

Tuesday, June 12, 2012
**TECHNOLOGY AND ENABLING CAPABILITIES:
MOBILE SURFACE SPACECRAFT AND NAVIGATION**
2:00 p.m. Lecture Hall

Semrud E. B. * Evans B. W. Fredericks B. Wells D.

[*A System of Systems Approach for Martian Exploration*](#) [#4134]

A system of systems is designed for characterization of the martian atmosphere and exploration of lava tubes in preparation for human colonization. Multiple expendable deployable sensor packages ensure mission success with a high level of redundancy.

Deans M. C. * Fong T. Pedersen L. Utz H. Nefian A. Edwards L.

[*Advanced Robotic Surface Navigation for Mars Exploration*](#) [#4343]

Fast autonomous mobility, autonomous target sampling, and terrain relative navigation promise to have a significant impact on the utility, efficiency, cost, and reliability of future robotic Mars surface missions.

Mojarradi M. * Some R. Sirota A. Boykins C. Cressler J. Blalock B.

[*Cold Rover for Mars*](#) [#4239]

We propose to build a highly Cold Rover that uses combination of electronic components, thermal cycle resistance electronics packaging and low temperature capable mechanical components that have the ability to directly operate at the martian surface.

McQuin C. J. C. * Wilcox B. H.

[*Low-Cost ATHLETE-Based Mars Lander/Rover*](#) [#4152]

A low-cost Mars lander/rover is proposed based on technologies developed or perfected at JPL that may enable a highly capable Mars lander/rover to be flown in the near term at a reasonable cost.

Anderson F. S. * Waite J. H. Pierce J. Zacny K. Cohen B. Miller G. Whitaker T. Nowicki K. Wilson P. McSween H. Y.

[*In-Situ Life Detection and Dating: A MSR Precursor Mission Concept*](#) [#4324]

We describe a *in situ* triple coincidence life detection/characterization and Rb-Sr/K-Ar geochronology mission concept using a MER to mid-sized rover.

Picard M. Lange C. Hipkin V. (Presented by Y. Gonthier *)

[*Potential Canadian Contributions to Challenge Area 3 — Surface Systems*](#) [#4336]

This paper discusses current advanced technology developments related to surface mobility and rover systems funded by the Canadian Space Agency under CSA's Exploration Systems Mobility project.

McQuin C. J. C. Frost M. A. *

[*SMALER — Small Mobile Lightweight Agile Exploration Rover*](#) [#4092]

A small yet robust, build to print Mars exploration rover design is presented. Cost are kept low by using extreme simplicity in design, while still maintaining the primary objective of roving Mars with a small science payload.

Kuhlman K. R. * Behar A. Jones J. Coleman M. Boston P. McKay C. P. Rothschild L. J. Buehler M. G. Northup D. Choi D. S.

[*Tumbleweed: Wind-Propelled Measurements for Mars*](#) [#4371]

Tumbleweed is a wind-propelled, long-range, autonomous vehicle based on well-developed airbag technology which will survey Mars for variations in habitability using the Mars exploration paradigm, "Follow the Water" or to survey for *in situ* resources.

Moeller R. C. * Kriechbaum K. L. Sekerak M. J.

[Mars Hopper for Long-Range Mobility, Regional Surface and Lower Atmospheric Investigations, and In-Situ Resource Utilization](#) [#4112]

The Mars Hopper is a versatile, long-range mobility platform for exploring the surface and atmosphere of Mars. After ISRU propellant production, it propels up to ~70 km (potentially hundreds of kilometers total), enabling much greater extent and accessibility.

Gemmer T. R. * Aggarwal S. Bakunov A. S. Jordan T. N.

[Hopper/Entomopter Tandem System for Surface and Subsurface Exploration of Mars](#) [#4160]

A mid-range hopping rover working in tandem with a flying entomopter scout is proposed for exploration of martian lava tubes. The system can enter and exit multiple lava tubes to characterize their suitability as environments able to support life.

Parness A. * Frost M. Boston P. Cutkosky M.

[Rock Climbing Robot for Exploration and Sample Acquisition at Lava Tubes, Steep Slopes, and Cliff Walls](#) [#4128]

The rock climbing robot utilizes a unique technology, microspines, that enables gravity-independent access to some of the most interesting locations on the martian surface. Inverted rock coring has also been demonstrated with this technology.

Nesnas I. A. * Matthews J. B. Burdick J. W. Anderson R. A. Conrad P. G.

[Sample Return from "Water" Seeps on Mars](#) [#4158]

We propose a surface mission concept for in-situ target characterization and sample retrieval of "water" seeps on Mars' recurring slope lineae using the novel Axel rovers that explore and sample extreme terrains.

PANEL DISCUSSION