Tuesday, June 12, 2012
HUMAN EXPLORATION AND PRECURSORS:
POWER AND PROPULSION
2:00 p.m. Hess Room

Mason L. S. Poston D. I. *
Near Term, Low Cost Options for Mars Fission Power **[#4384]**
This paper examines several near term fission power concepts that could be used to support robotic and human Mars missions.

Houts M. G. Kim T. Dorney D. J. Swint M. S. *
Fission Systems for Mars Exploration **[#4126]**
Fission has the potential to eliminate energy density constraints for many space missions. By enabling a power-rich environment and highly efficient propulsion, fission systems could enable affordable, sustainable exploration of Mars.

Howe S. D. * O'Brien R. C. Howe T. M. Stoots C.
Compact, Low Specific-Mass Electrical Power Supply for Space Exploration **[#4032]**
The CSNR is developing a new configuration of the RTPV system that weighs less than one half of current sources for a given power level, has high conversion efficiency, no moving parts, and has variable power output to match mission requirements.

Dujarric C. * Santovincenzo A. Summerer L.
The NTER: A Proposed Innovative Propulsion Concept for Manned Interplanetary Missions **[#4220]**
The paper adresses a proposed high thrust, high specific impulse innovative propulsion concept for the interplanetary transfer engine for a manned Mars mission. The concept is offered for common conceptual design investigation by ESA and NASA.

Howe S. D. * O'Brien R. C.
Economical Mars Exploration Supported by a Nuclear Thermal Rocket **[#4041]**
A nuclear thermal rocket (NTR) developed for human Mars missions could act as a "mother ship" and carry multiple unmanned platforms to Mars for independent deployment. Use of the NTR could increase the science per dollar for each Earth launch.

Oh D. * Dankanich J. DeGrys K. Hofer R. Katz I. Moeller R. Randolph T. Reeve R. Sims J. Strange N. Warner N.
Commercial Electric Propulsion Enables Innovative and Practical Mars Sample Return Missions **[#4054]**
The availability of affordable commercial electric propulsion fundamentally changes the option space for Mars sample return, leading to near-term architectures that are simpler and less expensive and enabling combined human-robotic missions.

Klaus K. K. * Elsperman M. S. Smith D. B. Lawrence S. J. Clifford S.
Mars Mission Concepts: SAR and Solar Electric Propulsion **[#4381]**
A robust and compelling Mars mission can be designed to meet the 2018 Mars launch window using advanced in-space power and propulsion provides enormous mission flexibility and enables Mars Sample Return Technology Demonstrations on the same mission.

Donahue B. B. *
Phobos Sample Return Mission Using 20kW High Isp Solar Electric Propulsion System **[#4016]**
Presenting a 20kW Solar Electric Propulsion (SEP) transfer system/Mars spacecraft for a Phobos sample return mission. A E-M trajectory is described and the benefits of SEP for Mars is presented; reductions in cost and reuse of systems are benefits.

Riedel J. E. * Marrese-Reading C. Mueller J. Eisenman D. Lee Y. H.
"Packetized Propulsion" for Human and Robotic Mars Exploration **[#4265]**
This is a proposal to modularize propulsion elements of Mars missions into ~50 kg packets to autonomously self-deliver and self-assemble over time in Earth and Mars orbit, providing a Mars return propulsion system years before the need.

Polzin K. A. *
Pulse Inductive Thruster Using Martian Atmosphere as Propellant **[#4344]**
Pulse Inductive Thrusters (PIT) can use the martian atmosphere as is for propellant used on the return orbit transfer vehicle, or as refill propellant for other science missions in the solar system.

Johnson L. * Macdonald M. Mcinnes C. Percy T.
Mars Sample Return Using Solar Sail Propulsion **[#4103]**
Solar sail propulsion for the Earth return stage of a Mars sample return mission could reduce (by 25–50%) the launch mass of the orbiter and decrease cost. Solar Sails are TRL 7/8 as demonstrated by the 2010 flight of the JAXA IKAROS mission.

Folta D. C. * Howell K. C.
Earth-Moon L2 To Mars Roundtrip Transfers Leveraging Invariant Manifolds **[#4187]**
We leverage the application of invariant manifolds with recent operational knowledge and expertise of Earth-Moon (EM) libration orbits to formulate an innovative next step in EM L2 and Mars system transfers.

PANEL DISCUSSION