

Summary of the presentations, discussion, and main outcomes of the 35th MEPAG meeting
September 25th, 2017; virtual attendance only, 10:00AM-1:00PM PDT

Posted agenda and presentation files: <https://mepag.jpl.nasa.gov/meetings.cfm?expand=m35>

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** may occur at a date to be determined in Jan-Feb 2018 (tentative).
- The **next MEPAG “face-to-face”** meeting may occur in either the February, 2018 or early April, 2018 timeframes. Meeting items currently expected include: 1) updates on planning for possible progress on Mars sample return and 2) preparations for the next Decadal Survey, including discussion on updates to the MEPAG Goals Document spurred by compelling science questions that are addressable by non-MSR missions. In “Future Activities” below, we have a request for comments on a proposal for how to facilitate this discussion; *please send comments by Nov 15.*

Past and Ongoing MEPAG Activities:

- MEPAG Chair Jeff Johnson presented an [introduction and summary](#) of MEPAG activities since MEPAG Meeting #34 and of the rationale behind the organization of MEPAG Meeting #35. This included a review of the [MEPAG #34 virtual meeting](#).
- The current meeting (MEPAG Meeting #35) was a topical meeting primarily focused on the potential use of small satellite missions as a new way of advancing Mars science, and will also include a presentation from NASA Headquarters regarding future Mars Exploration architectures.
- MEPAG activities since MEPAG meeting #34 include:
 - On July 13th, 2017 Rich Zurek gave a presentation 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*). This presentation included an overview of two recent MEPAG Science Analysis Group studies, the [NEX-SAG and MIC-SAG reports](#), as well as a presentation of [MEPAG perspectives and concerns on Mars architecture](#) discussed at the July meeting. The Committee found these to be very informative.
 - Jeff Johnson gave an invited presentation at the 12th Low-Cost Planetary Missions Conference which took place from August 15-17th in Pasadena, CA. This presentation, “[The Role of Small Satellites in Addressing Mars Science Goals](#)” was well received by the conference attendees. The conference also included ~12 other presentations relevant to Mars.
 - The Goals Committee work on mapping of polar science questions to the MEPAG goals is ongoing. Don Banfield, the Goals Committee Chair, and Serina Diniega are working with Isaac Smith, Wendy Calvin, and other members of the polar science community on this effort. There is expected to be a report on this at the next MEPAG face-to-face meeting in Spring, 2018 (see “Future Activities” below).
 - Dr. David Brain (UC Boulder) will be joining the MEPAG Goals committee as the Goal II representative as successor to Paul Withers (Boston University).
 - A request for indications of interest for service on the MEPAG Executive Committee and other MEPAG activities will be announced in the coming weeks.

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- New Mars discoveries and a news items portal for the MEPAG website is under development with input from missions and the Goals committee and is expected to go live by the end of 2017.
- Bruce Banerdt provided a slide reporting status of the Insight mission---see last slide of Jeff Johnson's introductory [presentation](#):
 - Things are going smoothly-no critical issues at this time.
 - The lander is fully assembled and currently undergoing testing, ATLO is on schedule
 - Upcoming milestones:
 - Late Feb, 2018-ship to Vandenberg
 - May 5, 2018-open launch period
 - June 8, 2018-close of launch period
 - November 26, 2018-land on Mars

Presentation from NASA Headquarters on future Mars architecture

- Mars Exploration Program Director Jim Watzin gave a presentation on the [future Mars program architecture](#).
- This presentation reprised for the MEPAG community the slides previously presented by Thomas Zurbuchen, the Associate Administrator for the Science Mission Directorate, to the Mid-term Decadal Committee on August 28th, 2017.
 - The overall message from the presentation was to reinforce the science goals of the *Visions & Voyages* Decadal Survey in terms of advancing Mars Sample Return in the 2020s.
 - Zurbuchen articulated the possibility of a "lean" sample retrieval architecture, dependent upon current orbital assets, that could get samples back in the next decade.
- Questions generated from this discussion and answers from Jim Watzin are included below.
- MEPAG welcomes that NASA Headquarters can now openly discuss possible next steps in the return of Mars samples.

NASA's Planetary Science Deep Space SmallSat Studies (PSDS3) program selectees

Presentations were given by each of the Mars system-focused NASA-selected PSDS3 concept study teams.

PRISM: Phobos Regolith Ion Sample Mission-M. Collier

- "Phobos/Deimos Regolith Ion Sample Mission (PRISM): Determining Origins" was given by Michael Collier, PI of the PRISM team

Chariot to the Moons of Mars-B. Horgan

- "[Chariot to the Moons of Mars](#)", was given by Briony Horgan, Co-I on the Chariot team

Aeolus – to study the thermal and wind environment of Mars-A. Colaprete

- "[A Mission to Map the Winds of Mars](#)", was given by Anthony Colaprete, PI of the Aeolus team

MISEN: Mars Ion and Sputtering Escape Network-R. Lillis

- "[Mars Ion and Sputtering Escape Network: MISEN](#)", was given by Rob Lillis, PI of the MISEN team

MAT: Mars Aerosol Tracker-L Montabone

- "[Mars Aerosol Tracker \(MAT\): An aerostationary CubeSat to monitor Martian dust and water ice dynamics](#)", was given by Luca Montabone, PI of the MAT team

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Future MEPAG Activities

- Jeff Johnson gave a brief presentation on [Future MEPAG Activities](#).
- Future MEPAG meetings:
 - The next MEPAG face-to-face meeting is being considered for mid-February or early-April, 2018
 - Draft agenda includes:
 - Congressional budget, if one is passed by then,
 - Updates from NASA HQ, the Mars Exploration Program, Human Exploration Office
 - Reports on Mars Sample Return technology development studies
 - Mission reports
 - Conference/Workshop/Team reports
 - Polar Science goals report
 - Mid-term Decadal Committee review panel findings
 - Science Analysis Group formations
 - Run-up to next Decadal Survey: Mars missions in addition to Mars Sample Return
 - Discuss Mars exploration plans after Mars Sample Return
 - If the April time period is chosen for the face-to-face meeting there may be another virtual MEPAG meeting in the January-February, 2018 timeframe.
- In preparation for the next Decadal Survey:
 - Continue to press for sample return, including updates on the planning for an early “lean” mission to retrieve and orbit samples cached by the 2020 Mars rover and possible return to Earth (see notes on Jim Watzin’s presentation above).
 - Develop compelling mission concepts in addition to Mars Sample Return to address fundamental Mars science objectives.
 - Review possible updates to the Goals Document, with changes currently focused on items related to polar science (as noted above).
 - A proposal: Add a 1-day workshop-type session prior to the face-to-face MEPAG meeting. *Comments on this proposal are requested **by Nov 15** and can be sent to mepagmeetingqs@jpl.nasa.gov.*
 - This could contain a ½ day devoted to more detail about the Polar Science objectives being considered and also possible measurement approaches. The second ½ day could be devoted to discussing other possible science mission objectives on which progress could be made in the next decade (2023-2032). Depending on the number of suggestions, we may provide poster space and ~1-minute introductions at the meeting, to be followed by a discussion period. *Comments and suggestions for topics can also be sent to mepagmeetingqs@jpl.nasa.gov.*

MEPAG Virtual Meeting

September 25, 2017

Answers to Questions from the WebEx chat room/Email, related to
“Presentation from NASA HQ on future Mars architecture” by Jim Watzin

Note that some answers were verbally provided during the meeting; due to meeting time constraints, others were only answered in written-form after the meeting. All answers were provided by NASA HQ unless otherwise noted and are recorded concisely below.

Louise Prockter/LPI: when is the Insight Participating Scientist call likely to be reissued?

Answer at meeting: Do not know answer, will look into and (if possible) post in meeting summary.

Post-meeting, From Bruce Banerdt: Hopefully soon, in a month or so (TBC).

Casey Dreier: what is the current mass-to-orbit capability of these MAV designs?

The current configuration under study is capable of launching all of the M2020 samples. Packaged and encased in the OS, this payload mass is ~12 kg.

Juan Delfa: Is NASA/JPL intention to develop/build the Sample Fetching Rover as well?

No decision has been made on implementation.

We may be able to use the 2020 rover to deliver the samples if we have the opportunity to fly sooner rather than later.

LPI: What is the impact of the helicopter on the Mars2020 mission?

Still just a technology demonstration effort, no decision to fly it.

Alfred McEwen: What fraction of the science community supported by current missions will be needed to support a future program of MSR plus smallsats?

Michael Aye: This all sounds like mostly engineering activities. How much space/funding is there left for actually doing science at Mars?

Scientists can participate in extended missions of current assets, competition in Discovery and other programs, including international missions, data analysis and modeling.

Casey Dreier: can you share more detail about how the MEP plans to extend the life of MRO? How much risk is being assumed? What would be the operational impacts of relying only on TGO and MAVEN for comms relay for MSL, Mars 2020, and any fetch mission, should MRO not last as long as desired?

“We only need one orbiter of the three” ... there is a very high probability that one asset will be in place. We don’t see impact or high risk in relying on those assets.

Through preparation for M2020, we’ll already have the needed landing site information.

Alfred McEwen: How much of the new urgency for MSR is driven by a desire to succeed before China?

Good question and it depends on with whom you talk. As you know, the scientific community just wants the samples – the sooner the better.

LPI: How is HEO helping to fund MSR?

It is under discussion.

Juan Delfa: Talking about autonomy, there are several potential software components: path planner, autonomous image recognition and mission planning. Any insights about autonomous mission planning?

Autonomous (semi-autonomous) has been part of the development for Mars 2020, and has been undergoing extensive testing on MSL. As you may know, an AEGIS system is already targeting rocks on Mars for ChemCam.

Alexander Pavlov: Mars 2020 does not have equipment to measure the radiation exposure of surface samples. Ionizing radiation is very effective at modifying organic molecules erasing evidence of ancient life. How does MSR plans to overcome this difficulty?

RAD on MSL is giving a good baseline of the radiation spectrum on the surface, this will inform our understanding of the radiation effects on organics. Through our MSL experience we are learning better how to identify the more recently exposed geology, which will certainly migrate into our M2020 operations planning.

David Kass: What is the need for atmospheric support during EDL for the SRL mission?

As in the past, we will use what assets we have going at the time for EDL. The capability of the system to land safely will have been simulated using environmental databases acquired earlier.

Don Banfield: Following on from David Kass' question: what are the environmental requirements for SRL's Ascent stage, and how will we obtain the required information about (e.g.) boundary layer winds/shears and electrostatics to ensure the Ascent stage will succeed?

Currently, atmospheric conditions are not believed to be strongly constraining. Dust storms may limit the solar power needed to warm up the MAV in preparation for launch. Unusual air densities near the surface could affect trajectories. Winds are not considered to be a limiting factor.