

May 18, 2006

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 April 19-20, 2006.

According to our attendance records, 220 people attended the meeting, including scientists and representatives from 7 of NASA's 10 field centers and NASA Headquarters, 44 attendees from the academic sector, 20 from industry, 15 foreign nationals (from 8 different countries), and a scattering of others from non-profit research institutes, government agencies, and private research organizations. The good attendance is an indication of an engaged Mars community with a strong interest in keeping abreast of developments. It is clear that the Mars community wishes to provide direct and positive input into new plans for exploration of the Red Planet, especially given the limits imposed by the tightly constrained budgets over the next decade. The relatively high attendance may have also been partly associated with the close juxtaposition with the MSL PSG Meeting, a feature that we should keep in mind for future MEPAG Meetings.

The goals of the April 2006 MEPAG meeting were for the community to listen to and provide comments on:

- Updates from NASA and JPL Managers on the current status of the NASA Mars Exploration Program and associated flight projects.
- The draft Mars Exploration Program Plan for the next decade
- Updates from our foreign colleagues on research and Mars programs, particularly the European Space Agency's ExoMars surface mission
- The Mars Science Orbiter Science Analysis Group Report
- The Special Regions Science Analysis Group Report
- Presentations from instrument development program managers and members of the community focused on lessons-learned from the "Life Cycle of a Flight Instrument" forum that dominated the agenda on the second day of the meeting

This remainder of this letter is a brief summary of the primary issues and discussions that took place during the two day meeting.

The next MEPAG Meeting is planned for January 10-11, 2007 and will take place in the Washington, D.C. area.

## **The Mars Exploration Program Plan**

A major topic of discussion focused on the impacts of the decreased Mars Exploration Program budgets now and in the future. Key results of the discussions follow:

- The community was relieved to hear that the currently implemented missions (MGS, Odyssey, MER, and MRO) and the missions in development (Phoenix and MSL) will continue operations and development, as appropriate.
- A great deal of concern was expressed about the inability, with the currently projected budget profiles, to fund instrument and technology development programs that would prepare us for new missions, including the Mars Science Orbiter and the possible Astrobiology Field Laboratory or mid-range rovers. These concerns also extend to plans for network science and sample return missions. The lack of a planned call for proposals for FY2007 for MIDP is a particular concern.
- The community expressed concern that network science and sample return missions are no longer even shown in the draft plan presented during the MEPAG Meeting. We hope that NASA vigorously pursues joint ventures with our foreign partners to make these missions happen as soon as possible.
- Concern was expressed about cuts in Mars-related research and analysis programs. The current planned cuts and the flat budget projections will not allow us to capitalize on investments made during the past few years in orbital and surface-based missions and associated measurements. The planned budgets will not allow us to keep up the current rapid pace of discovery about the history of Mars, including the history of water and implications for habitability and life, topics of great interest to many members of the public.
- Concern was also expressed that the flat budgets will make it difficult to train and supply talented young scientists and engineers who will be the future leaders needed to implement the NASA Vision for human expeditions to Mars.
- A recommendation was made to form a Science Analysis Group to consider: a. Comparison of the quality and nature of measurements that would be made on returned samples as opposed to in-situ measurements, b. Developing a sample acquisition and caching strategy, and c. Selecting candidate landing sites for a sample return mission. During its session just after the end of the MEPAG Meeting the Executive Committee decided to table these recommendations until the final program plan is unveiled this summer and possible joint activities with foreign partners are better understood.

A related area of discussion focused on the extent to which the Mars community is effectively communicating concerns about the reduced scope of the Mars exploration program to NASA, the President, and to members of Congress. There was a sense among attendees that the voices being heard are few and without a unified theme. MEPAG is not chartered to advocate particular programs or budgets. It is chartered to provide analyses that will help the Mars Exploration Program managers make informed decisions about program directions and approaches. MEPAG can certainly conduct analyses that show the effects of budget decreases. The MEPAG Executive Committee thus took an action item to work with the Program Managers to develop factual information that summarizes the impacts of the current and projected budgets on the nature and pace of missions, the extent to which exciting discoveries will continue to be made, and the future work force who would implement NASA's Vision for Mars exploration.

## **Mars Science Orbiter Science Analysis Group Report**

Barney Farmer and Daniel Winterhalter presented the MSO SAG report. They argued for an MRO-class mission, which will focus on coordinated measurements of atmospheric escape rates and trace gases. The report was well received with the following comment:

- The recommended investigations do not include capabilities for landing site selection measurements or other important orbital measurements such as radar imaging of the shallow subsurface. Additional assets will be needed in orbit during the next decade to support site characterization and certification for landed missions and the pursuit of other important scientific investigations. Scouts will be fundamentally important for implementation of important orbital investigations not covered under the topics within the SAG Report.

## **Special Regions Science Analysis Group Report**

The consensus was that the SAG produced an excellent report with a quantitative approach for defining special regions based on expected temperatures and water activities. The community agreed with the conclusions, with some input in oral and written forms that will be used by the SAG in revising the report.

## **Life Cycle of a Flight Instrument Discussion**

The MEPAG Meeting included a full day to hear from instrument development program managers, investigators who have been involved in instrument development efforts, investigators who have been involved in flying instruments, a representative from the Planetary Data System, and a scientist who has used data from PDS archives. Key discussion points follow:

- There are multiple programs for instrument development. HQ is taking some welcome steps to streamline to better prepare for instrument development efforts in an era with reduced funding.
- The importance of the deep involvement of the principal investigator and his or her science team, end to end, from conception to archiving and analyses of data, was stressed repeatedly. This deep involvement maximizes the probability that a well-calibrated instrument will fly, and that valid and useful data products will be produced and delivered to the PDS for use by the community.
- The importance of peer review was stressed, including reviews of calibration plans and results. Blind tests to determine the extent to which instrument capabilities meet expectations were also stressed.
- The need for sustained funding for development of processing software and reprocessing of data to standard products (as the understanding of the instrument increases and calibrations change) should not be underestimated.
- The PDS depends in large part on derived data products from instrument teams. Thus the teams need to work with relevant PDS personnel early in the mission, planning the nature and content of standard products, validating actual products, and ensuring that the products made are of maximum use to the community.
- Primary PDS customers (the science community) cover a wide range from expert users who need raw data, algorithms, and software and will do their own derived product generation, to

investigators who need highly derived products for their research. The PDS should strive to meet these diverse user needs by ensuring that a minimum number of formats is used, algorithms and software are supplied to process data, and highly derived products are obtained from instrument teams or otherwise generated (e.g., through DAP's).

- Adopting standard cartographic and GIS approaches across our entire enterprise would maximize the portability and utility of derived products.
- Six valuable “lessons learned” presentations were given by Brad Joliff, David Blake, Ed Guinness, Phil Christensen, Doug Ming, and Jeff Johnson. For the benefit of the members of the Mars community who were not able to attend the meeting, and most importantly, for young scientists who are in the early phases of the instrument life cycle, these six presentations will be posted on the MEPAG web site for future reference.

### **MEPAG Goals Document**

Over the past six months or so, the MEPAG Goals Committee completed the 2006 revision of the MEPAG Goals Document, under the leadership of John Grant, Chair of the Goals Committee. These changes have been validated via an open community comment period, and the new version has been accepted by the MEPAG Chair. Because the changes are not extensive in nature, and they had already been vetted by the community, this topic was not scheduled for further discussion at the MEPAG meeting. The new version is posted on the MEPAG web site at [http://mepag.jpl.nasa.gov/reports/MEPAG%20Goals\\_2-10-2006.pdf](http://mepag.jpl.nasa.gov/reports/MEPAG%20Goals_2-10-2006.pdf). The document will undergo a major revision once results from the MRO Mission are in hand.

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  
Fuk Li, JPL  
John McNamee, JPL  
Daniel McCleese, JPL  
David Beaty, JPL  
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## Agenda for MEPAG meeting of April 19-20, 2006

Start	Time	Agenda Item	
<i>Note: Unless otherwise indicated, all time speakers should assume that 30-50% of their time allocation is for discussion.</i>			
<b><u>Wednesday, April 19, 2006</u></b>			
7:30	0:30	Coffee	
8:00	0:15	Meeting Purpose, Scope, Expected Results	Ray Arvidson
8:15	0:30	Mars Program Director's Comments	D. McCuistion
8:45	0:30	Mars Exploration Program Update	Fuk Li
9:15	0:15	Mars Exploration Program Science Update	Mike Meyer
9:30	0:45	Presentation/Discussion of Next Decade Program Plan	D. McCuistion
10:15	0:15	Break	
10:30	0:30	General discussion: Program-level issues	
<b><u>Future mission planning topics</u></b>			
11:00	0:15	PHX: status of landing site discussions	Peter Smith
11:15	0:15	MSL: Landing site selection process	Golombek, Grant
11:30	0:15	ExoMars: Updated plans after ministerial conference	Jorge Vago
11:45	0:15	Support for Landing Site Selection and Characterization by the High Resolution Stereo Camera (HRSC)	Gerhard Neukum
12:00	1:15	Lunch	
13:15	1:30	Findings of the MSTO SAG	Farmer et al.
14:45	0:15	Break	
15:00	2:00	Findings of the Special Regions SAG	Beaty et al.
<b>17:00</b>		Adjourn	
<b><u>Thursday, April 20, 2006</u></b>			
7:30	0:30	Coffee	
8:00	0:10	Call to order, overnight issues	Ray Arvidson
8:10	0:15	Status Report on the Canadian Analog Research Network	Alain Berinstain
<b><u>Instrument Life Cycle</u></b>			
8:25	0:20	Synopsis of the instrument lifecycle	Ray Arvidson
8:45	0:40	Overview of NASA's current instrument development programs	Dave Lavery
9:25	0:25	Highlights of recent results from MIDP	Samad Hayati
9:50	0:15	Highlights of recent results from ASTID, ASTEP	Dave Lavery
10:05	0:15	Break	
10:20	0:15	Instrument development: Incubation period	Brad Joliff
10:35	0:15	Instrument development: Overcoming the obstacles	Dave Blake
10:50	0:15	Instrument case history: mature	Phil Christensen
10:35	0:15	Instrument case history: calibrations	Doug Ming
11:05	0:15	Archiving data products	Ed Guinness
11:20	0:15	Making use of data products	Jeff Johnson
11:35	0:25	Instrument lifecycle--general discussion	Ray Arvidson
12:00	1:15	Lunch	
13:15	2:00	Break-out sessions: What are the lessons learned and issues to address relating to the instrument life cycle?	
15:15	0:45	Break-out reports, discussion	Group Leads
16:00	0:45	MEPAG Forward Planning	Ray Arvidson
<b>16:45</b>		<b>ADJOURN</b>	