

Program



This is a revised agenda as of 3/20/15. Please note real-time changes may occur.

Agenda Overview

Tuesday, March 24, 2015

- 8:00 a.m. Room 171 Planetary Protection and Human Missions: Opening Statements and Background
1:25 p.m. Room 171 Microbial and Human Health Monitoring

Wednesday, March 25, 2015

- 8:00 a.m. Room 171 Microbial and Human Health Monitoring Continued
10:30 a.m. Room 171 Technology and Operations for Contamination Control
3:25 p.m. Room 171 Natural Transport of Contamination on Mars

Thursday, March 26, 2015

- 8:00 a.m. Room 171 Natural Transport of Contamination on Mars Continued
10:30 a.m. Room 120 Microbial and Human Health Monitoring Breakout Session
10:30 a.m. Room 116/117 Technology and Operations for Contamination Control Breakout Session
10:30 a.m. Room 112 Natural Transport of Contamination on Mars Breakout Session
2:35 p.m. Room 171 Workshop Conclusion

Tuesday, March 24, 2015
PLANETARY PROTECTION AND HUMAN MISSIONS:
OPENING STATEMENTS AND BACKGROUND
8:00 a.m. Room 171

Chairs: Cassie Conley
Bette Siegel

8:00 a.m. *Check-In*

8:30 a.m. Conley C. *
Welcome Statement

8:40 a.m. Johnson J. *
Statement of Workshop Goals and Scope

8:50 a.m. Craig D. *
NASA's Evolvable Mars Campaign Overview

9:20 a.m. Conley C. *
Current Planetary Protection Policy and Human Spaceflight

9:50 a.m. Siegel B. *
NPI 8020.7 and Path to Requirements

10:05 a.m. Johnson J. *
NASA's Literature Review & Identifying Notional Studies

10:25 a.m. Johnson J. *
Workshop Introductions

10:40 a.m. *Break*

10:55 a.m. Rummel J. D. * Race M. S. Kminek G.
[*The Development of Planetary Protection Requirements for Human Mars Missions: A History*](#) [#1010]
The paper will review and highlight the history of the development of planetary protection provisions for human missions to Mars. The role of NASA and ESA's planetary protection offices, and the aegis of COSPAR will be identified and explained.

11:25 a.m. Hogan J. A. *
[*Summary of the 2005 Life Support and Habitation and Planetary Protection Workshop*](#) [#1023]
This presentation provides a summary of the results of the Life Support and Habitation and Planetary Protection Workshop held in 2005 in Houston, TX.

11:55 a.m. *Lunch Break*

Tuesday, March 24, 2015
MICROBIAL AND HUMAN HEALTH MONITORING I
1:25 p.m. Room 171

Chair: Craig Kundrot

- 1:25 p.m. Law J. * **[KEYNOTE PRESENTATION]**
[*Planetary Protection for Human Exploration Missions: A Human Health Monitoring Perspective*](#) [#1006]
Planetary protection will be a challenge for human exploration missions. A collaborative approach that takes into context all the challenges facing human space exploration will benefit both the space medical and planetary protection communities.
- 1:55 p.m. Venkateswaran K. *
[*Capabilities for Planetary Protection: Safeguarding the Crew and Engineering Systems for Human Missions to Mars*](#) [#1018]
Validated microbial monitoring systems are required to preserve acceptable microbial burden levels, ensure interference of false-positives with life-detection experiments, and prevent the inadvertent exposure of humans to extraterrestrial materials.
- 2:15 p.m. Lang J.*
[*What can navel-gazing teach us about the microbial ecology of the ISS?*](#)
An investigation into how the ISS microbial community compares to homes on Earth. A review of microbial sequence data from 15 surfaces in the ISS analogous to surfaces sampled by the citizen science project, "Wildlife of Our Homes."
- 2:35 p.m. Bell M. S. * Rucker M. Love S. Johnson J. Chambliss J. Pierson D. Ott M. Mary N. Glass B. Lupisella M. Scheuger A. Race M.
[*NASA's International Space Station: A Testbed for Planetary Protection Protocol Development*](#) [#1002]
Toward utilizing NASA's International Space Station to develop an integrated forward contamination test and analysis plan to meet planetary protection standards for human exploration.
- 2:55 p.m. Lee P. * Lorber K.
[*Phobos and Deimos: Planetary Protection Knowledge Gaps for Human Missions*](#) [#1007]
Phobos and Deimos, Mars' two moons, are associated with significant planetary protection knowledge gaps for human missions, that may be filled by a low cost robotic reconnaissance mission focused on elucidating their origin and volatile content.
- 3:15 p.m. Roman M. C. * Ott C. M.
[*Overview of Microbial Monitoring Technologies Considered for Use Inside Long Duration Spaceflights and Planetary Habitats*](#) [#1016]
NASA has been looking at microbial monitoring technologies that could be used in long duration missions. This presentation will provide an overview of the microbial monitoring technologies that have been considered for use inside spacecrafts and planetary habitats.
- 3:35 p.m. *Break*
- 3:50 p.m. Karouia F. * Peyvan K. Santos O. Pohorille A.
[*Current Trends of High-Throughput Methods for Planetary Protection Requirements Associated with a Human Mission*](#) [#1025]
We will discuss which "omics" technologies are currently amenable to adaptations for space applications and how these adaptations can be achieved to be ready for deployment on-board spacecraft in the next few years.

4:10 p.m. Wainwright N. R. *

[Near Real-Time Quantitation of Viable Microorganisms for Planetary Protection and Crew Health](#) [#1019]

For planetary protection and crew health, the knowledge of when minimal acceptable levels of microbial contamination are exceeded is critical. We have developed an instrument and procedures to detect as few as one viable organism under 1 hour.

4:30 p.m. *Closing Comments*

4:35 p.m. *Social Hour (until 6:00 p.m.)*

Wednesday, March 25, 2015
MICROBIAL AND HUMAN HEALTH MONITORING II
8:00 a.m. Room 171

Chair: Lee Bebout

8:00 a.m. *Venue Open*

8:30 a.m. Johnson J. *
Opening Comments

8:35 a.m. Jaing C. * Gardner S. McLoughlin K. Allen J. Thissen J. Be N. Slezak T.
[*Comprehensive and Sensitive Microbial Detection Using A Broad Spectrum Detection Microarray*](#) [#1012]
The Lawrence Livermore Microbial Detection Array is a cost-effective and sensitive DNA detection technology to rapidly identify all sequenced microbes from environmental and clinical samples.

8:55 a.m. Mabilat C. * Abaibou H. Linder R. Reffestin S. Lasseur C.
[*Current Progresses of Midass: The European Project for an Automated Microbial Identification Instrument*](#) [#1031]
The European Space Agency (ESA) and bioMérieux initiated a co-development of MIDASS, the world's first fully automated system for the monitoring of the environmental microbial load in confined spaces, including clean rooms and hospital wards.

9:15 a.m. Olsiewski P. J. *
[*The Sloan Foundation Microbiology of the Built Environment Program: What's There? Where Does it Come From? And What Does it Mean?*](#) [#1030]
Sloan began supporting basic research in this area by coaxing prominent life scientists Norman Pace and J. Craig Venter to move from studying natural outdoor environments to indoor built environments.

9:35 a.m. Rose L. J. * Coulliette A. D.
[*Surface Sampling and Detection Investigations at the CDC*](#) [#1027]
The Environmental and Applied Microbiology Team is tasked with investigating disease outbreaks in healthcare settings. We will summarize and discuss applied research endeavors to understand and optimize sampling and detection of microorganisms.

9:55 a.m. Leys N.* Van Houdt R.
[*Microbial Biocontamination Control in Manned Space Habitats*](#) [#1028]
A review of knowledge of procedures implemented by space agencies to control bio-contamination in manned spacecraft.

10:15 a.m. *Break*

Wednesday, March 25, 2015
TECHNOLOGY AND OPERATIONS FOR CONTAMINATION CONTROL
10:30 a.m. Room 171

Chair: Molly Anderson

- 10:30 a.m. Ross A. * **[KEYNOTE PRESENTATION]**
Exploration Space Suit Architecture and Critical Science Operations for Mars
- 11:00 a.m. Barta D. J. * Anderson M. S.
[Environmental Control and Life Support Systems for Mars Missions — Issues and Concerns for Planetary Protection](#) [#1024]
Planetary protection (PP) represents additional requirements for Environmental Control & Life Support (ECLSS). PP guidelines will affect operations, processes, and functions that can take place during future human planetary exploration missions.
- 11:20 a.m. Buffington J. A. * Mary N. A.
[Extravehicular Activity and Planetary Protection](#) [#1005]
The extravehicular activity presentation will discuss the effects and dependencies of the EVA system design on the technology and operations for contamination control and planetary protection on surface of Mars.
- 11:40 a.m. Lupisella M. L. * Bobskill M. Rucker M. Glass B. Gernhardt M.
[Low-Latency Teleoperations for Mars Planetary Protection](#) [#1003]
Low-latency teleoperations has the potential to help address a number of planetary protection concerns associated with human exploration missions to Mars, including landing site evaluation, special region exploration, sample operations, and asset cleaning.
- 12:00 p.m. *Special Lunch Presentation: Andy Weir and Pascal Lee*
- 1:30 p.m. Hays L. E. * Beaty D. W. Jones M. A.
[Mars Sample Return Feedforward of Potential Planetary Protection Technology/Knowledge to Human Exploration](#) [#1020]
Planetary protection considerations for Mars Sample Return and Human Extraterrestrial Missions clearly have significant overlap. What are some of the ways that considerations for the former may or may not feed forward to the latter?
- 1:50 p.m. Sanders G. B. * Mueller R. P.
[Mars Soil-Based Resource Processing and Planetary Protection](#) [#1026]
It is believed that the currently proposed Mars soil-based ISRU concepts will be able to mitigate both forward contamination and creation of Special Region planetary protection concerns.
- 2:10 p.m. Glass B. * Paulsen G. Zacny K. Dave A.
[Mitigating Inadvertent Contamination in Subsurface Drilling](#) [#1014]
Our concept is to develop and test a new method of drill sterilization (embedded bit heater for sterilization) compatible with drilling sample acquisition and transfer.
- 2:30 p.m. Polarine J. P. Jr. *
[Case Study of Human Flora and Spore Contamination](#) [#1013]
The overall objective and scope of this seminar will be to discuss specific cases studies that have occurred in my years of experience in the industry regarding contamination control and prevention. Advances in bioburden control will be covered.

2:50 p.m. Gershman B. *
[Sample Containment Technology for Mars Sample Return](#) [#1021]
Technology under development to meet likely sample containment requirements for a first robotic Mars sample return mission is described.

3:10 p.m. *Break*

Wednesday, March 25, 2015
NATURAL TRANSPORT OF CONTAMINATION ON MARS I
3:25 p.m. Room 171

Chair: Andy Spry

- 3:25 p.m. Mancinelli R. * **[KEYNOTE PRESENTATION]**
*Human Associated Biological Contamination in the Antarctic and on Mars:
Empirical and Modeling Studies*
- 3:55 p.m. Jones M. A. * Beaty D. W. Hays L. E.
[Understanding the Process and Drivers for Developing Human Exploration Planetary
Protection Requirements](#) [#1017]
It is beneficial to take a “system view” approach to determine the best path forward for planetary protection requirements development for future human missions. It is critical to determine driving factors early in the processes for developing an NPR.
- 4:15 p.m. Beaty D. W. * Davis R. M. Hamilton V. E. Hays L. E. Jones M. A. Lim D. S. S.
Rummel J. D. Whitley R.
[Forward Planetary Protection Issues and Constraints Related to Planning for the Potential Human
Exploration of Mars](#) [#1022]
This paper summarizes some of the key issues and concerns related to planning for the forward planetary protection of Mars in a potential human exploration environment.
- 4:35 p.m. Schuerger A. C. *
[Ultraviolet Irradiation on the Surface of Mars: Implications for EVA Activities During Future
Human Missions](#) [#1011]
The solar UV irradiation environment on the surface of Mars is significant, and will assist in the inactivation of spacecraft, spacesuit, and hardware contamination during EVA activities.
- 4:55 p.m. *Closing Comments*

Thursday, March 26, 2015
NATURAL TRANSPORT OF CONTAMINATION ON MARS II
8:00 a.m. Room 171

Chair: John Rummel

8:00 a.m. *Venue Open*

8:30 a.m. Johnson J. *
Opening Comments

8:35 a.m. Paulino-Lima I. G. * Araujo G. G. Rodrigues F. Silva E. P. Rothschild L. J. Galante D.
[*Geodermatophilus Sp. Strain MN04-01 Survives High Doses of Simulated Present-Day Martian UV Radiation*](#) [#1008]

We found that *Geodermatophilus* sp strain MN04-01 is extremely resistant to present-day Martian UV radiation with LD10 at least 33 times greater than *Deinococcus radiodurans*.

8:55 a.m. Smith D. J. * E-MIST Team
[*Predicting the Response of Terrestrial Contamination on Mars with Balloon Experiments in Earth's Stratosphere*](#) [#1009]

A species-specific inactivation model that predicts the persistence of terrestrial microbes on the surface of Mars is one of many possible outcomes from high altitude balloon experiments in Earth's stratosphere.

9:15 a.m. Schuerger A. C. * Lee P.
[*Low Dispersal of Human-Associated Microbes on to Pristine Snow during an Arctic Traverse on Sea Ice by the Moon-1 Planetary Surface Rover*](#) [#1004]

The harsh conditions on the surface of Mars, combined with an anticipated ultra-low rate of microbial dispersal away from crewed rovers, suggests minimal risks to the contamination of the martian surface.

9:35 a.m. Harrison S. M. *
[*Near Space Biological Research Using Weather Balloons*](#) [#1015]

This is a short abstract that explains how ultra low cost near space probes launched via weather balloon can be used for biological research into how cells can survive in extreme environments.

9:55 a.m. *Break*

10:10 a.m. Race M. *
Breakout Session Ground Rules and Assumptions

Thursday, March 26, 2015
MICROBIAL AND HUMAN HEALTH MONITORING BREAKOUT SESSION
10:30 a.m. Room 120

Moderators: **Jennifer Law**
 Monserrate Roman
 Aaron Mills
 Terry Taddeo

Scribes: **Craig Kundrot**
 Steve Davison

10:30 a.m. Breakout Session Commences

11:50 a.m. *Lunch Break*

1:20 p.m. Breakout Session Wrap-Up

2:20 p.m. Re-Group

Thursday, March 26, 2015
TECHNOLOGY AND OPERATIONS FOR CONTAMINATION CONTROL BREAKOUT SESSION
10:30 a.m. Room 116/117

Moderator: John Hogan

Scribe: Jesse Buffington

10:30 a.m. Breakout Session Commences

11:50 a.m. *Lunch Break*

1:20 p.m. Breakout Session Wrap-Up

2:20 p.m. Re-Group

Thursday, March 26, 2015
NATURAL TRANSPORT OF CONTAMINATION ON MARS BREAKOUT SESSION
10:30 a.m. Room 112

Moderators: **Andy Spry**
 John Rummel

Scribe: **Lindsay Hays**

10:30 a.m. Breakout Session Commences

11:50 a.m. *Lunch Break*

1:20 p.m. Breakout Session Wrap-Up

2:20 p.m. Re-Group

Thursday, March 26, 2015
WORKSHOP CONCLUSION
2:35 p.m. Room 171

Chairs: Cassie Conley
Bette Siegel

- 2:35 p.m. Ott M. * Bebout L. *
Microbial and Human Health Monitoring Breakout Outbrief
- 3:05 p.m. Hogan J. *
Technology and Operations for Contamination Control Breakout Outbrief
- 3:35 p.m. Spry A. * Rummel J. *
Natural Transport of Contamination on Mars Breakout Outbrief
- 4:05 p.m. Johnson J. *
Discussion of Next Steps
- 4:20 p.m. Conley C. *
Wrap-Up/Closing Comments