



John F. Mustard
Professor
Department of Geological Sciences

Dr. Sean Solomon
Chair, Planetary Science Subcommittee

Dear Sean:

Feb. 29, 2008

The purpose of this letter is to report on the MEPAG meeting of Feb. 20-21, which was held in Monrovia CA. Attendance was about 180 in person, with an additional 100 who participated via webex. There was a full agenda for the meeting (attached) with reports from five analysis groups and updates on international activities, all of which stimulated extensive discussion. The key outcomes of the meeting are summarized here and a detailed report of the meeting will be posted at the MEPAG web site.

MEPAG was pleased that NASA Associate Administrator Dr. Alan Stern participated in the meeting. Dr. Stern provided an overview of both SMD's proposed Mars mission architecture through 2020, and the associated budget (including both the President's proposed FY09 budget, the publicly announced budget run-out through 2013, and the SMD planning budget that goes from 2014-2020). In summary, the missions proposed include the Mars aeronomy Scout in 2013, a significant mid-decade mission in 2016, and the launching of both elements of sample return by 2020 (for a sample arrival at Earth in 2023). Completing the MSR launches by 2020 is a goal Dr. Stern presented to MEPAG at its last meeting in July, 2007, and to which the community responded with great enthusiasm. However, Dr. Stern also showed that the Mars budget has been cut by approximately half for at least the next several years.

Through MEPAG, the Mars community has invested significant time in considering sample return as part of a Mars Exploration Program. The results of these efforts were presented at the meeting and discussed. After carefully considering the budget and architecture presented by Dr. Stern, and the impact of these severe budget cuts on the Mars Program, MEPAG has concluded:

- 1) **MEPAG strongly endorses the architecture as stated by SMD that has a balanced scientific program with the launch of MSL in 2009 and launches at each opportunity beginning with a Scout in 2013, a 2016 mid-decade mission, and the MSR elements in 2018 and 2020.** This architecture carries forth a MEP that achieves high level NRC and MEPAG goals and is consistent with FY08 Congressional Appropriations Act, enacted into law in December 2007.
 - The Mars program has been exceptionally successful with its strategy of 'following the water', and is now ready to shift its focus to understanding habitability—we are poised to address one of NASA's most important questions: Are we alone?
 - There is widespread support from all sectors of the Mars science community for MSR, if the mission is carried out in a way that optimizes its science return. However, support will wane sharply if the Mars program becomes MSR-only, or if MSR becomes so simple that the scientific usefulness of the samples returned is compromised.
 - The MSL cache cannot be the only samples returned by MSR—even if the cache is recovered, MSR must have the ability to collect additional samples.

- Dr. Stern has specifically asked MEPAG for its priorities for a 2016 mission, and there is strong support for the Mars Science Orbiter (MSO), with a mid-range rover being a close second. Either of these would be key to the habitability strategy.
- 2) **The proposed budget does not support the SMD architecture.** The primary problems are: (1) the total NASA funding through FY20 is \$2-3B less than required for this architecture; and (2) the funding profile is back-end loaded; the front-end money necessary for development of both the 2016 mission and MSR is insufficient.
- 3) **All MSR options will require significant international participation.** The international community is equally excited about sample return and a strong foundation to make a NASA-led international MSR possible is being put together. However the international community was disappointed that the 5-year budget projections in the FY2009 request had no visible commitment to starting MSR.
- 4) **The SMD budget as presented (including assumptions for a dramatically higher budget beyond FY18) would support only a Scout mission in 2013, followed by the MSR orbiter in 2016 or later and the earliest launch of the MSR lander in 2022.** This would have a devastating effect on the Mars Program, including: (1) a 13-year period between NASA Mars landings (2009 to 2022) with the resulting loss of technical, operational, and scientific expertise; (2) a 4-year (or greater) gap between the launch of the flight elements of MSR; (3) the 2022 launch opportunity is very bad for the MSR lander—this would impose serious compromises that could be avoided in 2020; (4) the loss of scientific balance and the lack of progress toward the four major goals of Mars exploration; and (5) Severe damage to our public outreach efforts, and to our efforts to train the next generation of scientists—many universities have made major commitments to Mars exploration, and a large population of Mars-oriented students is working through the system.
- 5) **Without the assumption that the funding for Mars exploration will dramatically increase from the proposed level of \$300-400M per year (FY11-13) to levels of \$600-900M per year in the future, then MSR cannot happen.** Flat funding would support only a medium-sized mission launched every other opportunity, a dramatic slowing of the program just as new discoveries should propel it forward.

The Mars program has been painstakingly built up over the past decade, and associated with this has been an exceptional level of public interest, congressional support, very strong endorsement by the National Academy, and scientific results that have placed us in position to answer some of mankind's greatest questions. All of this is at risk.

Sean, please don't hesitate to contact me if you have any questions.

Best regards



Jack Mustard