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Mars Exploration 2016-2032: Rationale and Principles for a Strategic Program

Preliminary Report for MEPAG

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Planetary Society Coordinated Activities

Examining the Vision: Balancing Science and Exploration

- Workshop Feb 2008 at Stanford University
- Focus on human exploration goals and options
- Published “*Beyond the Moon: A New Roadmap for Human Space Exploration*”
- http://planetary.org/special/roadmap/beyond_the_moon.pdf
- Presented to Congress, NASA, Augustine Comm.

Mars Exploration: Rationale and Principles for a Strategic Program

- Workshop convened May 2009 at Caltech (~20 attendees plus telecon)
- Focus on robotic program goals and opportunities
- **Initial DRAFT consensus summary to MEPAG (7/09)**
- White paper circulated in August for consensus inputs from attendees
- White paper will be submitted to Decadal Survey and other venues

My Road Leads to Mars: Demonstrating Ongoing Public Interest in Mars

- Web-based campaign
- Opportunity and venue for public input and participation
- On-line petition to Administration: U.S. to lead a global initiative toward Mars
- 5000+ signatures so far

*Heavy Lift
Launch System*



*Lunar Outpost
(if needed)*

*First Mission to Another
Planetary System:
Human Exploration of Mars*

Human Factors

NEW CAPABILITIES

*First Journeys
Beyond Earth's Gravity*

*First Interplanetary
Expeditions: NEOs*



Mars Sample Return

HUMAN SPACE EXPLORATION

*International
Exploration*



*Martian
Habitability*



ROBOTIC MISSIONS

http://planetary.org/special/roadmap/beyond_the_moon.pdf

Workshop Background

- Sponsored by The Planetary Society, convened May 2009 at Caltech; 20 attendees plus telecon/WebEx
- Steering Comm: Bell, Friedman, Stetson, McKay, Nye
- MEPAG representation: Mustard, Christensen
- *Goal:* Identify and recommend key attributes and rationale to help preserve a strategic Mars program
 - An *independent* input to the Decadal Survey
 - Advocacy to Congressional staff and others
 - Include international and education voices along with science, engineering, and programmatic
- White paper in draft form for consensus review and submission to Decadal Survey by September

Mars Exploration 2016-2032: Preliminary Workshop Summary

1. Mars exploration has been a “crown jewel” of NASA space science *but its continuation is at risk*
 - Budget pressures and competing priorities
 - High cost of key next steps
 - Lack of consensus on future goals and architecture
2. *The search for life* should be the framework which guides and motivates future Mars exploration
 - A bold commitment not couched in scientific “code words”
 - Articulate the challenge and excitement of the search, and the significance of even a “negative” finding
 - Rallying cry: [Life: Past, Present, and – for sure – future](#)

Mars Exploration 2016-2032: Preliminary Workshop Summary (cont.)

3. The robotic and (eventual) human exploration of Mars should be perceived as parts of a *unified* long-term endeavor
 - Public (and workshop participant) support is strong for realistic and reasonably paced progress toward human exploration
 - A “human-robotic partnership” is the most effective means of addressing such an intricate issue as the presence of life on Mars
4. Mars Sample Return remains both the “anchor point” of the robotic science program and an important step toward human exploration
 - An international Mars Sample Return campaign utilizing a heavy-lift vehicle (Ares V) can bridge the robotic and human programs
 - Multi-mission campaign across science and exploration directorates, leading to MSR as a *NASA-wide* goal

Mars Exploration 2016-2032: Preliminary Workshop Summary (cont.)

5. Public support for Mars exploration continues to be strong but new opportunities must be emphasized

- Challenging goals and engineering uncertainties: The challenges and rewards of exploration must be expressed
- New technologies, including “green tech” where appropriate, can be motivated by MSR and human exploration
- Connections to understanding climate change and Earth as a planet

6. International collaboration is an *enabling* feature of long-term Mars exploration

- The program must be envisioned and designed as international from the start – not as an afterthought
- International interest and participation is increasing – now is the time to provide a unifying framework and commitment

Summary

- Key attributes for continuation of a strategic program of Mars exploration:
 - Bold commitment to the *search for life*
 - Embrace long-term human goal and identify common activities
 - Unify robotic and human initiatives via Mars sample return
 - International commitment and coupling to planetary/climate issues
- Next Steps
 - White paper draft to be circulated for consensus inputs and comment to workshop attendees (mid-August)
 - Formal submission of Workshop White Paper to MEPAG and to the Decadal Survey panel (mid-September)
 - Publication online, in *The Planetary Report*, and elsewhere
 - Continued Congressional, Augustine Committee, & public advocacy – a core strength of The Planetary Society