



COSPAR Panel on Planetary Protection

Presented by Dr. Athena Coustenis
European Space Science Committee of the ESF
COSPAR Planetary Protection Panel incoming Chair



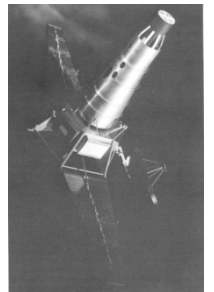
History of planetary protection

"...we are in the awkward situation of being able to spoil certain possibilities for scientific investigations for a considerable interval before we can constructively realize them...we urgently need to give some thought to the conservative measures needed to protect future scientific objectives on the moon and the planets..." J. Lederberg and D. B. Cowie, *Science*, 1958



- Reflects the concern raised by the International Astronautical Federation (IAF), UN-COPUOS and US National Academy of Science (NAS) in this time period that lead to the Committee on Contamination by Extraterrestrial Exploration (CETEX), established by the International Council of Scientific Unions (ICSU)
- ICSU adopts the CETEX Code-of-Conduct and established the Committee on Space Research (COSPAR)
- COSPAR established the Consultative Group on Potentially Harmful Effects of Space Experiments

- The first spaceflight missions to use this Code-of-Conduct were the Ranger missions in 1961
- Since then, all planetary missions had to implement planetary protection measures at different degrees – ranging from simple documentation to terminal sterilization of entire flight systems
- More detailed quantitative regulations, in particular for Mars, were adopted by COSPAR in 1964 (e.g., C. Sagan and S. Coleman, *Astronautics & Aeronautics*, 1965; C. Sagan, E. C. Levinthal, J. Lederberg, *Science*, 1968)



Credit: NASA SP 4210





Rational for planetary protection

Ensure that **scientific investigations** related to the origin and distribution of life **are not compromised**

- *Protect our investment in space science & exploration*
- *Unique opportunity to learn more about the origin of life in a way that is no longer possible on Earth*
- *And that there is the more philosophical issue about the Drake equation*

Protect the Earth from the potential hazard posed by extraterrestrial matter carried by a spacecraft returning from an interplanetary mission

- *Simple prudence - protect the Earth!*
- *In line with the precautionary principle of environmental protection*



Science class should not end in tragedy...
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Science class should not

Bart Simpson, Dec. 17, 2000, "Skinner's Sense of Snow"



Framework for planetary protection

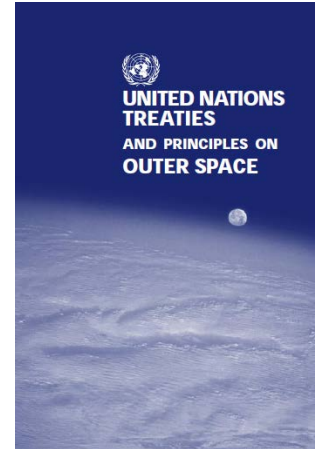
The legal basis and the goal for planetary protection was established in Article IX of the United Nations Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (Outer Space Treaty)

“...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...”

→ The United States has ratified the Outer Space Treaty

COSPAR maintains and promulgates a planetary protection policy for the reference of spacefaring nations, both as an international standard on procedures to avoid organic constituent and biological contamination in space exploration, and to provide accepted guidelines and requirements in this area to guide compliance with the wording of the Outer Space Treaty

→ The United States is member of COSPAR through the National Academies of Sciences





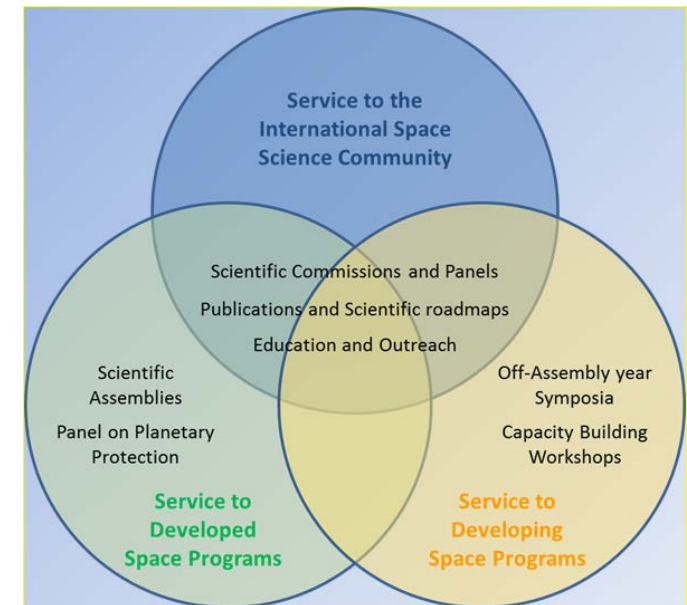
COSPAR at a glance

The **Purpose** of COSPAR, by its Charter from the International Council for Science (ICSU), is to promote at an international level scientific research in space, with emphasis on the exchange of results, information and opinions, and to provide a forum, open to all scientists, for the discussion of problems that may affect scientific space research

The **Objectives** of COSPAR are achieved mainly through the organization of scientific assemblies and publications

The **Organizational Structure** of COSPAR consists of:

- Scientific Commissions - representing each and every scientific discipline involved in space research
- Panels - designed to deal with crosscutting issues that can affect particular segments of the international space research community, and often for which there is an urgent need for input





Panel on planetary protection

The Panel is concerned with biological interchange in the conduct of solar system exploration, including:

1. Possible effects of contamination of planets other than the Earth, and of planetary satellites within the solar system by terrestrial organisms
2. Contamination of the Earth by materials returned from outer space carrying potential extraterrestrial organisms

The primary objectives of the Panel within COSPAR are to develop, maintain, and promulgate planetary protection knowledge, policy, requirements and plans to prevent the harmful effects of such contamination, and through symposia, workshops, and topical meetings at COSPAR Assemblies to provide an international forum for exchange of information in this area

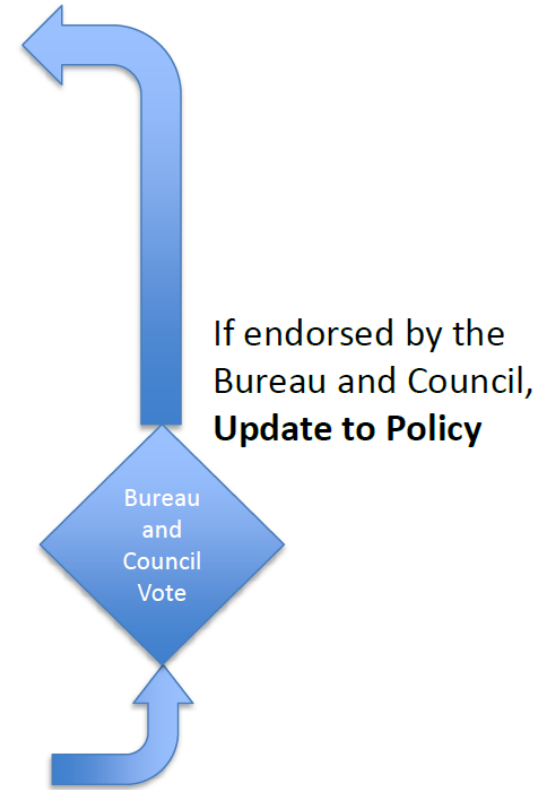
UN-COPUOS noted the long-standing role of COSPAR in maintaining the planetary protection policy as a reference standard for spacefaring nations and in guiding compliance with article IX of the Outer Space Treaty (UN-COPUOS General Assembly, 2017)

Through COSPAR the Panel informs the international community, e.g., the Committee on the Peaceful Uses of Outer Space (COPUOS) of the United Nations, as well as various other bilateral and multilateral organizations, of policy consensus in this area



Maintaining the policy (and associated requirements)

- **COSPAR Planetary Protection Policy**
(COSPAR Bureau- and Council-endorsed version in this publication)
↓
- **New phenomena reported/new missions proposed/other external considerations**
(Peer reviewed scientific literature/request from private or public entity/recommendations from agency advisory groups)
↓
- **Possible study by a scientific organization and/or a COSPAR-sponsored workshop**
(May be solicited by space agencies and carried out by a National Scientific Institution or International Scientific Unions)
↓
- **Panel on Planetary Protection meeting**
(Panel business meeting at COSPAR Scientific Assemblies or dedicated COSPAR Panel Colloquium, involving representatives of the scientific community and other relevant stakeholders)
↓
- **Panel recommendation to Bureau & Council**
(At COSPAR Scientific Assemblies or at COSPAR Bureau meetings between Assemblies)



Important: the COSPAR Planetary Protection Policy does not describe how to implement the requirements nor does it describe or require a certain organisational structure for the implementing entity (i.e. space agency); both aspects are under the discretion of the user (again, space agency)



Things to remember

- COSPAR is an international scientific committee of ICSU
- COSPAR provides a forum for discussions and advice on matters of planetary protection since its very begin in 1958
- The COSPAR Panel on Planetary Protection maintains the COSPAR Planetary Protection Policy
 - In the future (July 2018) the Panel will have members appointed by the COSPAR Bureau and the Chair will be a representative of the scientific community
- Updating the COSPAR Planetary Protection Policy is a process that includes the scientific community
 - Changes to the policy or requirements are not a one-person show, neither at COSPAR nor at the space agencies
- The COSPAR Planetary Protection Policy is published in Space Research Today, COSPAR's information bulletin (current version in number 200, December 2017)



Panel Leadership

Starting July 2018

Chair: Dr. Athena Coustenis

Vice Chairs: Dr. Niklas Hedman (UNOOSA), Dr. Gerhard Kminek

Important: all COSPAR events, including Panel meetings, are open forums; everybody who is interested can participate



PPOSS Project



- Supported by European Commission – 2016-2018
- **Main Objective:** *To provide an international forum to consider and approach the specificities of Planetary Protection (biological and organic contamination) for outer Solar system bodies, including small Solar system bodies, in the general context of Planetary Protection regulation and to provide recommendations to COSPAR.*
- **Note:** Planetary Protection tutorial (PP101) on July 12-13 in CalTech
OPEN and FREE – Contact: Alissa Haddaji - alissa_haddaji@alumni.brown.edu