Tuesday, June 12, 2012
HUMAN EXPLORATION AND PRECURSORS:
IN SITU RESOURCE UTILIZATION
10:00 a.m. Hess Room

Sanders G. B. * Larson W. E. Interbartolo M. A. Mueller R. P. Muscatello A. C.
Early In-Situ Resource Utilization (ISRU) Leading to Robust Sample Return and Human Exploration Missions **[#4208]**
ISRU to make propellants from Mars resources should be pursued early due to the benefits to Mars sample return and human exploration and synergism with lunar and Mars science objectives. Existing hardware can be used for a low cost/low risk demo 2018.

Heldmann J. L. Schurmeier L. Stoker C. * McKay C. Davila A. Marinova M. Karcz J. Smith H.
Mission Concept to Enable Science and In Situ Resource Utilization of Mid-Latitude Ice on Mars **[#4114]**
Human exploration of Mars will merge science and human exploration goals. Mid-latitude ice is an *in situ* resource for human exploration and is a scientifically rich target. We outline a precursor mission at an ice-rich site in Amazonis Planitia.

Max M. D. * Clifford S. M.
Mars Methane: An In-Situ Resource in Support of Human Exploration **[#4385]**
Identification and utilization of natural resources on Mars that can be directly used to support sustainable human habitation and produce materials such as food and fuels are critical to support further planetary exploration.

Zacny K. * Paulsen G. Craft J. Oryshchyn L. Sanders J. Mueller R.
Mars In Situ Water Extractor (MISWE) **[#4268]**
We present a method for extracting water *in situ*. A deep fluted drill acquires icy-soil, retracts into a cylindrical reactor where heat or microwaves are used to sublime ice, and dumps dry soil on the ground. Water vapor is captured onto cold finger.

Szabo J. J. * Hruby V. M.
Breakthrough Concepts for Mars Exploration with In-Situ Propellants **[#4350]**
The proposed architecture features Mg, found in Martian regolith. Mg can serve as a propellant in both chemical and electric rockets. Oxidizers include CO2 and H2O – both available available *in situ*. The first application could be sample return.

Ethridge E. C. * Kaukler W. F.
Microwave Extraction of Volatiles for Mars Science and ISRU **[#4328]**
Microwave heating can be used to liberate volatiles from regolith by heating *in situ*. The greatest advantage of microwave heating for volatiles extraction is that excavation can be greatly reduced and the process is less complex than other methods.

Litchford R. J. (Presenter: J. Jones*)
ISRU Metal Bipropellant Propulsion for Mars Mobility and Ascent **[#4162]**
An especially attractive propellant combination for Mars would be the combustion of Mg with CO_2 since they can be partially or wholly manufactured from indigenous planetary resources as part of a sustained science and exploration architecture.

Karr L. J. * Curreri P. A. Paley M. S. Kaukler W. F. Marone M. J.
Task-Specific Ionic Liquids for Mars Exploration (Green Chemistry for a Red Planet) **[#4383]**
Ionic Liquids are a safer and "greener" class of chemicals which form the basis of a variety of ISRU and structural applications to support NASA exploration missions.

Clark D. L. McGee M. S. Smith N. G. (Presenter: E. B. Bierhaus *)
Self Contained Propellant Production Plant for Mars Sample Return **[#4224]**
This presentation describes an approach to produce propellants from Mars resources for use in a sample return mission. This self contained propellant production plant validates the technologies while offering mass and cost reductions.

PANEL DISCUSSION