

Tuesday, June 12, 2012
SCIENCE AND MISSION CONCEPTS:
MOTIVATING SCIENCE
2:00 p.m. Berkner Room

Sellers P. J. * Garvin J. B. Kinney A. L. Amato M. J. White N. E.

[*A Vision for the Exploration of Mars: Robotic Precursors Followed by Humans to Mars Orbit in 2033*](#) [#4140]

NASA's SMD and HEOMD should develop an integrated program, led by high value robotic precursors, that will enable a human expedition to Mars orbit in 2033 to return samples suitable for addressing whether life exists or ever existed on Mars.

Wray J. J. *

[*The Scientific Necessity of Landing at Diverse Sites on Mars*](#) [#4380]

The past decade of missions to Mars has revealed an unexpected diversity of aqueous environments present and past. Landed characterization of each one will critically inform the selection of a site from which to return samples to the Earth.

Byrne S. * Dundas C. M. McEwen A. S. Holt J. W. Putzig N. E. Mellon M. T. Daubar I. J.

[*Exploration of Mid-Latitude Ice on Mars*](#) [#4283]

Ice is an essential resource to future human explorers on Mars, and is key to understanding recent climate change. Discoveries of low-latitude pure subsurface ice call for a comprehensive effort to fully characterize ice extent and physical state.

Hecht M. H. * Aharonson A. Byrne S. Calvin W. Clifford S. Herkenhoff K. Titus T.

[*Next Steps in Mars Polar Science: In Situ Subsurface Exploration of the North Polar Layered Deposits*](#) [#4330]

Using thermal drill technology, we suggest a polar subsurface investigation to explore the stratigraphy of the northern polar layered deposits.

Malin M. * Whetsel C. Sengupta A. Manning R. JPL Innovation Foundry A-Team

[*Contemporary Gully Processes on Mars*](#) [#4060]

Our mission studies active gullies and RSLs by landing a rover within a 3-km ellipse in a high-altitude crater, with mobility much greater than the landing uncertainty, power for a 20 kg science payload and at least 1 Earth year of operations.

Elliott H. M. * Renno N. O. Martinez G. M.

[*Characterization of Liquid Brines Under Mars Ambient Conditions*](#) [#4221]

We have been characterizing the properties of liquid brines under Mars ambient conditions to aid in the derivation of the baseline science requirements for future missions to Mars.

McEwen A. * Byrne S. Chevrier V. Dundas C. Hansen C. Masse M. Mattson S. Murchie S. Ojha L. Paige D. Schaefer E. Thomas N. Wray J.

[*Future Orbital Measurements Needed to Understand Present-Day Liquid H₂O on Mars*](#) [#4284]

Recurring Slope Lineae and hygroscopic salts suggest that there is water on Mars today. This abstract describes orbital measurements needed to understand H₂O today and to plan landed investigation of potential present-day habitability.

Paige D. A. * Hansen C. J. McEwen A. S. Komarek T. A. Elliott J. O. Nash A. E. McElrath T. P. Green R. O. Foote M. C.

[*Orbiting Observatory for Studying Hydrologically Active Regions on Mars*](#) [#4235]

We propose that NASA's next mission to Mars should be a high-resolution orbiting observatory capable of studying newly-discovered regions with current liquid water activity using MAVEN to MRO-class orbiter with a development cost of less than \$750M.

Ravine M. A. * Malin M. C. Caplinger M. A.

[Mars Geoscience Imaging at Centimeter-Scale \(MAGIC\) from Orbit](#) [#4325]

The Mars Geoscience Imaging at Centimeter-scale (MAGIC) investigation would be implemented as a Discovery-class mission to provide images of the martian surface at 5–10 cm/pixel, permitting resolution of features as small as 20–40 cm.

Matsuoka A. * Abe T. Seki K. Terada N. Futaana Y. Hirahara M. Ishisaka K. Kumamoto A. Kurihara J. Nakagawa H. Sakanoi T. Taguchi M. Yagitani S. Yamazaki A. Yokota S.

[Science Objectives of Japanese Atmospheric Escape Mission to Mars \(Heir of NOZOMI\): Role of Atmospheric Escape in Evolution of Martian Environment](#) [#4207]

The martian atmospheric escape mission working group in Japan is studying the possibility of two-orbiter mission in order to understand the processes of the atmospheric escape from Mars and their response to the solar variations.

Kirk R. L. Howington-Kraus E. Archinal B. A. Keszthelyi L. P. * Golombek M. P.

[Landers and Rovers Need High Resolution Topographic Maps: Lessons from the NASA Mars Exploration Program](#) [#4361]

We have provided landing site topographic data for every successful Mars lander since Pathfinder. Based on this experience we make recommendations for ensuring that future missions will get the topo maps needed for site certification and operations.

Lim D. S. S. * McKay C. P. Heldmann J. L. Marinova M. M. Osinski G. Brady A. L. Davila A. F. Cohen T. Lees D. Smith T. Deans M. Fong T. Gernhardt M. L.

[The Use of Terrestrial Analogs as High Fidelity Test Beds for the Development and Refinement of Mars Surface System Capabilities](#) [#4192]

Strategically selected terrestrial analogs will provide an innovative and cost-effective environment in which to test both near- and mid- to longer-term technological and operational development requirements.

Hipkin V. *

[Potential Canadian Contributions to Challenge Area 1 — Science Investigations](#) [#4382]

This paper presents Canadian science instrument concepts that are currently under development. It also discusses Canadian strengths in drilling and robotic manipulation in support of Mars sample return, as well as analogue mission deployments.

PANEL DISCUSSION