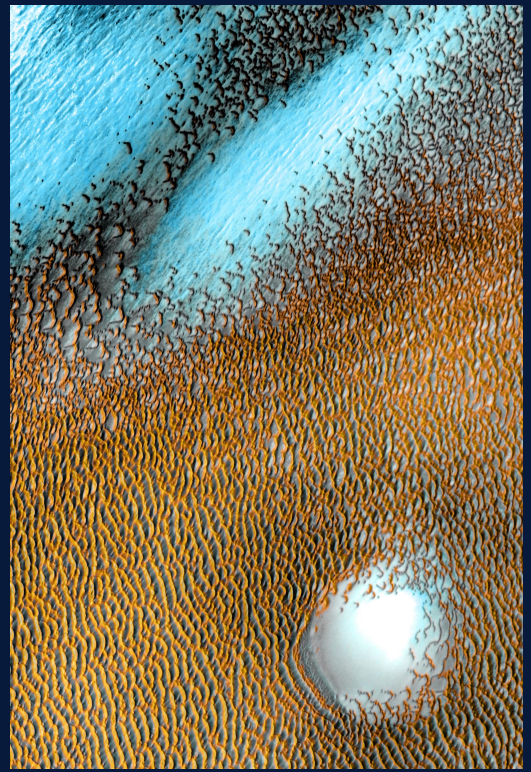
MEPAG VM 14

Introduction, Day 1

R. Aileen Yingst, MEPAG Chair

2-3 February 2022



Congratulations to Odyssey on its 20th anniversary this year!

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Agenda and Logistics 1:

- Please mute your phone
- Use chat box on WebEx; moderators will track questions
- Feedback/questions during and after meeting? → MEPAGmeetingqs@jpl.nasa.gov
- Presentations and recording will be online after meeting

PST	Day 1 Topic	Speaker	EST
10:00 AM	MEPAG Update	R. A. Yingst	1:00 PM
10:15 AM	MEP Status	E. Ianson M. Meyer	1:15 PM
10:55 AM	MEPO Status	J. Parrish	1:55 PM
11:10 AM	IDEA	TBD	2:10 PM
11:25 AM	IMIM MDT Status	J. Plaut / M. Lavagna / T. Haltigin	2:25 PM
11:40 AM	Discussion	All	2:40 PM
12:05 PM	Break		3:05 PM
12:25 PM	Perseverance	K. Farley, K. Stack Morgan	3:25 PM
1:00 PM	Ingenuity	J. Karass	4:00 PM
1:15 PM	MAVEN	S. Curry	4:15 PM
1:40 PM	MSL Curiosity Status	A. Vasavada, A. Fraeman	4:40 PM
2:00 PM	End		5:00 PM

Agenda and Logistics 2:

- Closed captioning for this meeting can be turned on by clicking on the CC icon on the lower left corner of webex or by clicking (Ctrl+Shift+A).
- A separate closed captioning panel can then be turned on by clicking on the "..." (panel options) button on the lower right of the webex window and selecting the "Captions" option.

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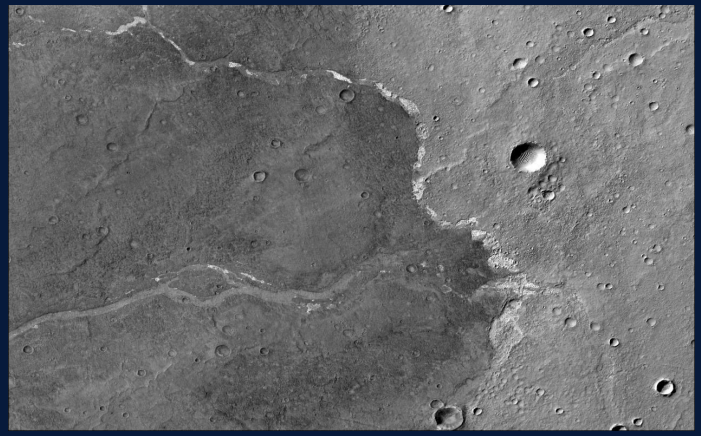
MEPAG Programmatics

- Steering Committee (Chair: R. Aileen Yingst (PSI), appointed June 2019)
  - W. Calvin (Univ. Nevada Reno)
  - B. Horgan (Purdue)
  - D. Banfield (Cornell)
  - J. Filiberto (LPI; IDEA representative)
  - C Dundas (USGS)
  - S. Hubbard (Stanford University)
  - S.S. Johnson (Georgetown University)
  - K. Lynch (LPI; IDEA representative)
  - J. Johnson (past Chair, JHU/APL)
  - M. Meyer (NASA HQ)
  - D. Beaty, R. Zurek, M Mischna (JPL)
  - J. Bleacher/P. Niles (HEOMD, NASA HQ) Ex Officio members



Salt deposits in Bosporos Planum, as imaged by MRO. Image credit: NASA/JPL-Caltech/MSSS.

- Goals Committee (D. Banfield, Chair)
  - Goal I <*Life*> (J. Stern, GSFC; A. Davila, ARC)
  - Goal II <*Climate*> (D. Brain (Univ. Colorado), Claire Newman (Aeolis Research))
  - Goal III <*Geology*> (C. Viviano, APL, Becky Williams, PSI)
  - Goal IV <*Human Exploration*> (J. Bleacher, NASA HQ HEOMD; M. Rucker, P. Niles JSC)

Mars Exploration Program Analysis Group (MEPAG)

R. Aileen Yingst
PSI
MEPAG Chair

Jeff Johnson,
JHU/APL
Past Chair

Wendy Calvin
UNR

Scott
Hubbard
Stanford U.

Sarah Stewart
Johnson
Georgetown

Don
Banfield
Cornell U.

Goals
Comm. Chair

Colin Dundas
USGS

Briony Horgan
Purdue

Justin Filiberto
LPI
IDEA Rep

Kennda Lynch
LPI
IDEA Rep

Steering Committee

Michael Meyer
NASA HQ

Michael Mischna
MPO/JPL

Jake Bleacher
NASA HQ

Dave Beaty
MSR/JPL

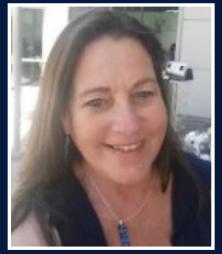
Paul Niles
JSC

Rich Zurek
MPO/JPL

Mars Program Office associates

(Jet Propulsion Laboratory)

Brandi Carrier



Barbara Saltzberg

Jonathan Bapst

Sona Hosseini

Updates since VM13

- Measurement Definition Team for International Mars Ice Mapper (I-MIM) is hard at work.
- PAC meeting (next slide)

Clouds over Mont Mercou, Gale crater, Mars. Image credit: NASA/JPL-Caltech/MSSS

MEPAG Active Findings (summary)

- **i-MIM:** The Mars community is eagerly waiting to see: (1) whether the MDT is given full support to exercise its charter and (2) whether and how the agency responds to the MDT recommendations. Open engagement with the Mars community is needed to strategically plan and execute Mars exploration most efficiently.
- **Mission Arcs:** There are concerns that future Mars missions during a budget-constrained period may be defined as was iMIM, with Agency programmatic objectives (resources, telecommunications) as core and science objectives as possible add-ons. The community believes this is not the only path to achieve compelling science by NASA; other options should be considered (e.g., low-cost, dedicated missions; commercial partnerships)? Let's start that discussion at this meeting. (see next slide)
- **Human Exploration:** The Moon to Mars program has its hands full with that first step, on a tight schedule and a tighter budget. MEPAG proposes to assist SMD/MEP make the best use of science mission data most likely to aid ESD when they are able to turn their attention to specific needs for exploration by humans on Mars. But there's more: what do humans do when they are *on* Mars?

MEPAG Input for Day 2 Discussion

- With Mars Sample Return dominating activities for the next decade, what can we do to introduce a parallel line of Mars exploration?

Goal: To fly a competed mission before the end of the decade

- Synthesize a broad range of inputs to formulate community consensus on next steps in parallel with MSR.

Day 2 Agenda

PST	Day 2 Topic	Speaker	EST		Minutes
10:00 AM	EMM	H. R. Al Matroushi	1:00 PM		0:25
10:25 AM	TGO/MEX	C. Wilson	1:25 PM		0:25
10:50 AM	ODY Status	J. Plaut	1:50 PM		0:20
11:10 AM	MRO Status	R. Zurek	2:10 PM		0:20
11:30 AM	InSight: Status and Results	W. B. Banerdt	2:30 PM		0:20
11:50 AM	Break		2:50 PM		0:15
12:05 PM	KISS Workshop Report: Revolutionizing Access to the Mars Surface	B.Ehlmann / E. Frank / A. Fraeman/ C. Culbert	3:05 PM		0:30
12:35 PM	Low Cost Mars Missions Workshop Status	S. Curry / C. Edwards	3:35 PM		0:10
12:45 PM	MEPAG Planning Discussion	R. A. Yingst	3:45 PM		1:15
	1) SAG: Split Goal IV? - Add Science Objectives for Humans when on Mars				
	2) Mission Opportunities in the Coming Decade				
2:00 PM	End		5:00 PM		4:00

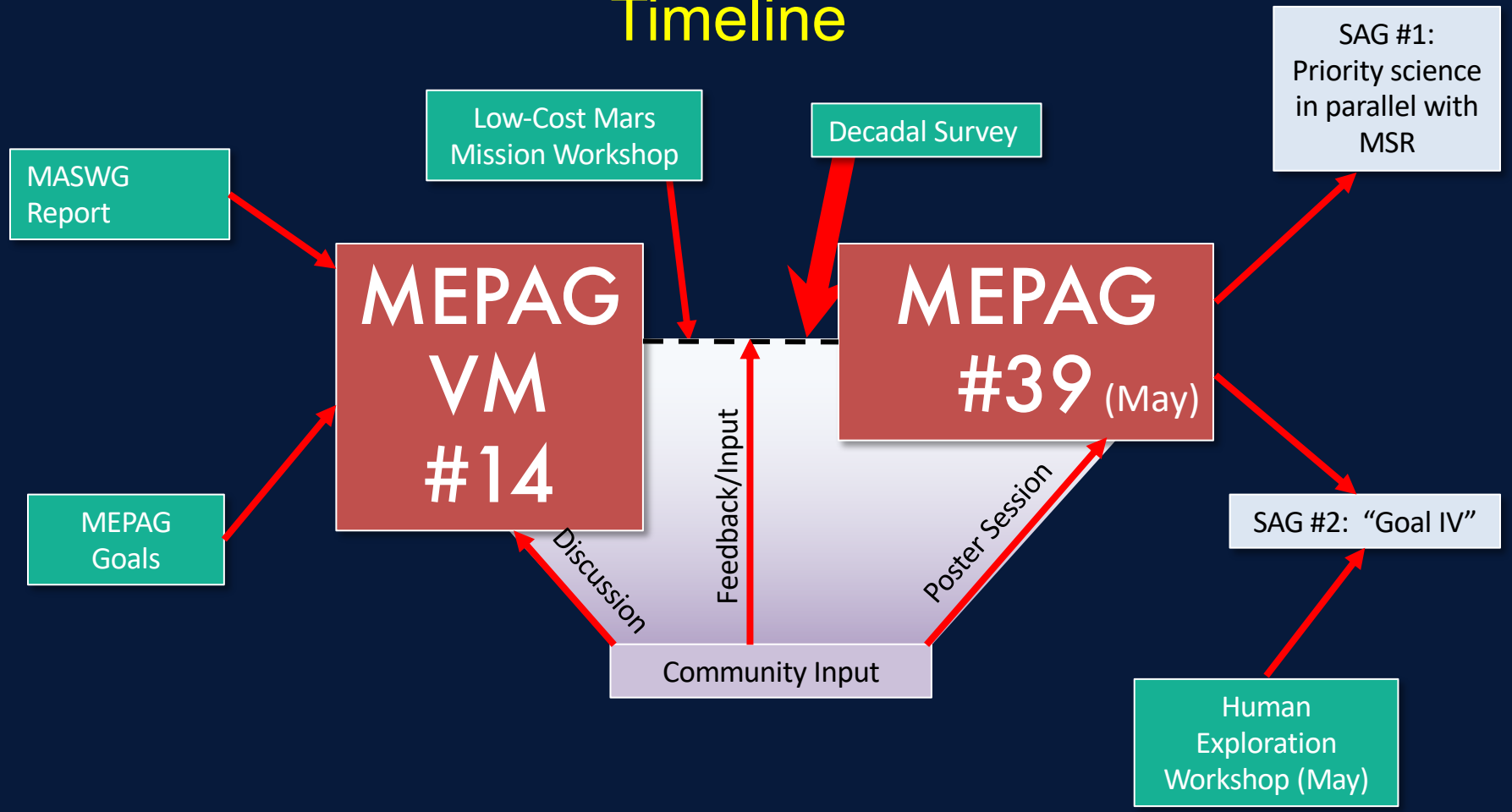
This Meeting

- We are beginning this discussion to continue through the May meeting and beyond.

- Questions:
  - Is there something missing from existing discussions/reports?
  - What science theme brought forward by the community is most important, and what step(s) are necessary to best advance the science?
  - Are there additional mission ‘arcs’ to add to the examples in the MASWG report?
  - Is there a vision of next steps you would like to communicate?

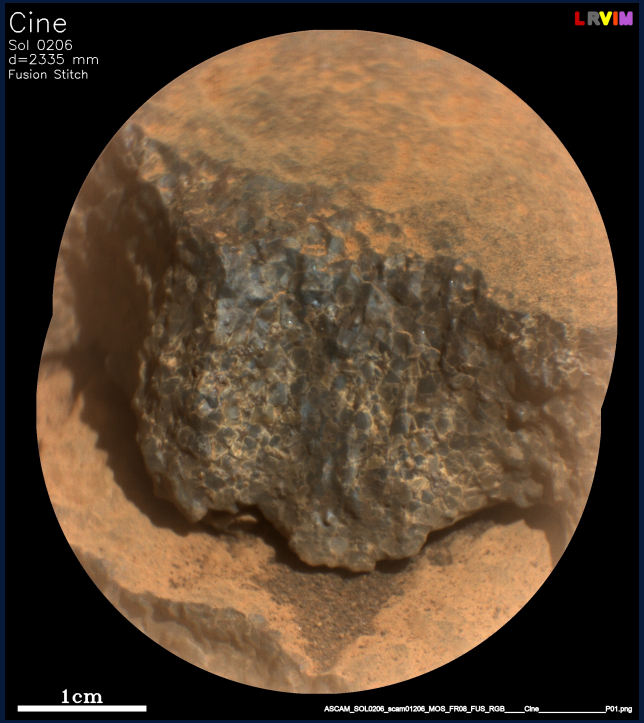
- THINK BIG! We should not be advocating instrument concepts, or even mission concepts here; rather, the community’s vision of key science goals/themes.

Timeline


MASWG Report
Low-Cost Mars Mission Workshop
Decadal Survey
SAG #1: Priority science in parallel with MSR
MEPAG VM #14
MEPAG #39 (May)
MEPAG Goals
Discussion
Feedback/Input
Poster Session
SAG #2: "Goal IV"
Community Input
Human Exploration Workshop (May)

MEPAG administrative updates

- MSR Systems Review date was moved up, so expect a bigger update at the next meeting
- New MEPAG Steering Committee (SC) and Goals Committee members
  - Briony Horgan, Purdue (SC)
  - Colin Dundas, USGS (SC)
  - Christina Viviano, APL (Goal III)



Perseverance Supercam RMI image showing potential olivine cumulate textures. Image credit: NASA/JPL-Caltech

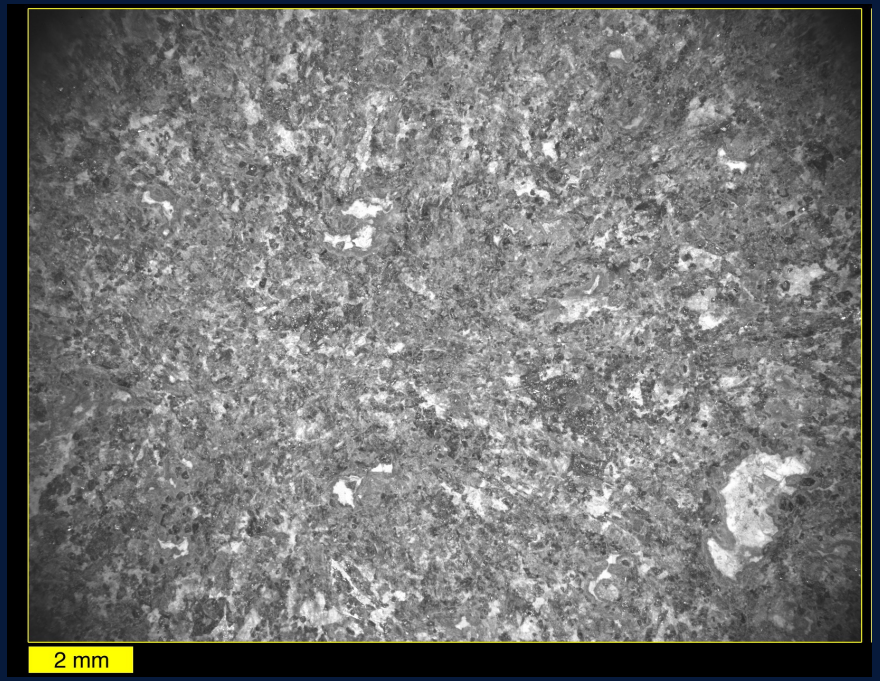
Decadal Survey tentative schedule

- NASA-NASEM negotiate Statement of Task Done
  https://sites.nationalacademies.org/SSB/SSB_198165
- Web Site opens for White Paper Done
- Co-Chairs for DS announced (Canup, Christensen) Done
- Deadline for *Science* White Paper Submittal Done
- DS Steering Committee/Panel Chairs organize Done
  - Sign up at the NAS website for updates of open sessions

- First complete draft of survey report assembled ~10/2021
- Final Report released March-April 2022

Other Upcoming Mars Activities

- Low-Cost Science Mission Concepts for Mars Exploration
  - March 29-31, Pasadena, CA
- MEPAG #39
  - May 2-4, Denver, CO
- Science Objectives for Human Exploration of Mars Workshop
  - May 4-6, Denver, CO



Perseverance SHERLOC ACI image of the target Belgarde, sol 186. Image credit: MSSS/NASA/JPL-Caltech/MSSS.

Mars Exploration Program Analysis Group (MEPAG)

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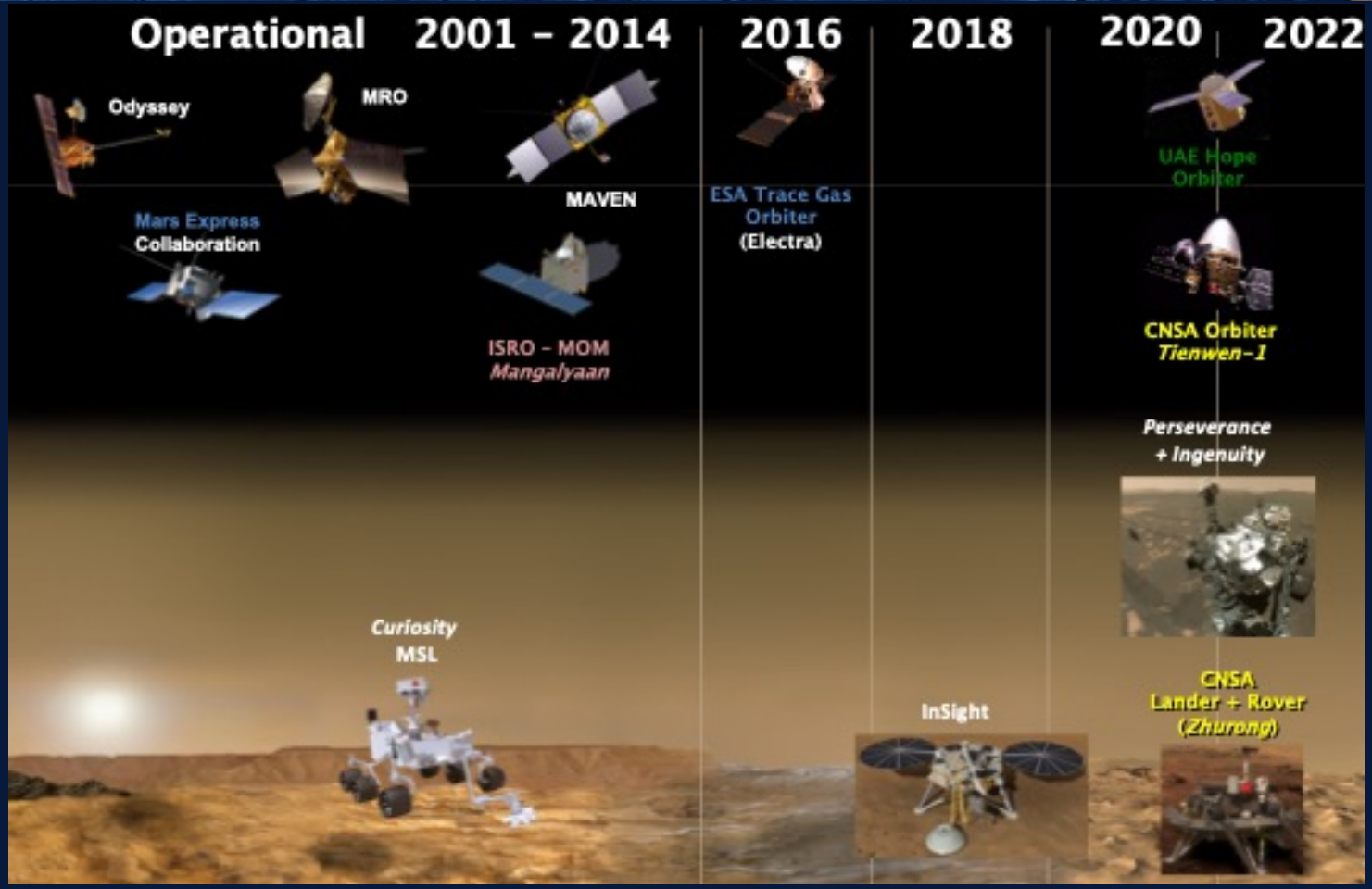
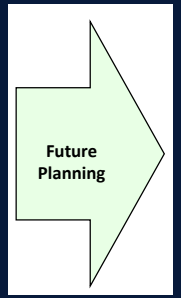
Backup slides

Mars Exploration Program Analysis Group (MEPAG)





ExoMars
Lander + Rover
in 2023

MEPAG Active Findings

Mars Exploration Program – Int'l Mars Ice Mapper (IMIM)

- The MEPAG community continues to request a more comprehensive rationale for iMIM, and from this follows a number of concerns.
  - Accepting that this is an agency initiative, what part of the agency sets the mission agenda and negotiates it with OMB? (It is not HEO/ESD.)
- MEPAG applauds the recent selection of a Measurement Definition Team (MDT).
- Before it can get behind this mission, the Mars community is waiting to see: (1) whether the MDT is given full support to exercise its charter and (2) whether and how the agency responds to the MDT recommendations. . The recent announcement of the MDT membership was a good first step. MEPAG hopes to hear from the group at one of its future meetings.
- Open engagement with the Mars community is needed to strategically plan and execute Mars exploration most efficiently.

MEPAG Active Findings

Mars Exploration Program – Mission Arcs

- Since the community is not clear how iMIM emerged, there are concerns that future Mars missions during a budget-constrained period may be defined as was iMIM, with Agency programmatic objectives (resources, telecommunications) as core and science objectives as possible add-ons.

- The community believes this is not the only path to achieve compelling science by NASA; other options should be considered (e.g., low-cost, dedicated missions; commercial partnerships)?
  - There is compelling science to be done at Mars in addition to completing MSR, and MASWG identified possible mission arcs that could be initiated with low/lower cost missions. Such missions could take advantage of rapidly developing small spacecraft capabilities, both by commercial and non-commercial entities, and do compelling science while avoiding unreasonable risks.
  - Activities like the upcoming Low-Cost Mars Science Mission Concepts Workshop can help highlight possibilities.
  - Building on the Decadal Survey results, MEPAG could assist discussion of which arc might be the pilot project within the context that more can be done in the future as the MSR flight developments are completed.
- *Again:* Open engagement with the Mars community is needed to strategically plan and execute Mars exploration most efficiently.

MEPAG Active Findings: How to Assist Human Exploration

- The Moon to Mars program has its hands full with that first step, on a tight schedule and a tighter budget
- MEPAG proposes to assist SMD/MEP make the best use of science mission data most likely to aid ESD when they are able to turn their attention to specific needs for exploration by humans on Mars
  - Ice Mapper *could* be one of those missions; MEPAG awaits the MDT recommendations
  - MEPAG will continue to update its Goal IV (Preparations for Humans) developed with HEO planners, in light of new discoveries or needs
  - MEPAG will also work within SMD and support its interactions with ESD by studying what human explorers on Mars *should* do with regard to science once they are there
- This is taking a longer view, but recognizes the main ESD/SO focus must be on the first steps away from Earth