

PLANNING FOR MARS SAMPLE RETURN: IMPLEMENTING
PLANETARY PROTECTION PROTOCOLS IN THE FACE OF SCIENTIFIC
UNCERTAINTY

Race, Margaret S. * and John D. Rummel**

* SETI Institute, Mountain View , CA 94043 USA

** Marine Biological Laboratory, Woods Hole, MA 02543 USA

Because of its similarities to the Earth, particularly early in its history, the planet Mars has a prominent place as a site for investigations into the origin of life. Particular areas of interest include Mars as a host to its own origin of life, as a planet exemplifying alternatives to the history of life on Earth, and as a site to understand the effects of the natural interchange of planetary materials and their potential biological implications. The use of Mars for these studies could be compromised during space exploration in two ways: 1) by the inadvertent introduction of Earth-life onto Mars, which would confound the data and/or destroy martian life forms, or 2) by the uncontrolled introduction of martian materials to the Earth by sample return missions, which could harm the Earth's biosphere.

Preserving Mars as a site for the study of life or chemical evolution necessitates a cautious approach to future exploration in the form of planetary protection controls. Unfortunately, ignorance abounds in numerous important scientific and technical areas upon which planetary protection policies and protocols must be based. Effective development and implementation of controls to prevent planetary cross-contamination will require a dynamic interaction between scientific discovery, regulatory judgements and public awareness of the risks and benefits of Mars exploration. For the scientific community, decision makers and the public, the very aspects of Mars that make it intriguing for study also raise challenging questions and areas for further research.