COSPAR's Experience with, and the Current Status of, Biological Planetary Protection Measures Related to OST Article IX

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Biological Planetary Protection Policy

COSPAR's planetary protection policy aims to:

- Preserve planetary conditions for future biological and organic constituent exploration
  - *avoid forward contamination; preserve our investment in scientific exploration*
- To protect Earth and its biosphere from potential extraterrestrial sources of contamination
  - *avoid backward contamination; provide for safe solar-system exploration*

Over 50 Years of International Effort

- Sept. 1956: International Astronautical Federation (IAF) meets and discusses lunar and planetary contamination
- Feb. 1958: International Council for Scientific Unions (ICSU) forms committee on Contamination by ExtraTerrestrial EXploration (CETEX)
- July 1958: Formation of UN-COPUOS
- Oct. 1958: Establishment of NASA
- Oct. 1958: Formation of COSPAR by ICSU
- June 1962: ESRO (later ESA) formed in Europe
- 1964: Publication by COSPAR of quantitative guidelines on preventing forward contamination
- 1963: NASA acquires the first 'Planetary Quarantine Officer' – on loan from the US Public Health Service; later 'Planetary Protection Officer.'
- 1999: COSPAR forms the current Panel on Planetary Protection
- 2004: ESA names its first Planetary Protection Officer
- 2013: Jaxa names its first Planetary Protection Officer

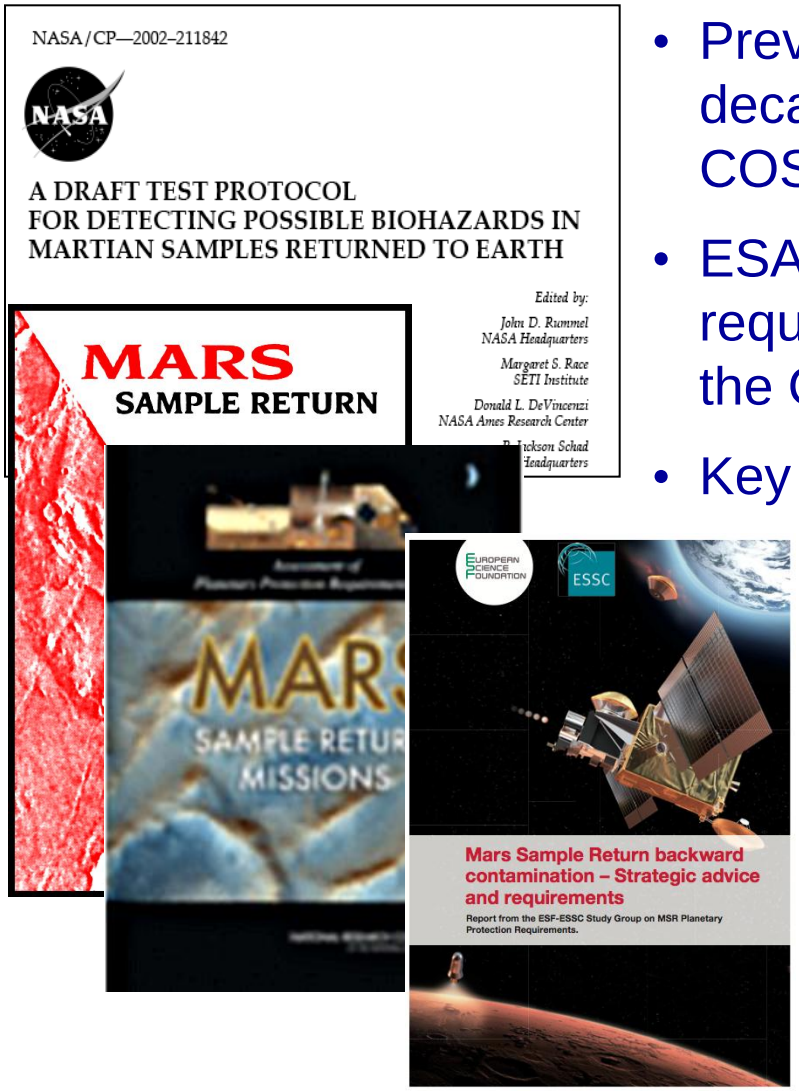
Current International Framework

- The Outer Space Treaty of 1967
  - Proposed to the UN in 1966; Signed in January 1967
  - Ratified by the USSR the US, and others by May 1967
  - Article IX of the Treaty states that:

"...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 Committee on Space Research of the International Council for Science maintains an international consensus policy on planetary protection, as it has since 1963; current version is dated March 2011
  - COSPAR's policy represents an international scientific consensus, based on advice from national scientific members, including the US Space Studies Board
  - COSPAR is consultative with the UN (through UN COPUOS and the Office of Outer Space Affairs) on measures to avoid contamination and protect the Earth
  - NASA and ESA policies specify that international robotic missions with agency participation must follow COSPAR policy, as a consensus basis for requirements

Example:
Returning Martian Samples to Earth



- Previous requirements developed over a decade of MSR preparation and adopted by COSPAR
- ESA and NASA are continuing a program of requirements refinement, based on advice from the COSPAR members US-NRC and EU-ESF.
- Key recommendations:

  NRC: "…samples returned from Mars by spacecraft should be contained and treated as though potentially hazardous until proven otherwise."

  ESF: "The probability that a single unsterilised [martian] particle of 0,01 μm diameter or greater is released into the Earth's environment shall be less than 10^{-6}."

Planetary Protection: Support for the Policy and Its Implementation

The practice of planetary protection evolves as planetary exploration progresses and as advances in planetary science and technology—capabilities for access, knowledge of the body, and organic measurement instrumentation improve.

The COSPAR Panel on Planetary Protection works on its own, and in close cooperation with Agency planetary protection personnel and their relevant advisory committees to ensure that it receives regular external and internal advice on what is required to implement the policy.

Other activities (again, alone and with agency collaboration) are undertaken to support the policy and ensure that its implementation is understood and practicable:

- Regular workshops and colloquia on implementation issues/opportunities
- Planetary protection courses provided by both NASA and ESA, (etc?)
- Regular education and outreach opportunities with the press and the

Final Microbial Assays on the Pathfinder Lander, Implementing Requirements Recommended by the NRC in 1992 (1995)