**Thursday, June 14, 2012**
**HUMAN EXPLORATION AND PRECURSORS:**
**ENTRY, DESCENT, AND LANDING**
**8:00 a.m. Hess Room**

Edquist K. T. * Dyakonov A. A. Korzun A. M. Cianciolo A. D. Zarchi K. A.
Lemke L. G. Bakhtian N. M.
*Development of Supersonic Retropropulsion for a Mars Precursor Mission* **[#4151]**
Supersonic Retropropulsion (SRP) is a promising EDL technology for future Mars missions. This paper summarizes the current state of SRP and recommends tasks to prepare for a Mars robotic precursor mission in the 2018–2024 timeframe.

Wright H. S. * Jordan J. F. Edquist K. T.
*Demonstration of Human-Scalable Entry, Descent, and Landing Systems with Mars Surface Measurements* **[#4145]**
Demonstration of human-scalable EDL architectures through inflatable aeroshells and supersonic retropropulsion aids in defining the human EDL development roadmap. A legged lander provides the landed asset to then gather critical surface measurements.

Saikia S. J. * Longuski J. M.
*Dual-Use Ballute-Based Robust Aerocapture, EDL, and Surface Exploration Architecture for Effective and Distributed Exploration of Mars* **[#4195]**
An innovative and game-changing Mars exploration mission architecture by synergizing the advantages of Inflatable Aerodynamic Decelerators, and a network of miniature space-based, aerial, surface, and subsurface exploration elements.

Masciarelli J. P. * Miller K. L.
*Ultralightweight Ballute Technology Advances* **[#4352]**
Ultralightweight ballutes can provide the deceleration for entry and aerocapture missions at a fraction of the mass of traditional methods. A contractor and NASA team made significant technology advances under funding provided by NASA.

Amzajerdian F. * Pierrottet D. F. Petway L. B. Hines G. D. Barnes B. W.
*Doppler Lidar Descent Sensor for Planetary Landing* **[#4269]**
Future robotic and manned missions to Mars demand accurate knowledge of ground velocity and altitude to ensure soft landing at the designated landing location. To meet this requirement, a prototype Doppler lidar has been developed and demonstrated.

Johnson A. E. * Golombek M. P.
*Lander Vision System for Safe and Precise Entry Descent and Landing* **[#4341]**
The Lander Vision System is a tightly integrated bolt-on smart sensor system that provides real-time terrain relative position, velocity, attitude and altitude while also detecting landing hazards. A prototype is in development.

Clark I. G. *
*Improving EDL Capabilities Through the Development and Qualification of a New Class of Supersonic Decelerators* **[#4093]**
NASA's Space Technology Program is developing a new suite of supersonic decelerators that will enable new capabilities for Mars exploration. These new technologies will provide considerable improvements in landed mass, elevation, and accuracy.

Venkatapathy E. * Wercinski P. Beck R. Hamm K. Yount B. Makino A. Smith B. Gage P. Allen G. Prabhu D.
*Mechanically-Deployed Hypersonic Decelerator and Conformal Ablator Technologies for Mars Missions* **[#4125]**
This presentation addresses application of and benefits to using mechanically deployable low ballistic coefficient architecture for robotic missions to Mars and other destinations in the near/mid term and human missions to Mars in the long term .

Campbell C. H. * Sostaric R. R. Cerimele C. J. Wong K. A. Valle G. D. Garcia J. A. Melton J. E. Munk M. M. Blades E. Kuruvila G. Picetti D. J. Hassan B. Kniskern M. W.
*Advanced Aero-Propulsive Mid-Lift-to-Drag Ratio Entry Vehicle for Future Exploration Missions* **[#4287]**
Advanced mid-L/D entry vehicles can provide performance advantages significant to mid-term robotic and human missions. Preliminary simulations with new paradigms show transonic Mach vehicle staging possible for retro-propulsion, descent and landing.

Folta D. C. * Vaughn F. J. Rawitscher G. S. Westmeyer P. A.
*Enhancing Mars Exploration Using Velocity Cancellation And Soft Landing Technology* **[#4179]**
A Velocity Cancellation And Soft Landing (VCASL) concept can be implemented using current propulsion designs to cancel forward velocity and design the descent segment to meet both robotic and human rated deceleration and landing requirements.

Wolf A. * Acikmese B. Casoliva J. Benito J. Cheng Y.
*End to End Architecture and Associated Technologies for Safe and Accurate Landing with Increased Payload Mass* **[#4082]**
This abstract discusses engineering and technology improvements for reducing landing accuracy to 100 m from the target and increasing payload mass.

Acikmese B. Casoliva J. Carson J. M. Blackmore L. (Presenter: D. Scharf *)
*G-FOLD: A Real-Time Implementable Fuel Optimal Large Divert Guidance Algorithm for Planetary Pinpoint Landing* **[#4193]**
We describe an optimal large divert powered descent guidance algorithm (G-FOLD) developed at JPL that autonomously computes the fuel optimal path that takes the lander to a given surface target without violating any mission constraints.

Sostaric R. R. * Campbell C. C.
*Mars Entry, Descent, and Landing (EDL): Considerations for Crewed Landing* **[#4347]**
Human missions to Mars will require EDL technologies and capabilities beyond those required for robotic missions. Developing and testing these approaches will prevent future delays and inadequacies when human designs become reality.

Miller K. L. Masciarelli J. * Rohrschneider R. R.
*Cross Cutting Relative Navigation Technologies for Improved Landing Accuracy and Vehicle-to-Vehicle Rendezvous and Docking* **[#4378]**
This presentation addresses recent development and test progress, as well as future technology advancement plans for precision landing and Autonomous Rendezvous, Proximity Operations and Docking (ARPOD).

Birge B. K. III *
*Closing the Loop: Precision Landing on Mars Using Evolutionary Computation* **[#4056]**
Develop an optimal set of guidance terminal descent trajectories for a baseline Mars mission, use this set as the start of a neural controller that can learn within a closed loop system and in the face of environmental uncertainties.

PANEL DISCUSSION