

November 21, 2005

Dr. Michael Meyer
Lead Scientist for Mars
NASA Headquarters
Washington, DC 20546

Dear Michael,

Introduction

On behalf of the Mars Exploration Program Analysis Group (MEPAG) Executive Committee I hereby summarize key results from the MEPAG meeting held in Monrovia, California, from November 2 to 3, 2005.

According to our attendance records, 275 people attended the meeting, including scientists and representatives from 7 of NASA's 10 field centers, NASA Headquarters, delegations from 25 universities, aerospace industry, non-profit research institutes, other government agencies, and private research organizations. There was also substantial participation from the international community. This MEPAG meeting set the attendance record by more than 100 people. It is an indication of a healthy and engaged community with a strong interest in keeping abreast of developments and making sure that they have direct and positive input into new plans, especially with the tightly constrained budgets for the next decade. The high attendance may have also been partly associated with the close juxtaposition of Odyssey, MSL, and MRO PSG Meetings, a feature that we should keep in mind for future MEPAG Meetings.

The goals of the meeting were:

- To get updates from NASA and JPL Managers on the current status of the Program and currently approved flight projects.
- To present and discuss information of relevance to post-MSL Mars program planning, as a means of setting the context for program planning, including:
 - New perspectives on the evolution of Mars based on new data from MER and MEX, both of which continue to return important new data. A special presentation on the MARSIS instrument, which recently started its observation campaign, was given.
 - Briefings from our ESA colleagues on plans for both the Aurora program and the ExoMars project.
 - Updated plans for the science investigation programs of MRO, PHX, and MSL.
 - Briefings on topical subjects related to future planning (Mars methane white paper, PREVCOM Report, Mars GIS workshop, Mars-Moon linkages from LEAG).

- To present and discuss in the open MEPAG forum the draft Mars Exploration Program Plan for the next decade. The process used was to allow the community to comment on the pros and cons of the plan, both in plenary sessions, and in break-out groups organized by the major investigation themes presented in the plan.

This remainder of this letter is a brief summary of the comments on the draft Mars Exploration Program Plan, responses to the PREVCOM Report, and activities that MEPAG will undertake over the next year.

The next MEPAG Meeting is tentatively planned for April 2005 and will take place in the Pasadena, California area. Specific dates are being explored.

The Draft Mars Exploration Program Plan

The overall focus of the Plan as presented is to understand Mars as a global system and how the planets climatic and tectonic processes have evolved with time. There is an emphasis on whether the planet was or is habitable and if life developed and evolved. The emphasis logically follows from our current strategy of “follow the water” and might be described as “follow the water and search for habitable zones.” We have found the evidence for water and have begun to understand its role in the evolution of Mars. We wish to continue to follow the water and to start focusing on the search for habitable zones on Mars. We wish to understand if life developed and evolved and characterize the systems that supported life in habitable zones. Note that the overall emphasis is consistent with the MEPAG overarching objectives of understanding the geologic and climatic evolution of Mars and whether or not life developed.

The baseline draft Mars Program Plan included the following set of missions and associated investigations, although since it is our expectation that the plan will need to be discovery-responsive, there will probably be branch points from the baseline as the plan is implemented.

- 2011/2013 Scout and Mars Science Orbiter with telecommunications capability
- 2016 Mid-rovers or Astrobiology Field Laboratory
- 2018 Scout
- 2020 Planetary Evolution and Meteorology Network
- 2022 MSR Orbiter with Telecom
- 2024 Mobile MSR

There are four core science investigation themes expressed in the plan, in addition to reaffirmation of the importance of Scouts to enhance the core program, respond relatively quickly to important discoveries, and perhaps employ innovative technical approaches. The four investigation themes are:

- Determine atmospheric escape rates and inventory and understand trace gases, including methane

- Continue surface observations using lateral and vertical mobility systems that are designed to get to and analyze samples of relevance to searching for habitable zones and life in the context of the overall climatic and tectonic evolution of the planet
- Determine the structure and dynamics of the interior using seismic and heat flow measurements (along with distributed surface atmospheric measurements) since these measurements are fundamental to understanding Mars as a system.
- Return samples to Earth from carefully chosen locations so as to maximize understanding of the evolution of the planet, habitable zones, and life.

Given the budgetary restrictions it is impossible to fit all four of these investigation themes into a decadal plan. Thus the plan extended over ~15 years.

After the plan presentation there was a plenary session to listen to community input. Numerous individuals provided lively and constructive input and all comments were recorded in writing. Highlights are shown below:

- Much of the discussion focused on comments about how to make MSR happen sooner rather than later because of the importance of laboratory-based sample analyses for understanding the evolution of Mars, including habitability and life. It was suggested, for example, that MSR be done in 2016 by swapping the mobile surface in-situ mission for the currently planned MSR in 2024.
- Questions were raised about the possibility of elevating MSR to an international mission to garner more resources.
- Comments were also made about the importance of Scouts for the vitality of the Program.
- Specific concern was expressed that a Scout AO is due to be released in March 2006 and we thus need to know by then the relationships between any core science orbiter and Scout mission planned for the 2011/2013 time frame.
- Questions also came up about whether all of Mars will be declared as “special regions” based on the PREVCOM Report, and what set of planetary protection requirements apply to the next set of Scout proposals that include surface mission components. Again, specific concern was expressed that a declaration of “special” and “non-special” regions will have to be made before the March 2006 Scout AO is released.
- Many other comments were made, all of which were recorded as input into the work of a Mars Program Plan Science Analysis Group, with a charter and timeline for work defined in a subsequent section of this letter.

After receiving input from the community the MEPAG audience divided into five subgroups for detailed discussions. The focus was not to come to consensus, necessarily, but rather to consider issues associated with and alternatives to the draft plan. The subgroups focused on the four major investigation themes and a fifth PREVCOM-focused subgroup considered data and models that would allow us to refine definitions of Mars regions as “special” and “not special”. The five subgroups reported back in plenary with written and oral comments.

Science Analysis Groups

Based on discussion with MEPAG and a post-meeting session with the MEPAG Executive Committee, it was decided to charter three MEPAG Science Analysis Groups:

- The Mars Program Plan Science Analysis Group was formed to take all input from the MEPAG meeting about the draft Mars Program Plan, together with its own evaluations, and provide a white paper by mid-December, 2006 that comments on the overall science objectives driving the plan, pros and cons of the nature and timing of the investigations and missions proposed, and alternate ways of implementing the plan.
- The Mars Science Orbiter Science Analysis Group will consider prioritized science investigations for a possible 2011/2013 core science orbiter. This work needs to be done by the March 2006 timeframe to let community members responding to the possible Scout AO know what investigations would be planned if there is a 2011/2013 core orbiter mission.
- The PREVCOM Science Analysis Group will examine data and models for Mars that will allow determination of which areas of the planet should be deemed “special” and which should be declared “non-special”. This work needs to be done by March 2006 for results to be included in a possible Scout AO.

NASA/ESA Analysis Group

It became clear during the MEPAG Meeting that the draft Mars Program Plan and ESA’s Aurora Program for exploring Mars have many similarities in approach and missions. Thus it is NASA’s intent to form a working group of NASA and ESA personnel to analyze the two programs and consider coordination pathways that would maximize the efficiency of exploring Mars.

The MEPAG Goals Document

The MEPAG Goals Document has been critically important to the success of MEPAG. MEPAG has always regarded it as a living document that needs to be continually updated based on discoveries. It is our plan to have the MEPAG Goals Committee review the current document and provide updates based on recent discoveries, including the importance of hydrated sulfate deposits for the sedimentary history of Mars and the recent discovery from OMEGA data of phyllosilicates in portions of the Noachian cratered terrain. The next major overhaul of the document would be after we have received and analyzed MRO data. The expectation is that MRO data will significantly improve our understanding of Mars and insights into its global evolution and habitability.

Other Results

Two poster-format status reports were presented on topics that have been raised in previous MEPAG meetings:

- The Open Mars Journal (on-line) is now established a formal editorial board. The journal has accepted and published a first paper. The number of electronic visitors to their web pages is steadily increasing and has now reached about 200-300 per month.
- The planning for the MRO student intern program was described and flyers were distributed. Please tell students or faculty who want more information to contact Marguerite Syvertson at the Mars Program Office, Marguerite.L.Syvertson@jpl.nasa.gov).
- The MEPAG audience heard a summary of the LEAG Meeting. No specific actions for MEPAG resulted from the presentation.

Please don't hesitate to contact me if I can provide any further details on any of the issues discussed here.

Sincerely,

Raymond E. Arvidson
Chair, MEPAG

cc: Doug McCuiston, NASA HQ
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