THE NEED FOR INTEGRATING PLANETARY PROTECTION SCIENCE AND TECHNOLOGY INTO LUNAR EXPLORATION PLANNING. M.S. Race, SETI Institute, 515 No. Whisman Rd., Mountain View, CA 94043, mracemom@aol.com

Abstract : In discussing observations, activities and priorities for science investigations associated with lunar exploration, Planetary Protection (PP) should be considered even though current policies and regulations do not impose specific PP controls for missions to the moon. A number of recent PP workshops and studies have identified a host of important science, life support, and environmental issues associated with future robotic and human missions to Mars. Integrating these priority concerns into plans for science and activities on the moon will be important in enabling future Mars missions and will also guide design efforts in ways that articulate effectively with future hardware and architectures for long duration planetary missions to other bodies such as Mars. In planning long term design and operations strategies associated with science exploration, it will be important to avoid pursuing two distinct and expensive technology pathways—one for the Moon and the other for Mars or other bodies.

Areas of importance to PP that have been targeted for further work include life support systems, both within habitats and during EVAs; environmental monitoring and control; development of protocols to ensure cleanliness of samples during collection and testing; investigations of the nature and amount of cross contamination between inside and outside environments during routine activities and sampling/exploration; waste disposal during and after human presence and mission completion; spacesuit and hardware cleaning and repair during the missions, and and human factors that might interfere with implementation of PP protocols or proper science methods.

In addition to considering the technical and scientific aspects of these issues, it will also be important to integrate plans for communicating PP-related science, technology and policy information to the public as part of lunar exploration. Addressing anticipated questions about PP for both the moon and Mars will be essential for maintaining public understanding and support for the missions.

Particular workshops and references that provide more information on these PP-related R&D needs include:

Beaty, D.W., et al. (2005). An Analysis of the Precursor Measurements of Mars Needed to Reduce the Risk of the First Human Missions to Mars. Unpublished white paper, 77 p, posted June, 2005 by the Mars Exploration Program Analysis Group (MEPAG) at http://mepag.jpl.nasa.gov/reports/index.html.

Criswell, M.E., et al. 2005. Planetary Protection Issues in the Human Exploration of Mars, Final Report May 9, 2005 (workshop held June 2001), NASA, Ames Research Center, Moffett Field CA , NASA/CP – 2005-213461

Hogan, J.A. et al., 2006. Life Support and Habitation and Planetary Protection Workshop Final Report, NASA, Ames Research Center, Moffett Field CA , NASA/TM- 2006-213485

Hogan, J.A., et al. 2005. Influence of Planetary Protection Guidelines on Waste Management Operations, paper 05ICES266, International Conference on Environmental Systems, Rome Italy, July 2005 (Paper No. 2005-01-3097 in Journal of Aerospace, SAE 2005 Transactions, March 2006)

Race, M.S. et al., 2007. Planetary Protection and Humans on Mars: NASA/ESA Workshop Results, (summary report of 2005 workshop and overview article in preparation: contact mracemom@aol.com)