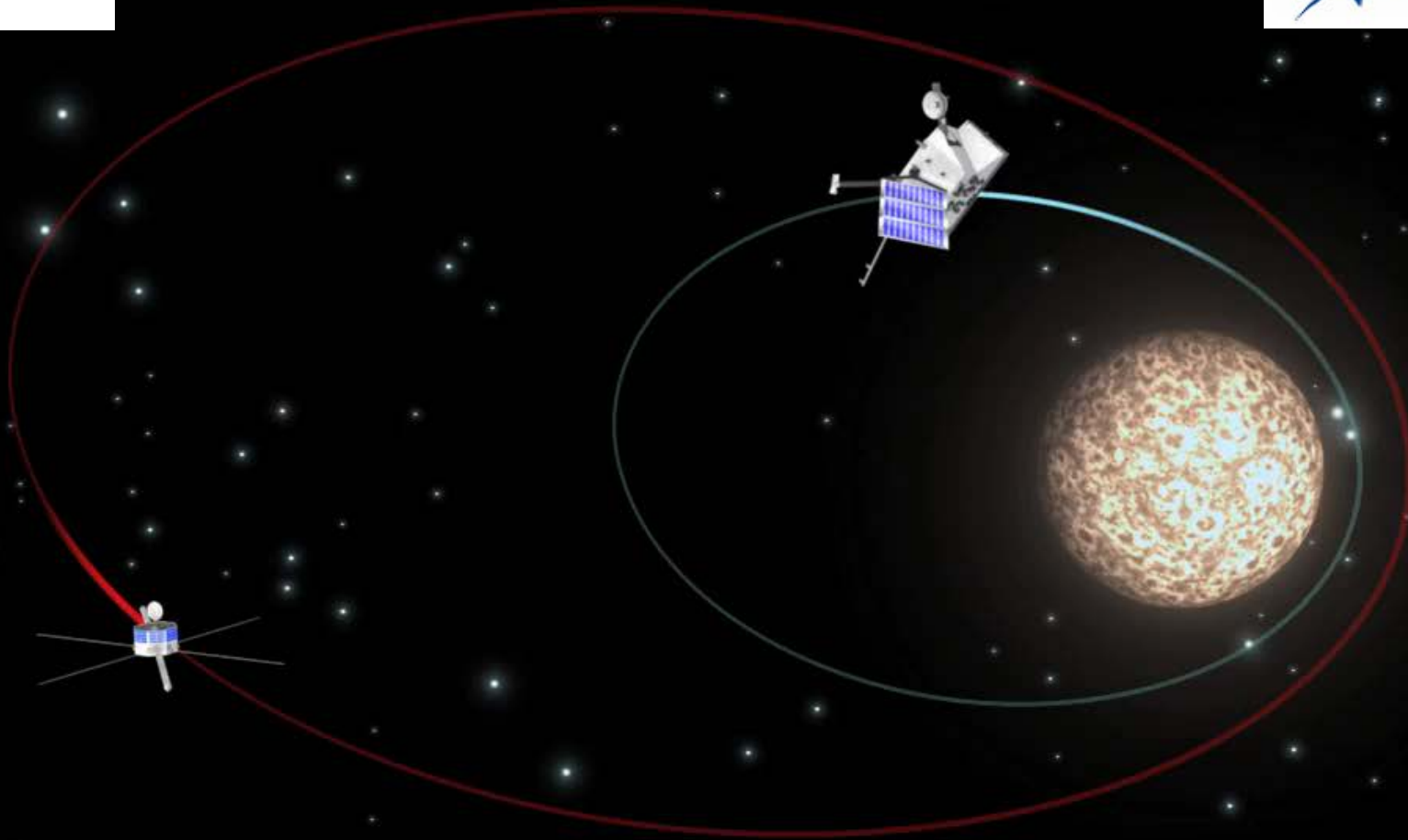


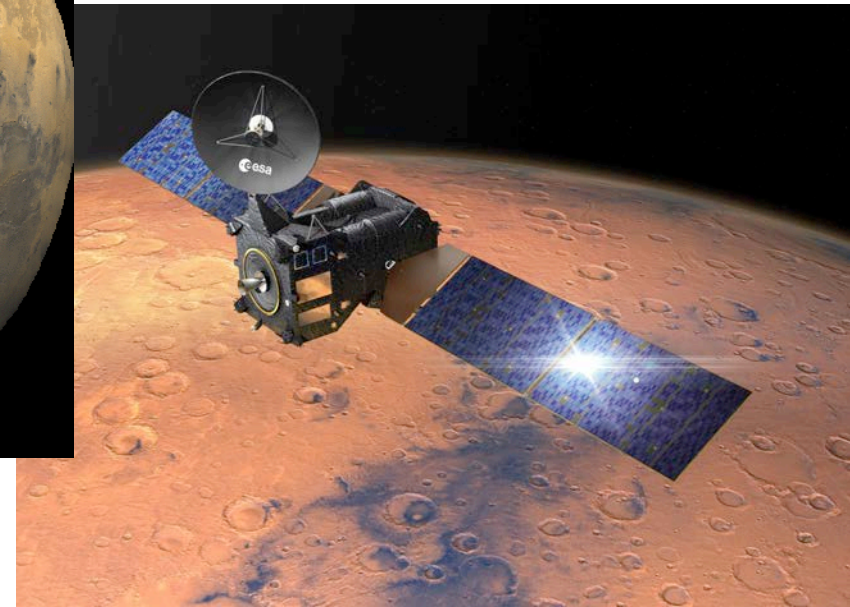
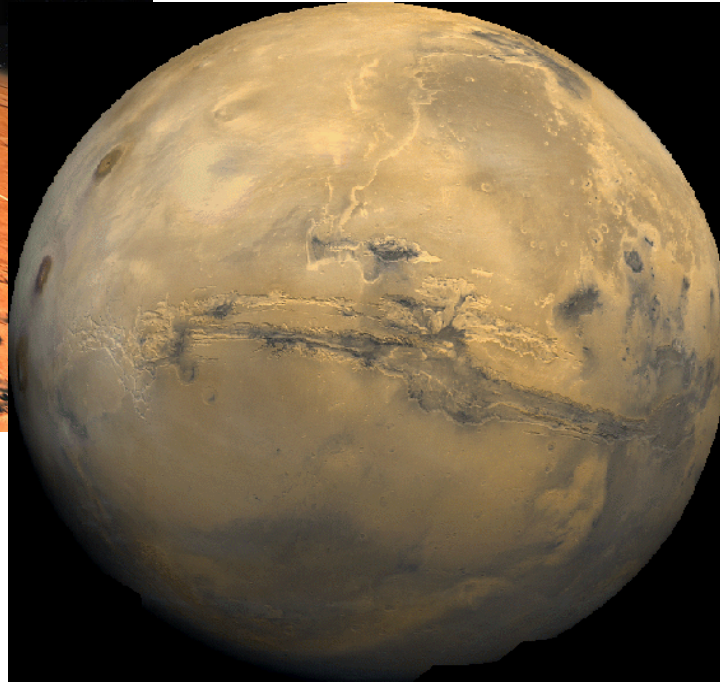
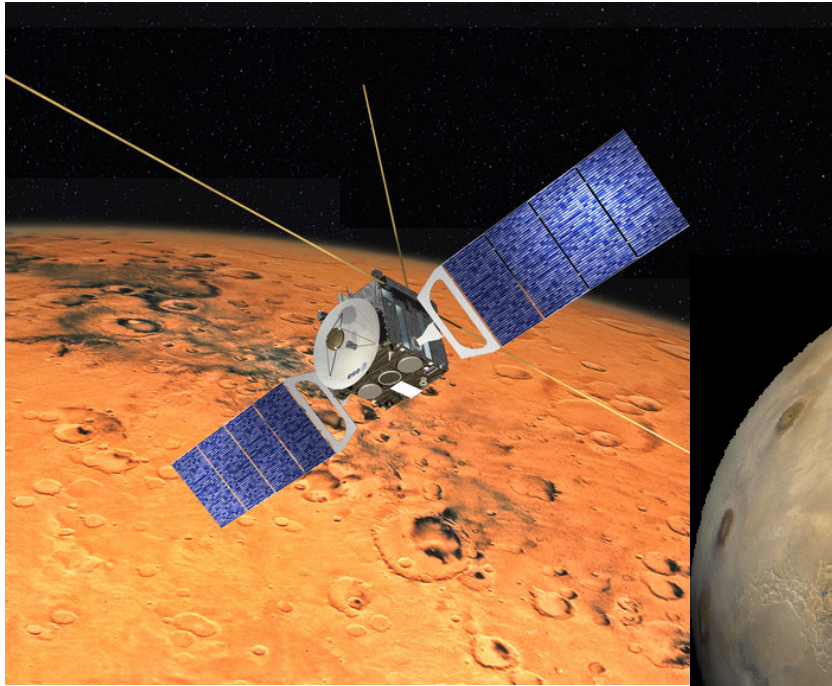
12 Nov. 2014

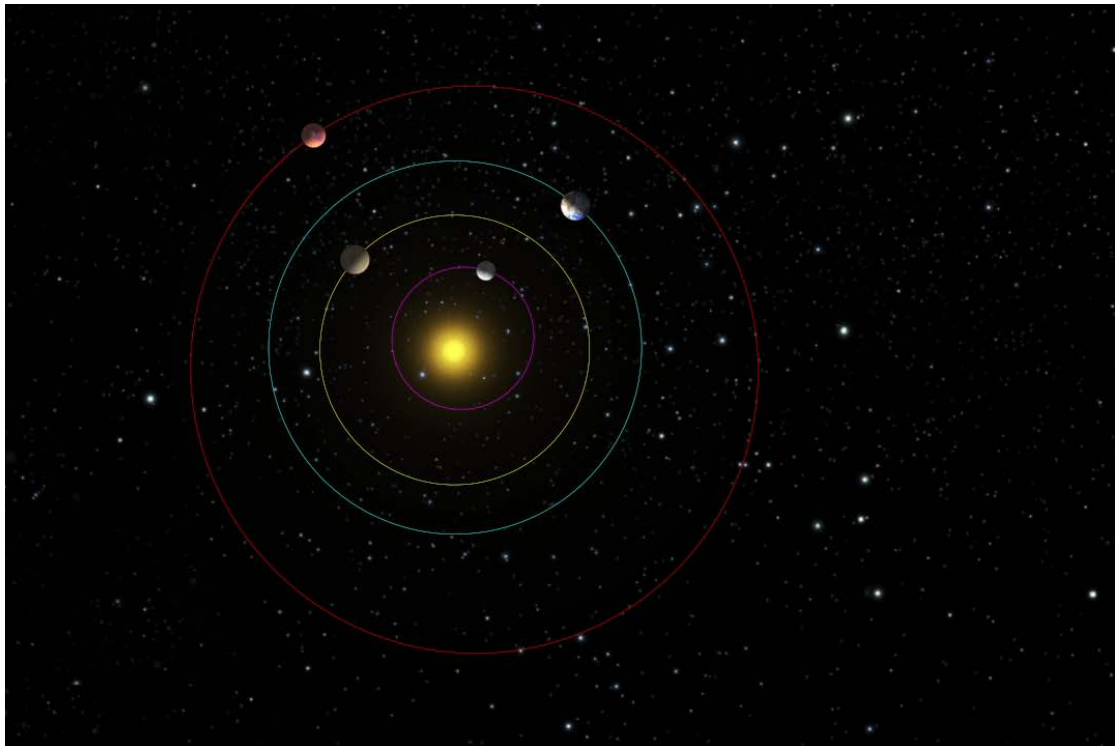




bepicolombo



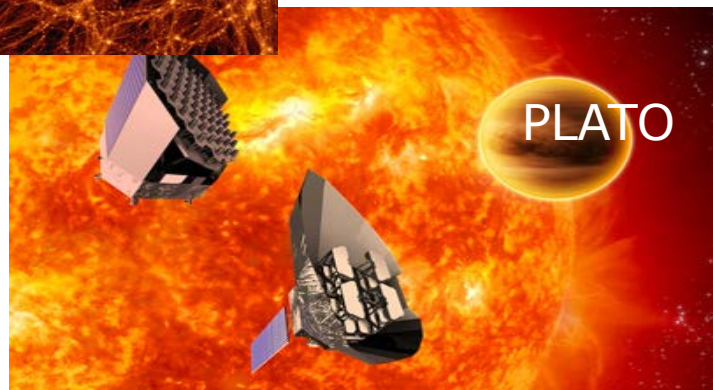
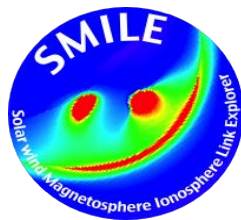




Moons of the Solar System



Science Programme

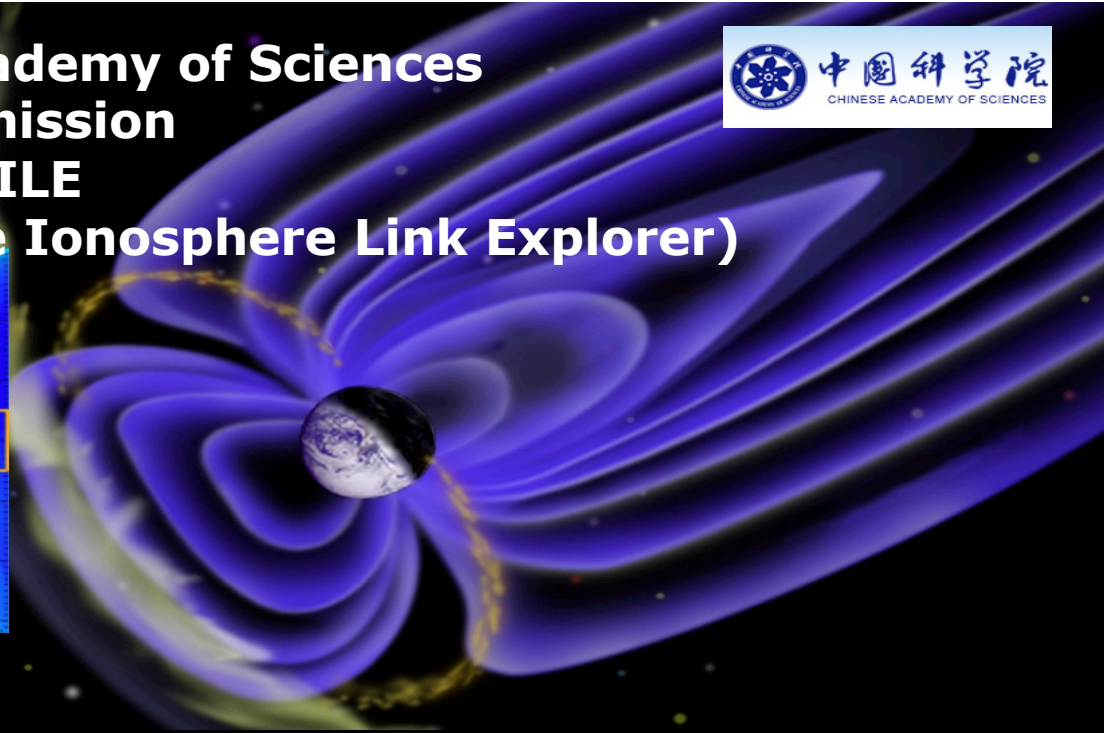
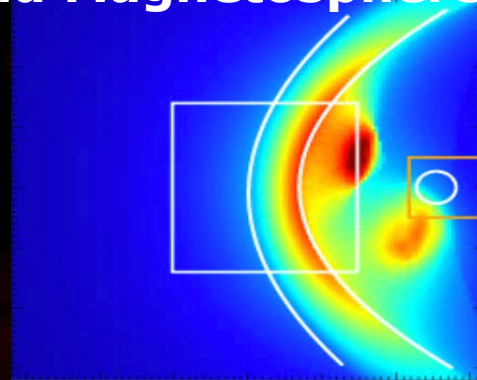




ESA – Chinese Academy of Sciences
Joint mission
SMILE



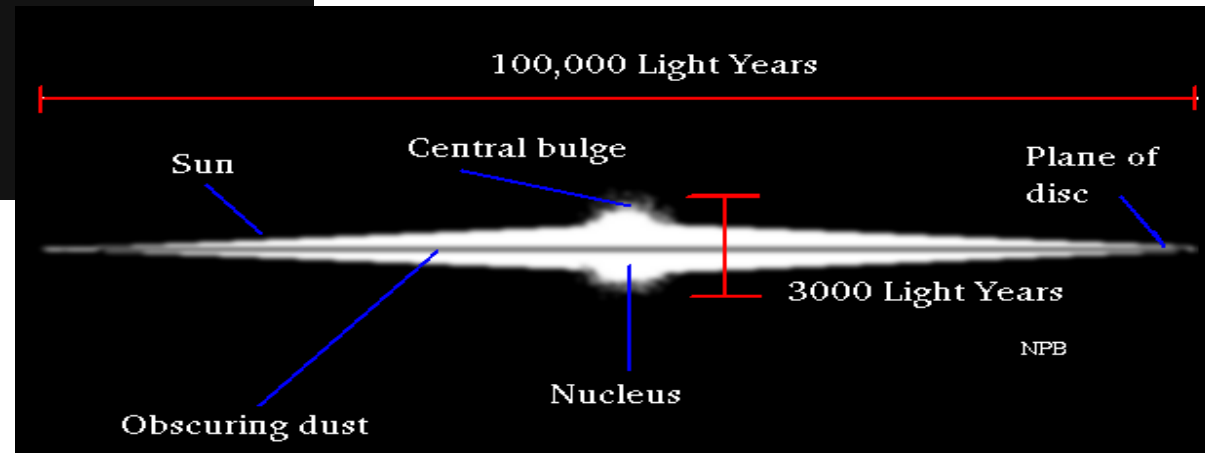
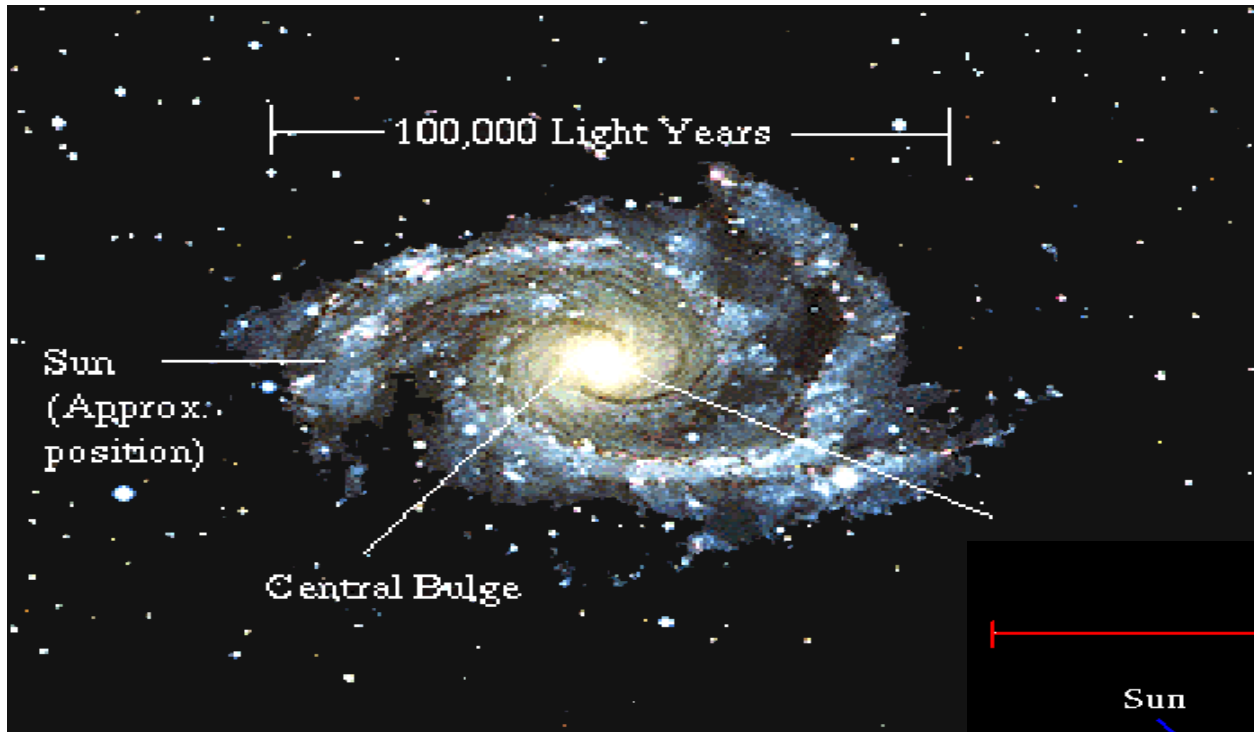
(Solar wind Magnetosphere Ionosphere Link Explorer)



Co-Pis: G. Branduardi-Raymont and C. Wang

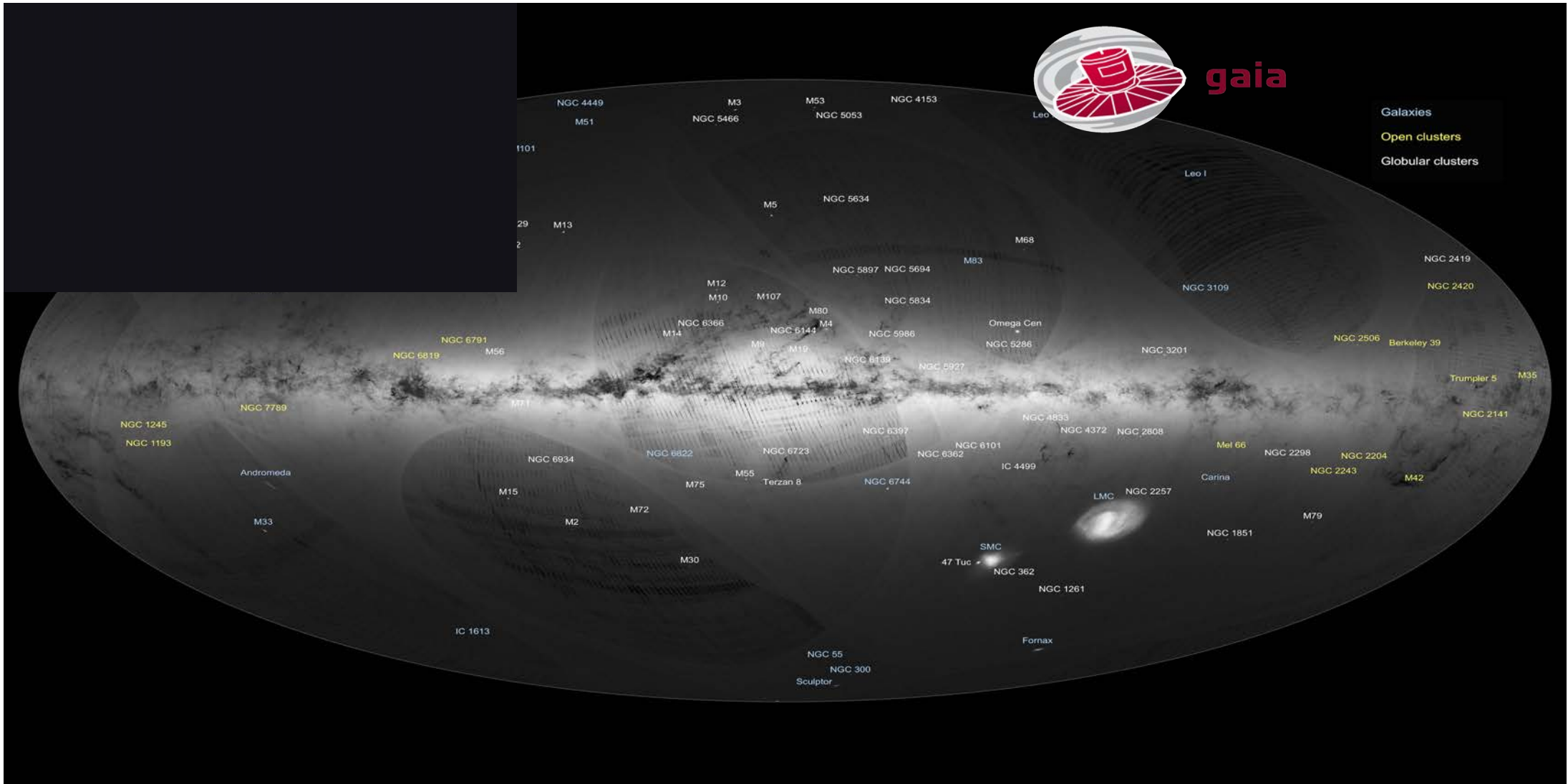
Smile will investigate the interaction between Earth's protective shield – the magnetosphere – and the supersonic solar wind

Goal: understanding the physical processes taking place during the continuous interaction between the solar wind and the magnetosphere



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jwst

JWST mission



NASA flagship mission

partnership between NASA, ESA and the Canadian Space Agency



- General purpose near and mid-infrared observatory
- Largest astronomical telescope ever flown
- Observing objects ranging from planets and bodies of our Solar System to some of the most distant galaxies



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jwst

JWST hardware status - OTIS

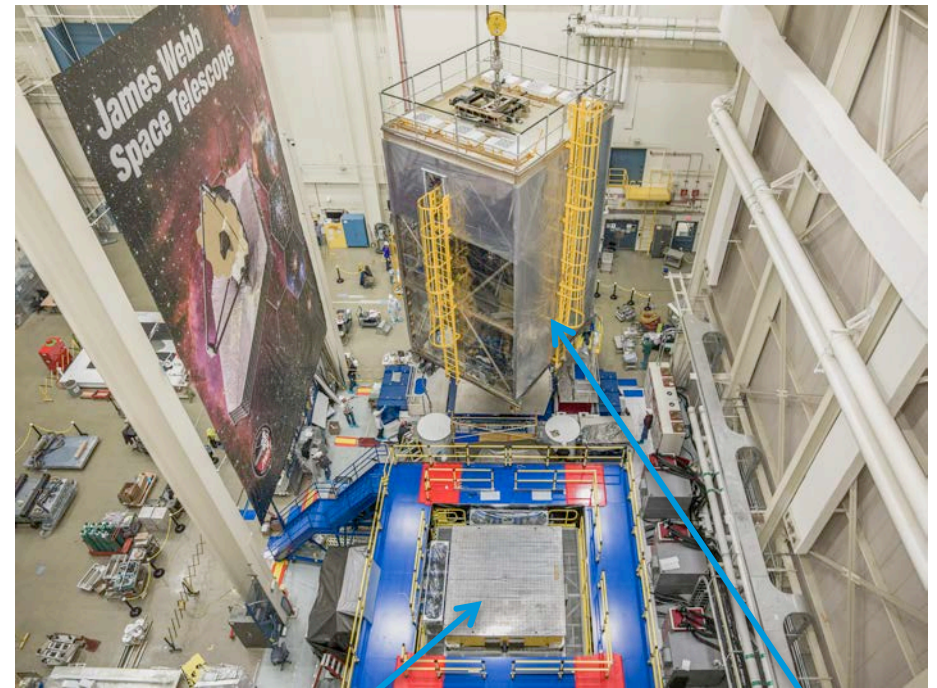


Making sure the telescope and the instruments can survive the harsh conditions of a rocket launch: acoustic and vibration testing.



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Credits: NASA/Chris Gunn



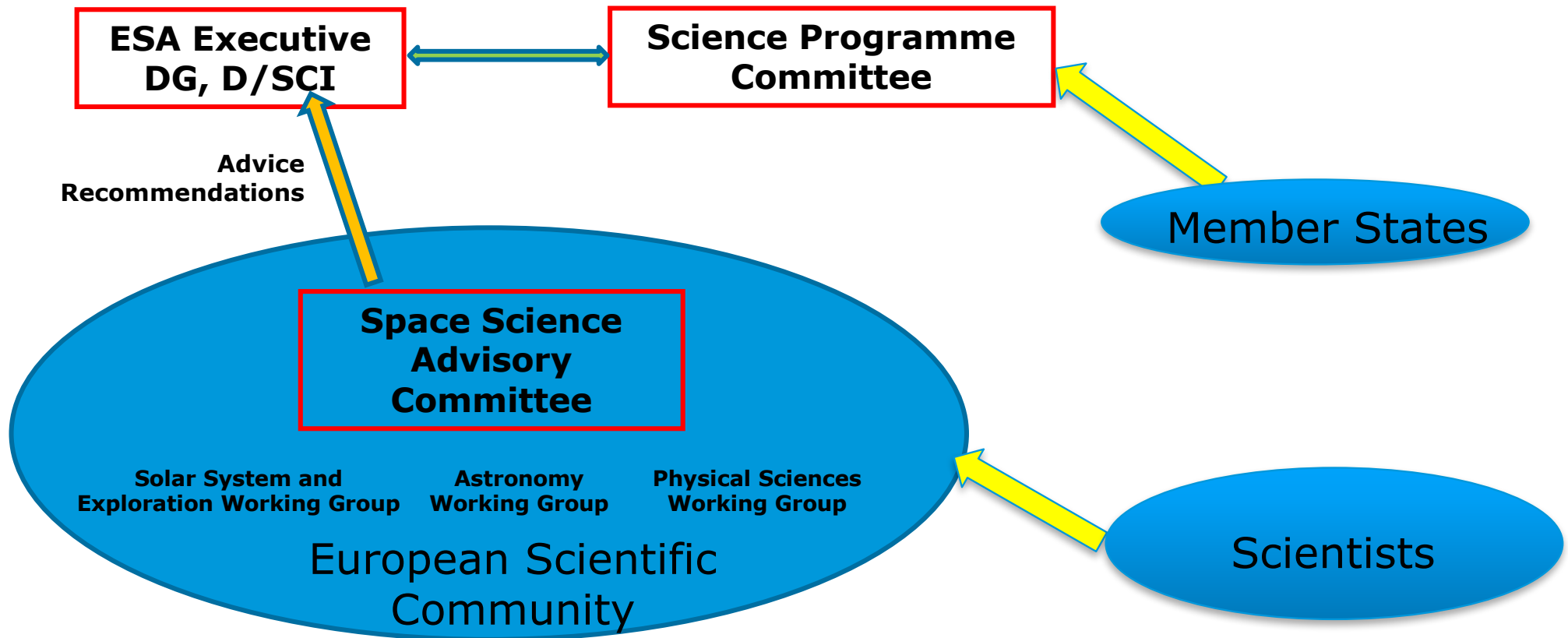
Vibration table

OTIS

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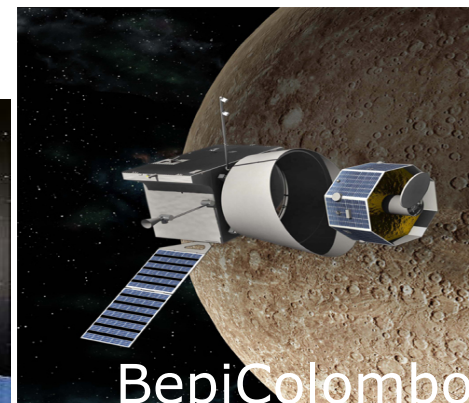
A bottom-up approach



The elements

The building blocks of the programme include:

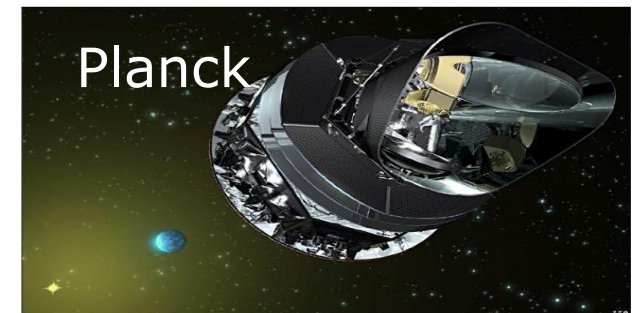
- a. **L-missions**, large European led flagship missions with a cost to ESA of around 2 annual budgets, one every 7-8 years.
 - High innovation content
 - European flagships



The elements

The building blocks of the programme include:

- a. **L-missions**, large European led flagship missions with a cost to ESA of around 2 annual budgets, one every 7-8 years.
- b. **M-missions**, provide the programme with flexibility. ESA led or implemented through international collaboration. Cost to ESA of around one annual budget, one every 3-4 years.
 - Makes use of current cutting-edge technology
 - Programme workhorse



The elements

The building blocks of the programme include:

- a. L-missions**, large European led flagship missions with a cost to ESA of around 2 annual budgets, one every 7-8 years.
- b. M-missions**, provide the programme with flexibility. ESA led or implemented through international collaboration. Cost to ESA of around one annual budget, one every 3-4 years.
- c. S-missions**, new concept allowing national agencies to play a leading role in missions, 0.1 annual budgets, one every 4 years, potentially.
- d. O-missions**, which are “missions of opportunity”, led by other agencies, small contributions.

ESA Council



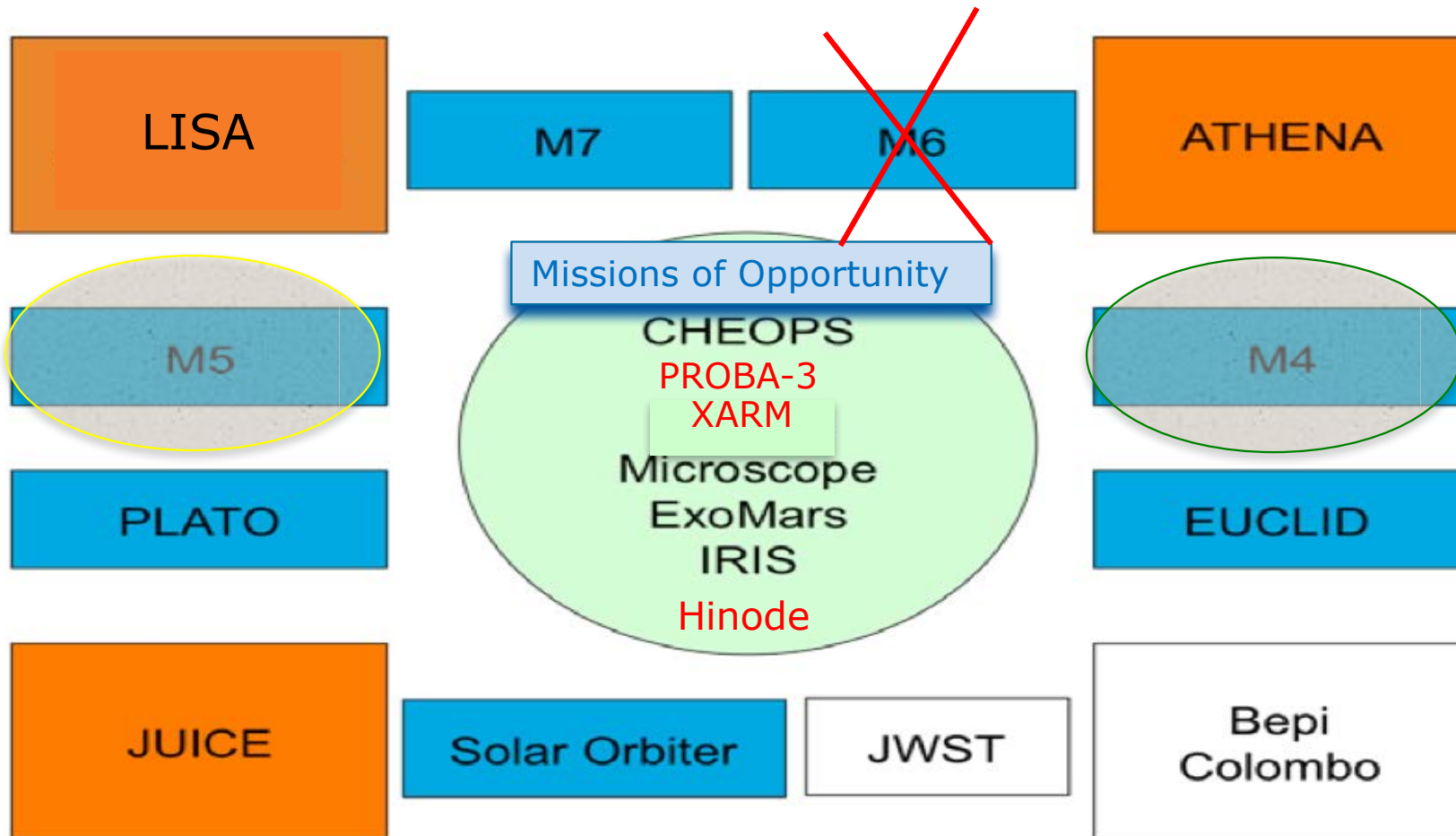
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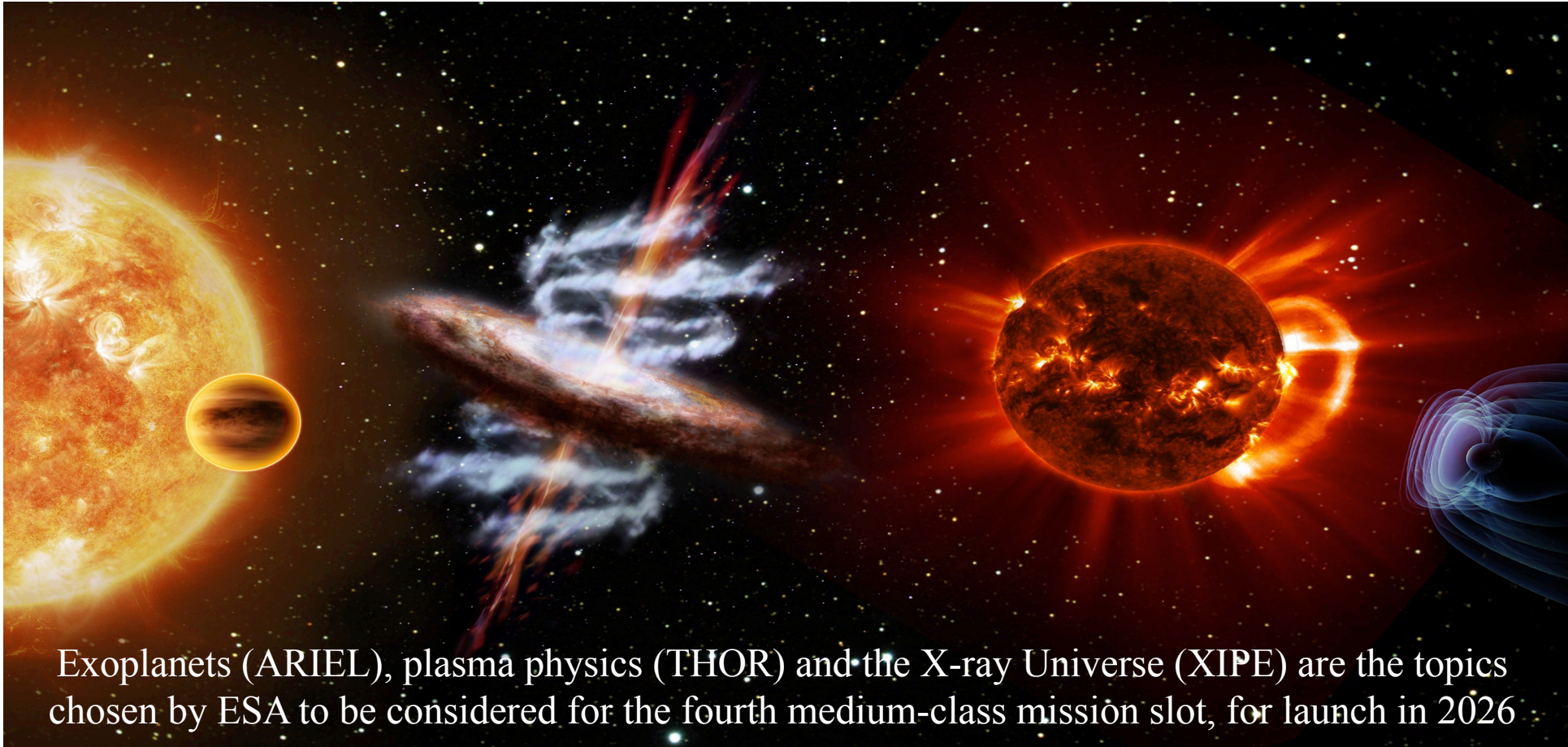
Scientific Programme - Plan



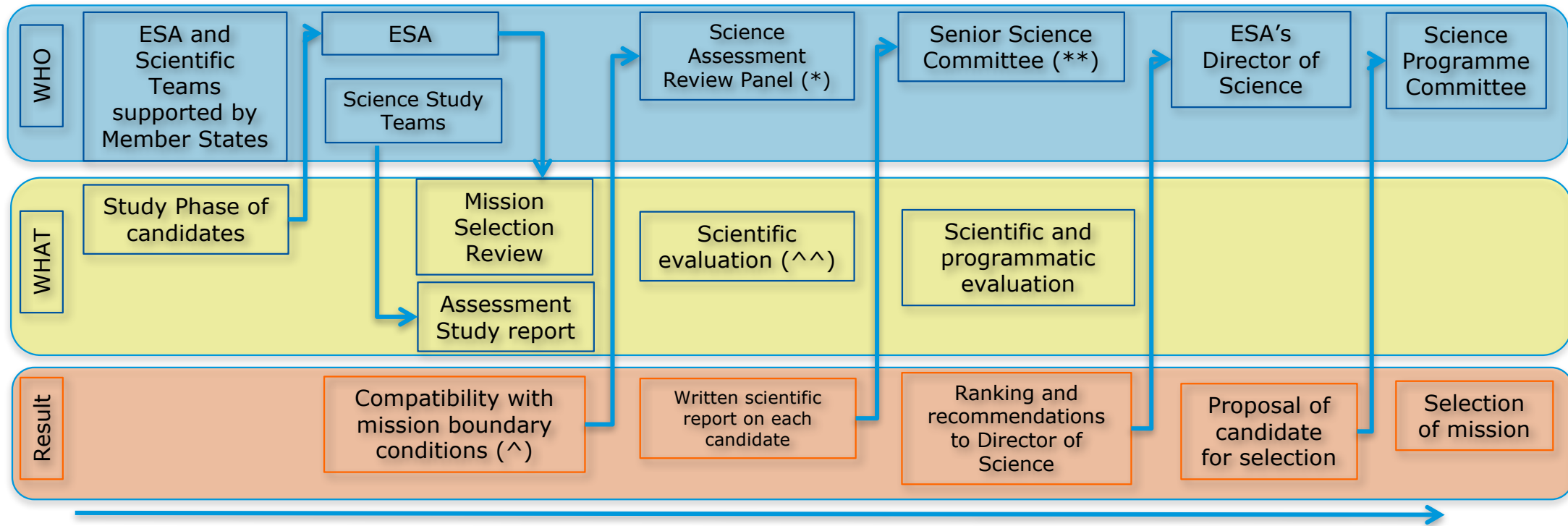
Call for new science ideas



M4 selection



Mission – selection process



- (*) Advisory Working Groups (exclusion of strongly conflicted members) + additional experts
- (**) SSAC members (exclusion of strongly conflicted members) + experts
- (^) Including financial envelope, TRL of mission elements and readiness of Funding Agencies to fund mission elements proposed not to be under ESA's responsibility
- (^^) Including demonstrated capability to obtain the scientific objectives declared at the time of candidate selection



New Science Ideas in ESA's Science Programme



- 26 proposals received by the deadline (14 September 2016)
- No a priori technical screening.
- Scientific assessment under the responsibility of the Advisory Structure, in two stages.
 - No prioritization, only identification of potentially interesting themes
- Post facto technical assessment
- Work on going on the three selected “themes”
- Results will be made public for the whole community



Selected themes (2/3) – Planetary science vs. platform size



- Strong interest in “focused” planetary missions based on small platforms
- Could enable significant additional opportunities for planetary science on rocky planets, small bodies
- Ideally suited for potential partnerships
- Workshop on “Planetary science missions vs. platform size” held on 6-7 September
- Interaction with the community => CDF study completed in December 2017





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