

**Summary of the presentations, discussion, and main outcomes of the 34th MEPAG meeting
July 10, 2017; virtual attendance only, 08:30-10:30 AM PDT**

Posted agenda and presentation files: <http://mepag.nasa.gov/meetings.cfm?expand=m34>

Notes present an overview of discussion as well as presentation materials

Key MEPAG Announcements

- Please respond to all requests for feedback via the email MEPAGmeetingQs@jpl.nasa.gov.
- The **next MEPAG virtual meeting** will occur at a date to be determined in September, 2017
- The **next MEPAG “face-to-face”** meeting will occur in the February, 2018 timeframe

Overview of MEPAG and Mars science community activities

- MEPAG Chair Jeff Johnson presented an [introduction and summary](#) of MEPAG activities since MEPAG Meeting #33 (February 2017). This included a MEPAG presentation, given by Jeff Johnson, at the Planetary Science Vision 2050 Workshop on [The Long-Range Future of the Scientific Exploration of Mars](#). A summary package based on the Mars-related content of this workshop was compiled by Dave Beaty and Bethany Ehlmann and is available on the [LPI website](#).
- On May 4th, 2017 Jeff Johnson presented to the National Academies of Sciences, Engineering, and Medicine (NASEM) committee “*Review of the Progress Toward Implementing the Decadal Survey Vision and Voyages for Planetary Sciences*” (henceforth *Mid-Term Decadal Committee*) at their 1st meeting, in Washington, DC. A description of the committee and its Statement of Task can be found on [The National Academies website](#). The presentation to the committee, [Mars Exploration Program Analysis Group \(MEPAG\) Perspectives on Mid-Term Decadal Survey Review](#), contained a general overview of MEPAG, a summary of Mars-related priorities in the original *Visions and Voyages* Decadal Survey and the progress that has been made in implementing those goals, a description of new Mars discoveries since the Decadal Survey, and a presentation of MEPAG’s concerns, including:
 1. The need for replenishment of the aging Mars Exploration Program Infrastructure for relay and landing site characterization and certification
 2. The absence of high-level discussion of future Mars missions to follow after the Mars 2020 caching rover currently in development
 3. The seeming absence of competed opportunities to address outstanding questions in Mars science
 4. The absence of committed missions of any kind in a program architecture
 5. That the *Visions & Voyages* recommendation for “major investment” in Mars Sample Return technologies has not been met
- MEPAG provided review and suggestions for a white paper prepared by The Planetary Society’s Jason Callahan and Casey Dreier titled [Mars in Retrograde](#). This paper is meant to condense the issues facing the Mars Exploration Program into a format that would be easily accessible to both leaders in Washington and to the broader Mars community and Planetary Society membership. Casey Dreier, one of the lead authors on the paper, summarized the document and its focus on the lack of current investments in order to achieve Mars exploration goals for the next decade. The

paper presents budget calculations in order to show what needs to be done in order to effectively pursue Mars Sample Return and updated telecom relay.

- Other MEPAG activities since the February 2017 meeting include:
 1. An abstract submitted to the 12th Low-Cost Planetary Missions Conference, to be held August 15th-17th in Pasadena, CA titled "*The Role of Small Satellites in Addressing Mars Science Goals*"
 2. A summary has been prepared of current citizen science Mars projects and NASA support
 3. The Goals Committee has been working on mapping Mars polar science questions to MEPAG goals based on results and discussions following a Mars polar science conference last September
 4. An exit meeting for former Planetary Science Subcommittee (PSS) members was held at the Lunar and Planetary Science Conference (March 2017, The Woodlands, TX). The Analysis/Advisory Groups (AG) are no longer members of PSS but will be invited to brief the members of the new Planetary Science Advisory Committee (PAC)
- Richard Zurek gave a condensed version of an overview of recent MEPAG SAGs (NEX-SAG & MIC-SAG) discussing a Mars orbiter as a possible next step in Mars exploration; the full version, to be presented to the *Mid-Term Decadal Committee* at its July meeting, is now posted on the MEPAG website: [MEPAG SAG Updates on a potential Next Mars Orbiter](#). The presentation noted that there is still no formal pre-project activity (including no definition team), and indicated that the President's proposed FY18 budget would not support a 2022 launch for a Mars orbiter. The NEX-SAG study had concluded that the 2022 launch window was the best option in terms of supporting the Mars 2020 rover's extended mission and for setting up for future missions for completing Mars Sample Return. A delay in the launch of a next Mars orbiter causes future Mars Sample Return missions to be delayed as well.

Overviews of the US and other Mars Program Accomplishments and Plans

- Michael Meyer (NASA Headquarters) gave a presentation reflecting current status of the Mars Exploration Program. The timeline of Mars missions shows our strong history but everything confirmed on the timeline post-2020 represents commercial or international missions.
- A brief overview of the President's FY18 budget showed Mars Exploration total= \$584.7 million, with only \$285M in the FY18-22 period for future Mars missions. The FY17 Mars Exploration total=\$647M. This was an increase over the President's FY17 budget, indicating that it is possible that the final enacted FY18 budget may include an increase over the President's budget (possibly allowing for development of future missions) but this remains uncertain. (PS: the U. S. House of Representatives Appropriations committee legislation reported out on July 12 put in \$62M, rather than \$3M, in the future mission line and identified it as being for a Mars 2022 orbiter. The Senate has not yet acted.)
- As part of Michael Meyer's presentation the charter for the new Planetary Science Advisory Committee (PAC) was summarized. Nominations have been made for this committee and are currently waiting for approval. The committee will report to Jim Green.
- The InSight missions (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport) is on pace to launch in 2018 and arrive at Mars in November 2018. Mars Exploration Program orbital assets will be prepared to support EDL & telecom relay.

- The Mars 2020 mission has successfully passed Critical Design Review (CDR). The technical baseline has been established, all significant known post-PDR cost risks are included in the baseline or mitigated. The project budget is stable and adequate reserves have been budgeted.
- The first full science team meeting for the Mars 2020 mission was hosted at Caltech the week of June 26th and included 3 days of simulated operations training at JPL
- The Mars Organic Molecule Analyzer (MOMA), an instrument which combines GC-MS and LD-MS to characterize organic compounds in drill samples, currently being developed for the 2020 ExoMars rover as a collaboration between DLR, CNES, and NASA GSFC has also completed its ESA CDR and is scheduled for delivery in March, 2018.
- Meyer noted that, while Headquarters could not report anything now about Mars exploration by NASA to follow Mars 2020, it was expected that NASA MEP would report on the Mars exploration architecture at the NASEM Mid-Term Decadal Review committee's 3rd meeting at the end of August, including:
 - Mars Sample Return technology challenges and approaches
 - Mars Sample Return cost assessments
 - International collaboration opportunities
 - Industry capabilities
 - Other ground and flight initiatives

This was relevant because the Mid-term Decadal Review committee had also been tasked with reviewing the future MEP architecture in light of the *Vision & Voyages* recommendations.
- The NASEM committee will also assess how the current planetary protection policy is folded into the architecture (another NASEM committee is looking at planetary protection policy development).

Preview of, and community response to, the proposed MEPAG presentations for the 2nd meeting of the National Academies of Sciences, Engineering, and Medicine (NASEM) committee “Review of the Progress Toward Implementing the Decadal Survey Vision and Voyages for Planetary Sciences”

- The remainder of the meeting was focused on a draft to be presented to the NASEM committee updating the concerns that had been presented to them in May. A major reason for the update was the release later in May of the President's FY18 budget described above. These concerns would be presented at the 2nd meeting of the NASEM committee on July 13th, 2017, using part of the time that had been allocated for MEPAG-SAG overview by Richard Zurek, discussed above.
- The draft concerns, [MEPAG Perspectives on Mars Architecture](#), were presented by Jeff Johnson, the MEPAG chair, with the goal of encouraging discussion and comments from the meeting attendees. This document had been made available prior to the MEPAG meeting to solicit comments from community members unable to attend the virtual meeting.
- This [presentation](#) pointed out that the 2020 Mars Rover is on schedule and on budget to prepare the sample cache advocated in the Visions & Voyages Decadal Survey as they highest priority for flagship missions, and that some technology work has been done on rendezvous and capture and Mars Ascent technologies., and that extended missions are currently supported for several orbiters and rovers still functioning at Mars, but there are currently no commitments to flight missions after Mars 2020 and funding in the President's proposed FY18 budget is insufficient to support any future mission development for launch in 2022 and possibly 2024. Moreover,

- The lack of commitment-or even engagement-by NASA concerning planning for the future of what has been a highly successful Mars Exploration Program (MEP) is frustrating to the Mars community
 - There are no approved Mars flight projects after the Mars 2020 rover. No objectives & requirements definition teams (ORDTs) or Science Definition Teams (SDTs) have been formed for Mars projects launching after 2020
 - The Agency has declined to openly discuss with the Mars community the lack of progress on possible MEP next steps
- Possible advances through commercial/private partnerships with NASA are not being shared across the Mars community
- The presentation concluded with statements about what MEPAG currently advocates in regards to the future of the MEP:
 - Mars Sample Return
 - There should be a next orbiter mission and a lander mission that advance Mars Sample Return in a meaningful way
 - Replenishment of the telecom and recon capabilities needed for the 2020s should be pursued immediately
 - NASA PSD/MEP should be authorized and funded to proceed with planning for the possible return of samples by the early 2030s
 - Non-Mars Sample Return Science
 - MEPAG advocates going beyond an orbiter mission that supports only telecom and basic recon (imaging) in order to advance high-priority scientific objectives
- The meeting was then opened to community discussion via questions/comments in the WebEx chat window and addressed by the MEPAG Executive Committee members. General points from the discussion are summarized below, but the general consensus was in support of the MEPAG concerns stated in the presentations and a high level of frustration was expressed with the lack of a forward looking Mars exploration architecture.
- Summary of discussion:
 - Possible commercial collaborations: Some optimism was expressed in regards to possible options for getting science instruments onto future commercial payloads, but NASA hasn't made it clear how or even if this would work, and commercial companies have made it clear that they are primarily interested in transportation, not in funding science. There seems to be reluctance on the part of both NASA HQ and commercial companies to discuss this at this point, possibly because a lot of the new technology is proprietary. Concern was also expressed that adding science to "non-science" missions would likely not be ideal and wouldn't constitute a "Mars Program" on its own.
 - One of the things that may be slowing down Mars future planning at NASA is the lack of an administrator, along with the priority of some parties being placed on other targets. It is generally agreed that Mars is a goal for human exploration, but the next 5 years are uncertain.
 - The point was reiterated that, as telecom and recon alone would likely not be a strong enough driver for getting a next Mars orbiter funded, such an orbiter would need to advance Mars Sample Return and/or other high priority science objectives

- There were comments expressing the opinion that a cut in Planetary Science funding caused a backlog of missions, and that future funding is the main challenge now
- An increase in PSD funding does not necessarily equate to an increase in Mars Exploration funding. Congress will determine what the future funding levels actually are, and may prioritize other areas.
- It was expressed by Scott Hubbard, a former MEP director, that a solid future Mars architecture would require a 5-year budget of \$550+ million per year and some freedom/ability to create missions within that, rather than having to get every mission micromanaged through the approval process. The only way to restore the Mars program is a stable budget and some level of autonomy for planning missions
- It was noted that the future years section of the President's FY18 budget proposal showed an overall decrease in funding for Mars exploration.
- All of the community input was taken into account for the second presentation to the NASEM review committee, which can be viewed [here](#).

Future MEPAG Activities

- MEPAG's May 4th, 2017 presentation detailed above ([Mars Exploration Program Analysis Group \(MEPAG\) Perspectives on Mid-Term Decadal Survey Review](#)) also laid out MEPAG roles in the next Mars architecture and in preparation for the next Decadal Survey (2023-2032) including the formation of Science Analysis Groups (SAGs), face-to-face MEPAG meetings at least once per year, updating the Goals Document as new discoveries and research shape our understanding of Mars, continued support and advocacy for Mars Sample Return, and looking for opportunities to pursue non-MSR science.
- The next MEPAG meeting is scheduled to be another virtual meeting in the September, 2017 timeframe. Potential agenda items include updates on the congressional budget, summaries of the Planetary Science Deep Space SmallSat Studies (PSDS3) selected missions by the respective Principal Investigators of each study, and a report by the Goals Committee on updates regarding polar science goals.
- The next face-to-face MEPAG meeting will likely occur in the February 2018 timeframe (TBD).