

# **The COSPAR Planetary Protection Policy: Ensuring the Sustainability of Scientific Investigations in Space**

**United Nations/China 2nd Global Partnership Workshop on  
Space Exploration and Innovation  
21 - 24 November 2022**

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UNITED NATIONS  
Office for Outer Space Affairs



# Committee on the Peaceful Uses of Outer Space



1958 ad hoc body. 1959 established as permanent body (GA resolution 1472 (XIV))

Consensus principle applies to the work of COPUOS

- ❑ Developing international space law
  - Has created 5 treaties (OST, ARRA, LIAB, REG, MOON) and 5 principles (Legal Declaration, Television Broadcasting, Remote Sensing, NPS, Benefits Declaration)
  - Space Debris Mitigation Guidelines
  - Safety framework for nuclear power sources (NPS)
  - Guidelines for the Long-term Sustainability of Outer Space Activities (LTS Guidelines)
  - GA resolutions on launching State, registration practice, national space legislation.
  - COPUOS has expanded the number of States members from 18 (1958) to 100 (2022). Has 42 permanent observer organizations (IGO and NGO). COSPAR the first observer (1962)
- ❑ Two subcommittees: Scientific and Technical Subcommittee (STSC) and Legal Subcommittee (LSC)
- ❑ COPUOS reports annually to GA Fourth Committee – resolution on “international cooperation in the peaceful uses of outer space”



## The 1967 Outer Space Treaty (OST)

- Exploration and use of outer space – “province of all mankind” (*Article I*)
- Principle of non-appropriation (*Article II*)
- International law and UN Charter (***Article III***)
- Weapons of mass destruction/the Moon and other celestial bodies “exclusively for peaceful purposes” (*Article IV*)
- Astronauts as “envoys of mankind” (*Article V*)
- International responsibility for national activities in outer space (***Article VI***)
- International liability for damage (*Article VII*)
- Jurisdiction and control over objects launched into space (*Article VIII*)
- Cooperation and mutual assistance, due regard, harmful contamination, harmful interference (***Article IX***)
- Opportunity for observation of flight of space objects (*Article X*)
- Information and notification (*Article XI*)
- Stations, installation, equipment and space vehicles on the Moon and other celestial bodies open on the basis of reciprocity (*Article XII*)



## OST Article IX

**Cooperation and mutual assistance, “due regard” to corresponding interests of all other States Parties, “harmful contamination”, “harmful interference”**

Element on *harmful contamination* and *adverse changes in the environment of the Earth*:

“...States Parties to the Treaty shall pursue studies of outer space, including the Moon and other celestial bodies, and conduct exploration of them so as to avoid their **harmful contamination** and also **adverse changes in the environment of the Earth** resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose....”



## COSPAR-COPUOS (on planetary protection)

Contamination concerns raised, inter alia, in the report of the Ad Hoc Committee on the Peaceful Uses of Outer Space (COPUOS) in 1959.

In the 1964 COPUOS report (A/5785), the report by the COSPAR Consultative Group on Potentially Harmful Effects of Space Experiments was given important consideration by the re-print in the COPUOS report of the full COSPAR Executive Council resolution of May 1964, including attached recommendations of the Panel on Standards for Space Probe Sterilization (predecessor to Panel on Planetary Quarantine and the present Panel on Planetary Protection).

COPUOS in its 2017 report (A/72/20, para. 332) noted the long-standing role of COSPAR in maintaining the Planetary Protection Policy as a reference standard for spacefaring nations and in guiding compliance with Article IX of the Outer Space Treaty.



## COSPAR Policy on Planetary Protection (non-legally binding)

- Preambular para. 3: “COSPAR maintains and promulgates this policy on planetary protection for the reference of space-faring nations, both as an international standard on procedures to avoid organic-constituent and biological contamination in space exploration, and to provide accepted guidelines in this area to guide compliance with the wording of the UN Outer Space Treaty and other relevant international agreements”.
- Policy statement: “The conduct of scientific investigations of possible extra-terrestrial life forms, pre-cursors, and remnants must not be jeopardized. In addition, the Earth must be protected from the potential hazard posed by extra-terrestrial matter carried by a spacecraft returning from an inter-planetary mission”.
- Category I-IV level determined by “..target body of chemical evolution and/or origin of life interest”.

<https://cosparhq.cnes.fr/scientific-structure/panels/panel-on-planetary-protection-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 and on an ESA PPWG recommendation.
- COSPAR was involved throughout the multi-year-long process and at the end updated the requirements for missions to Europa and Enceladus.

*Published in Space Res. Today 208, 10-22 (Aug. 2020) "Planetary protection: New aspects of policy and requirements", 2019.*

*Life Sci. Space Res. 23*

*The Internl PP Handbook: Dec. 2018*

## Martian Moon Explorer (MMX)

In 2019 ESA and JAXA studied sample return missions from Martian moons 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, involved from the beginning.
- Assigned planetary protection category for the MMX mission: outbound Cat III and inbound Cat V: unrestricted Earth return).



## Updated planetary protection requirements for the Moon

- **Orbiter and fly-by missions to the Moon: *Category II*.** There is no need to provide an organic inventory.
- **Lander missions to the Moon:**
  - ***Category IIa*.** All missions to the surface of the Moon whose nominal mission profile does not access areas defined in *Category IIb* shall provide the planetary protection documentation described in Table 1 and an organic inventory limited to organic products that may be released into the lunar environment by the propulsion system.
  - ***Category IIb*.** All missions to the surface of the Moon whose nominal profile access Permanently Shadowed Regions (PSRs) and the lunar poles, in particular latitudes south of 79°S and north of 86°N shall provide the planetary protection documentation described in Table 1 and an organic inventory in line with chapter 3.
- **Category II:** All types of missions (gravity assist, orbiter, lander) to a target body where there is significant interest relative to the process of chemical evolution and the origin of life, but where there is only a remote chance that contamination carried by a spacecraft could compromise future investigations.

*The requirements are for simple documentation only*





# COSPAR PPP: FURTHER ITEMS

**Venus**

**Martian exploration**

**Exploration of Icy Moons**



## Space governance – a cross-cutting projection

- **Celestial bodies:** exploration and innovation, utilization and presence - space resources - environmental and cultural/heritage protection - planetary protection (COSPAR) (forward contamination) - planetary orbits →
- **Earth orbits:** security, safety, and sustainability of outer space activities - registration/frequency management/GSO - space debris – space weather - SSA - fabrics of “space traffic management (STM)” →
- **Planet Earth:** planetary defence, planetary protection (back contamination), space weather (also orbits), dark and quiet skies, sustainable development →
- Order - predictability and consistency – balancing policy, commercial, scientific interests

# THANK YOU



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