

Planetary protection : coordination in international efforts

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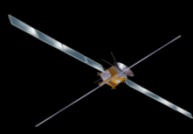
LESIA, Paris Observatory, PSL, Univ. Sorbonne, FR

Chair, COSPAR Panel for Planetary Protection

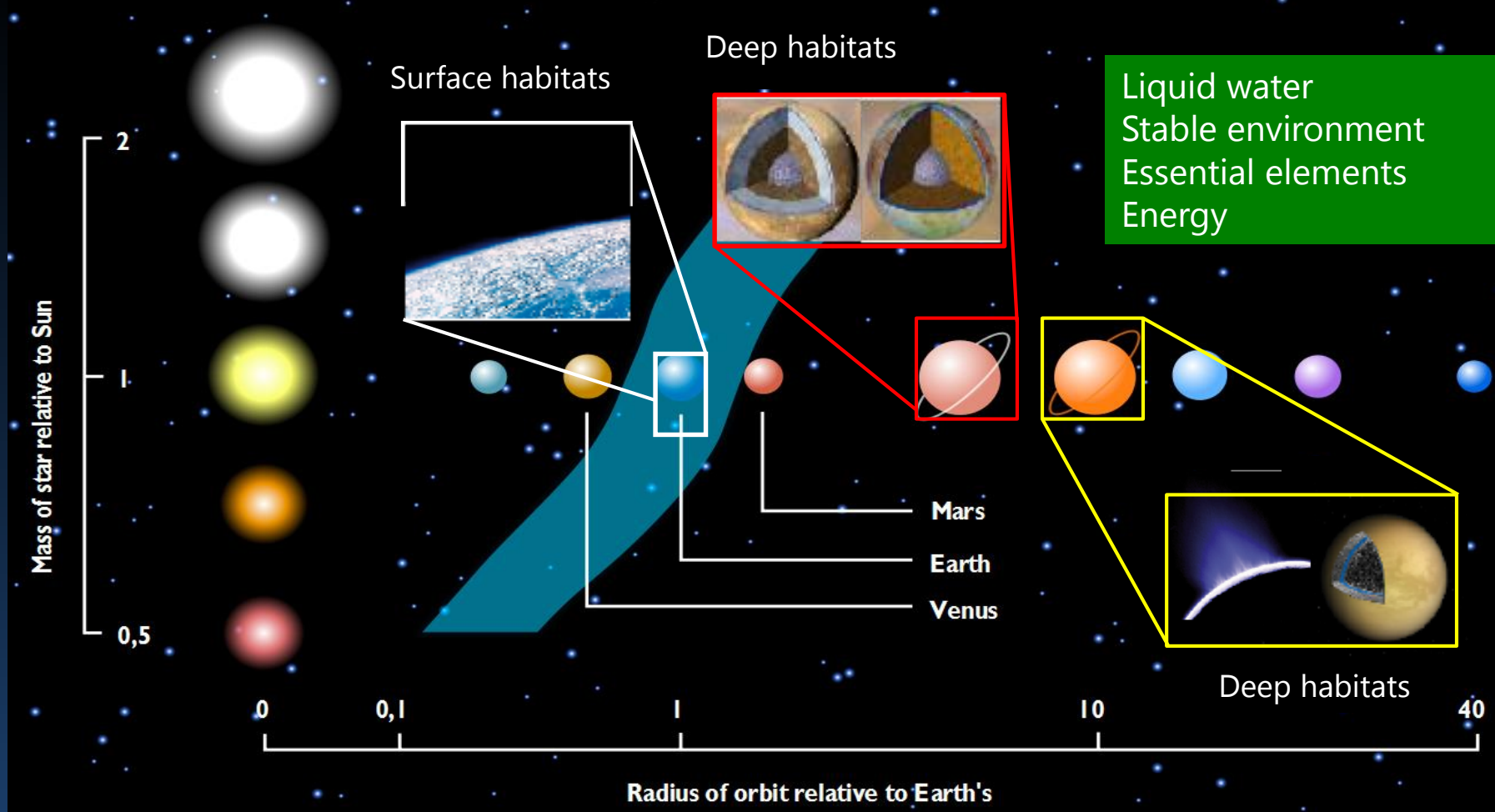
Chair, ESA Human Spaceflight and Exploration

Science Advisory Committee (HESAC)





Habitability in the Solar System: extended HZ



Icy satellites like Ganymede, Europa, Titan or Enceladus: habitable worlds ?

Recent missions to MARS

Al-Amal (Hope) – Emirates – launched 19 July 2020



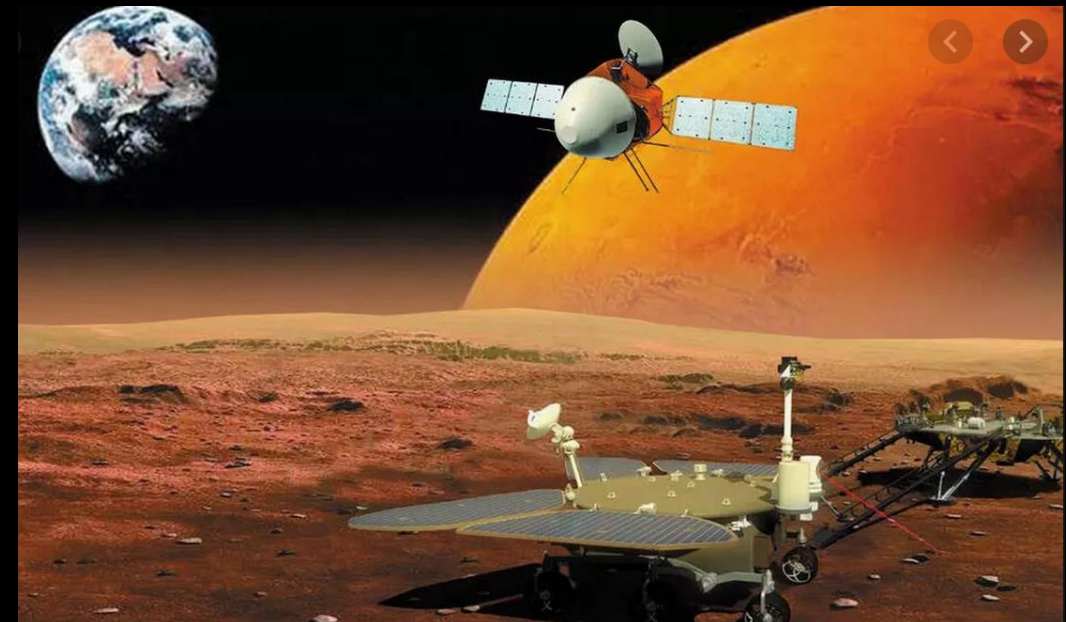
Mars 2020 – NASA – launched 20 July 2020

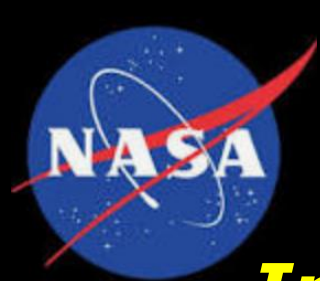


Mars Perseverance Rover



Tianwen-1 – China – launched 23 July 2020

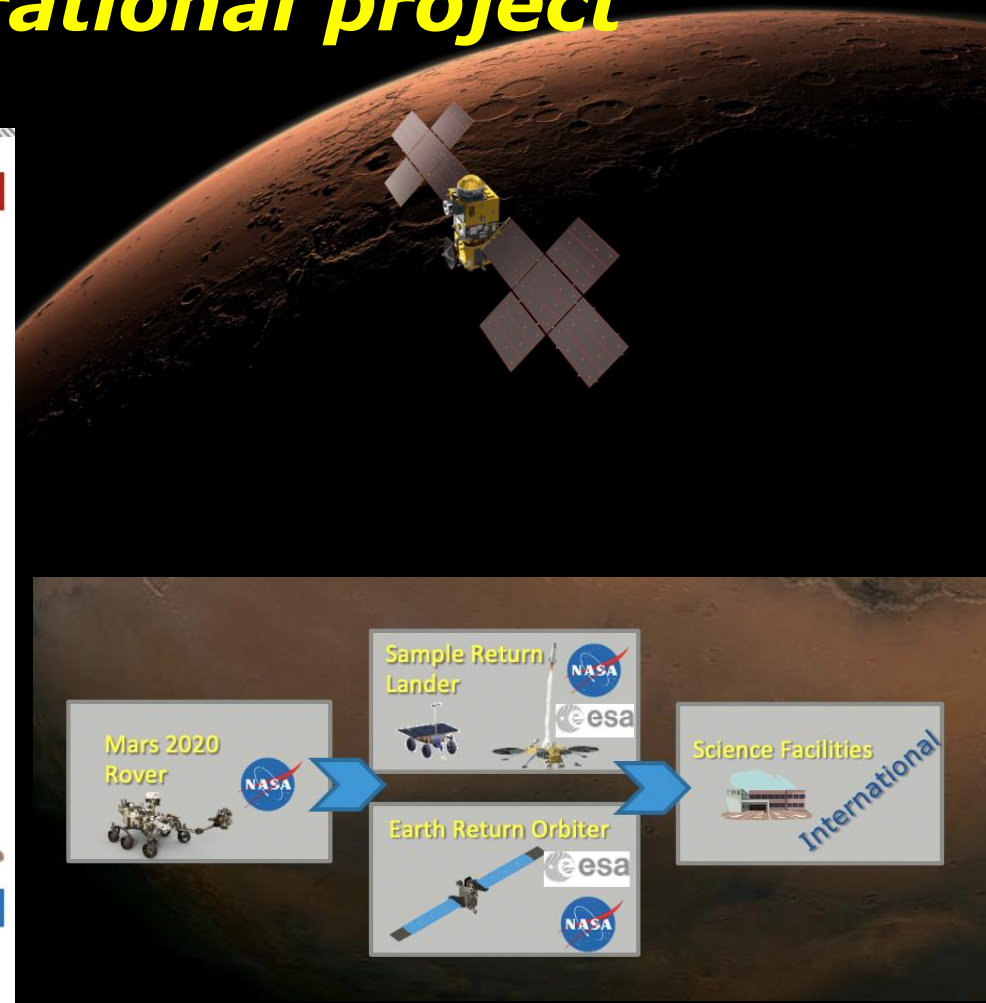
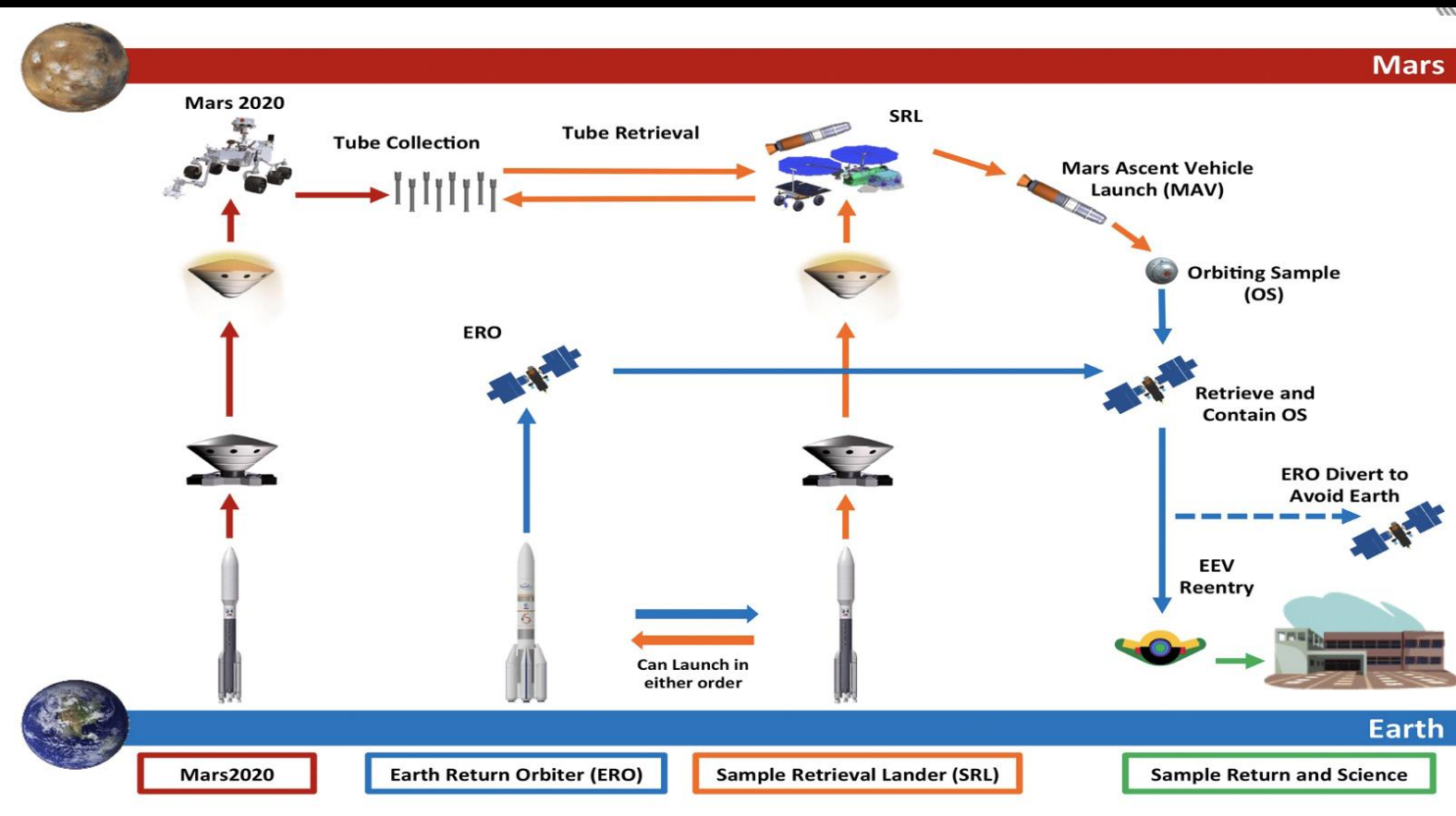




Mars Sample Return



International endeavor & generational project

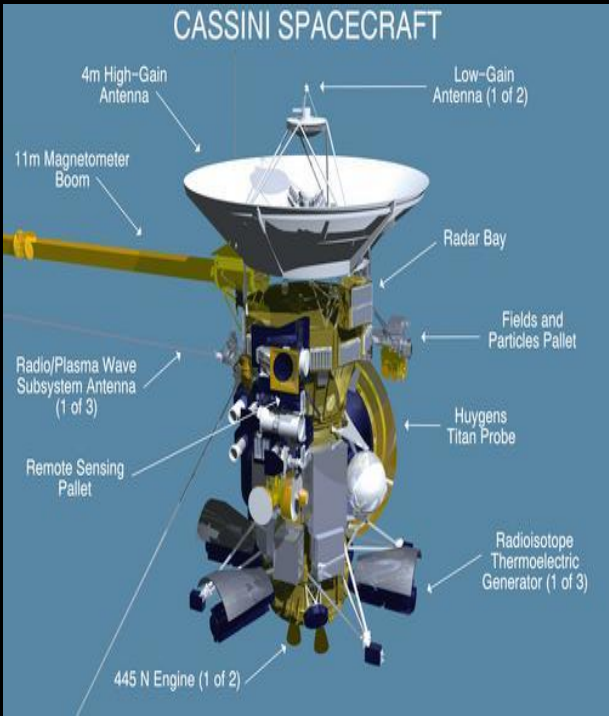


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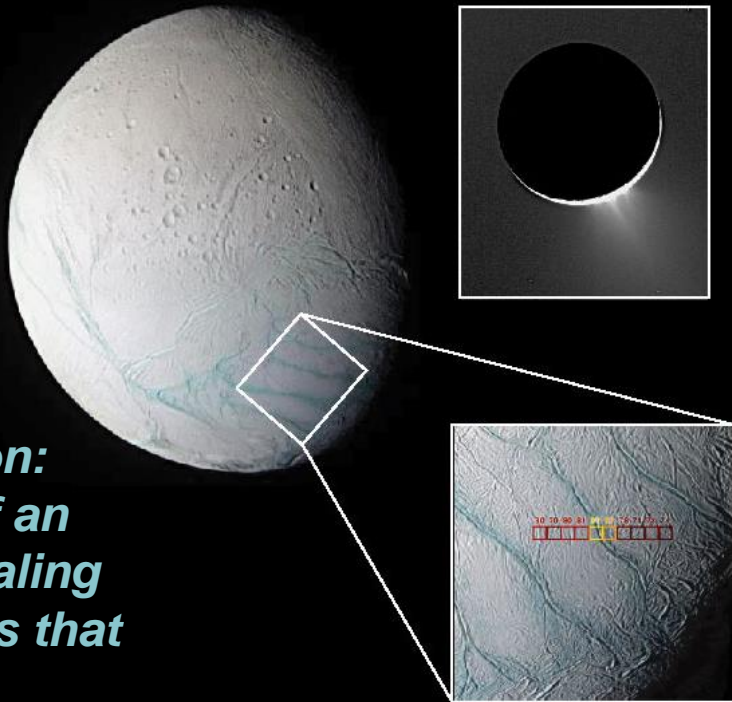


European Space Agency

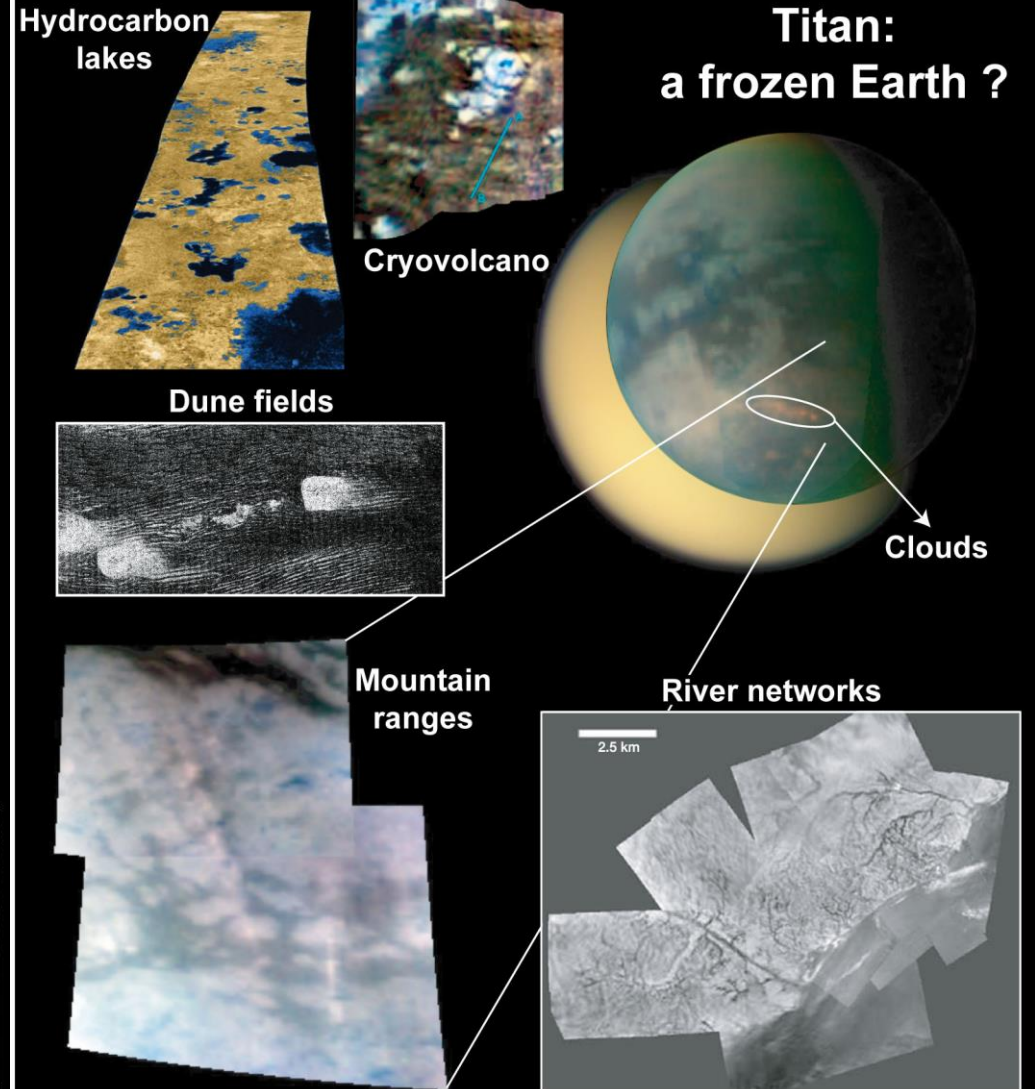
Exploration by Cassini-Huygens (2004-2017) reveals Titan and Enceladus



Enceladus



Titan



***Cassini-Huygens mission:
Extraordinary success of an
international mission revealing
new habitable environments that
need to be preserved***

Oceans in the Solar System



The Planetary protection at the service of the exploration of habitable worlds in the Solar System

OUTER SPACE TREATY



COSPAR planetary protection policy

The policy must be based upon the most current, peer-reviewed scientific knowledge, and is there to enable the exploration of the solar system, not prohibit it.

The COSPAR Panel on Planetary Protection is to develop, maintain, and promote the COSPAR policy and associated requirements that must be achieved to protect against the harmful effects of forward and backward contamination and to guide compliance with the Outer Space Treaty ratified today by 110 nations, i.e.

The conduct of scientific investigations of possible extraterrestrial life forms, precursors, and remnants must not be jeopardized.

In addition, the Earth must be protected from the potential hazard posed by extraterrestrial matter carried by a spacecraft returning from an interplanetary mission.





Scope and Objectives of the COSPAR Panel on Planetary Protection

- It is not the purpose of the Panel to specify **the means by which adherence to the COSPAR Planetary Protection Policy and associated guidelines is achieved**; this is reserved to the **engineering judgment of the organization responsible for the planetary mission**, subject to certification of compliance with the COSPAR planetary protection requirements by the national or international authority responsible for compliance with the UN Outer Space Treaty.
- The Panel provides, through workshops and meetings also at COSPAR Assemblies, an **international forum** for the exchange of information on the best practices for adhering to the COSPAR planetary protection requirements. **Through COSPAR the Panel informs the international community, including holding an active dialogue with the private sector.**

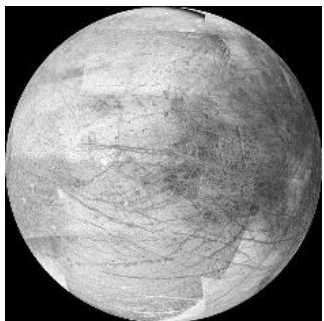
New COSPAR Policy updated official document published in August 2020: Space Res. Today 208, 10-22. <https://doi.org/10.1016/j.srt.2020.07.009>.

The COSPAR Panel on Planetary Protection:
<https://cosparhq.cnes.fr/scientific-structure/ppp>

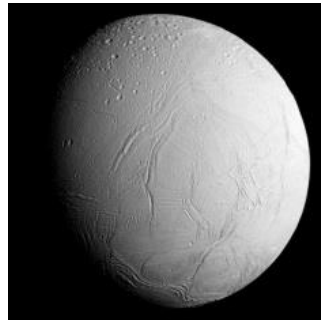


Planetary Protection of the Outer Solar System (PPOSS)

- Project led by the European Science Foundation, funded by the EC with DLR/Germany, INAF/Italy, Eurospace, Space Technology/Ireland, Imperial College London (UK), China Academy of Space Technology and NAS-SSB
- Recommended a revision of the planetary protection requirements for missions to Europa and Enceladus, based partly on the NAS-SSB 2012 Icy Bodies Report
- The ESA PPWG submitted a written assessment of the PPOSS recommendation to COSPAR
- COSPAR was involved throughout the multi-year-long process and at the end updated the requirements for missions to Europa and Enceladus



Credit: NASA/JPL/Galileo



Credit: NASA/JPL/Cassini

The International PP Handbook: Dec. 2018

Martian Moon Explorer (MMX)

In 2019 ESA and JAXA studied **sample return missions from Phobos and Deimos**



- ESA, NASA and JAXA supported scientific activities to evaluate the level of assurance that no unsterilized martian material naturally transferred to Phobos (or Deimos) is accessible to a Phobos (or Deimos) sample return mission, followed by an independent review by the NAS-ESF
- Outcome was presented to the ESA Planetary Working Group (PPWG) and to COSPAR
- COSPAR was involved throughout the process and assigned a planetary protection category for the MMX mission (**outbound Cat III and inbound Cat V: unrestricted Earth return**)



Planetary protection: For sustainable space exploration and to safeguard our biosphere



- *Planetary protection technologies are for cleaning and sterilizing spacecraft and handling soil, rock and atmospheric samples. Precautions are taken against introducing microbes from Earth.*
- *At the same time, when the samples are returned to Earth, there is need to avoid backward contamination and preserve our biosphere*