Wednesday, February 28, 2018
LUNAR AND PLANETARY: SAMPLES
8:30 a.m.  Boxelder Meeting Room

Chair: Cindy Evans

8:30 a.m.  Bakambu J. N.  Shaw A. *  Fulford P.  Osinski G.  Bourassa M.  Rehmatullah F. Zanetti M.  Rembala R.  
Lunar Science Enabled by the Deep Space Gateway and PHASR Rover  [#3103]
The Deep Space Gateway will be a tremendous boon to lunar surface science. It will enable the PHASR Rover, a concept for a Canadian rover system, with international contributions and the goal of sample acquisition and lunar surface science.

8:35 a.m.  Bourassa M. *  Osinski G. R.  Cross M.  Hill P.  King D.  Morse Z.  Pilles E.  Tolometti G. Tornabene L. L.  Zanetti M.  
Science Goals and Objectives for Canadian Robotic Exploration of the Moon Enabled by the Deep Space Gateway  [#3135]
Canadian contributions to the science goals and objectives of a lunar precursor rover for HERACLES, an international mission concept, are discussed. Enabled by the Deep Space Gateway, this rover is a technical demonstrator for robotic sample return.

8:40 a.m.  Kring D. A. *  
Accessing the Lunar Farside and Facilitating Human-Assisted Sample Return with the Deep Space Gateway  [#3043]
The Deep Space Gateway provides a platform for crew to tele-operate a sample-collecting rover and also provides a communication relay to farside surface sites.

8:45 a.m.  Downes H. *  Crawford I. A.  Alexander L.  
Lunar Sample Return Missions Using a Tele-Robotic Lander  [#3025]
Deep Space Gateway would allow tele-robotic landers and rovers to access regions of the Moon which have not been previously sampled. Scientific questions, e.g., the nature and duration of volcanic activity and the composition of the mantle/lower crust, could be addressed.

Low-Latency Telerobotic Sample Return and Biomolecular Sequencing for Deep Space Gateway  [#3032]
Low-latency telerobotics, crew-assisted sample return, and biomolecular sequencing can be used to acquire and analyze lunar farside and/or Apollo landing site samples. Sequencing can also be used to monitor and study Deep Space Gateway environment and crew health.

8:55 a.m.  Berinstain A. *  Richards R. D.  
Low-Cost Planetary Missions Enabled by the Deep Space Gateway  [#3092]
The authors will present options for discussion among participants of how low-cost lunar and planetary missions using the Moon Express family of spacecraft can be enabled by the presence of the Deep Space Gateway.

9:00 a.m.  Cichan T. *  Hopkins J. B.  Bierhaus B.  Murrow D. W.  
Communications Relay and Human-Assisted Sample Return from the Deep Space Gateway  [#3084]
The Deep Space Gateway can enable or enhance exploration of the lunar surface through two capabilities: 1. communications relay, opening up access to the lunar farside, and 2. sample return, enhancing the ability to return large sample masses.
9:05 a.m. DISCUSSION

9:25 a.m. Regberg A. B. * Fries M. D. Harrington A. D. Mitchell J. L. Snead C. McCubbin F. M.  
*The Deep Space Gateway as a Testbed for Advanced Curation Concepts [#3112]
Samples need a home / For preliminary science / Cold and sterile.

9:30 a.m. DiGregorio B. E. *  
*The Moon: A 100% Isolation Barrier for Earth During Exobiological Examination of Solar System Sample Return Missions [#3077]
The only 100% guarantee of protecting our planet’s biosphere from a back contamination event is to use the Moon as a sample return examination facility to qualify samples for eventual return to Earth.

*Advances in Planetary Protection at the Deep Space Gateway [#3111]
Planetary protection knowledge gaps that can be addressed by science performed at the Deep Space Gateway in the areas of human health and performance, space biology, and planetary sciences that enable future exploration in deep space, at Mars, and other targets.

9:40 a.m. DISCUSSION

9:55 a.m. BREAK

10:10 a.m. Cohen B. A. Eigenbrode J. A. Young K. E. Bleacher J. E. Trainer M. E.  
*Enabling Global Lunar Sample Return and Life-Detection Studies Using a Deep-Space Gateway [#3012]
The Deep Space Gateway could uniquely enable a lunar robotic sampling campaign that would provide incredible science return as well as feed forward to Mars and Europa by testing instrument sterility and ability to distinguish biogenic signals.

10:15 a.m. Calaway M. J. Evans C. A. Garrison D. H. Bell M. S.  
*An Integrated Science Glovebox for the Gateway Habitat [#3058]
A Deep Space Gateway astromaterials glovebox facility would enable science to return to Earth collected astromaterials from the Moon and ultimately Mars. Next generation habitats will benefit from on-board glovebox capability.

*Developing Science Procedures for Deep Space Gateway Habitat Mockup Ground Testing [#3078]
Science procedures for telerobotics, observations, and lunar sample return packaging have been developed and tested to evaluate NextStep contractor habitation mockups. Test results from these procedures aid requirements development for the Deep Space Gateway.

10:25 a.m. Gernhardt M. L. Bekdash O. S. Trevino R. C.  
*Utilizing the Habitable Airlock Transfer Port as a Modular, Low Volume Science Airlock [#3085]
The Habitable Airlock, one of several Deep Space Gateway options for providing airlock capabilities, provides the capability of integrating a low volume science airlock for bringing in samples, ORUs, and other hardware into and out of the vehicle.

10:30 a.m. Bleacher J. E. Gendreau K. Arzoumanian Z. Young K. E. McAdam A.  
Science instruments to be used during human exploration should be designed to serve as multipurpose tools that are of use throughout a mission. Here we discuss a multipurpose tool approach to using contact XRD/XRF onboard the Deep Space Gateway.

The concepts describe hardware and instrumentation for the study of planetary surface materials at the Deep Space Gateway as a progressive evolution of capabilities for eliminating the need for special handling and Planetary Protection (PP) protocols inside the habitats.