Mars Exploration Program Analysis Group (MEPAG)

# MEPAG Meeting #40

## *Findings*

11-12 April 2023

Washington, DC/Hybrid

*2018 Planet-Encircling Dust Event*
*MRO MARCI / MSSS / JPL / NASA*

## MEP Draft Future Plan, I

- MEPAG understands the significant effort that has gone into the MEP draft future plan and the broad range of community inputs that were considered in its development.
- Even as NASA is realizing the nearly 50-year strategic goal of returning samples from Mars, it is looking ahead to continuing exploration of the Red Planet; the plan includes exciting opportunities for lower-cost, small-class missions, the Decadal Survey-recommended medium-class mission, technology development, engagement with the commercial sector and international partners, expanded interactions with the human flight program, and plans to enable the participation of all communities (see Slide 4) in Mars exploration.

- *MEPAG supports the overall goals of the draft future plan and appreciates the opportunity to review and comment on the plan.*

**MEP Draft Future Plan, II**

- MEPAG understands that MSR is on the verge of entering its peak spending phase and that the budget available for additional activities during this period currently is limited; unfortunately, this results in a significant gap in new launches that extends to 2028, whereas the 2023 Decadal Survey (OWL) envisioned an ongoing MEP that could support small, low-cost missions in the period leading up to the launch of NASA's MSR flight elements.
- It is crucial to MEP flight missions, as well as the Moon-to-Mars initiative, that scientific expertise is not lost during this timeframe; the MEP draft future plan has identified a number of activities that can be undertaken to maintain preparedness and community engagement.

- *MEPAG encourages PSD/MEP, as part of the regular budget planning cycle, to seek the budget augmentation required to enable the launch of small-class missions earlier than currently envisioned in the draft future plan and as implied by the Decadal Survey.*
- *MEPAG strongly endorses the preparatory elements of the draft plan, including mission-enabling technology development activities, support for research and analysis (R&A), and increased interaction with commercial entities with interest in Mars flight opportunities; these may take the form of mission-enabling incubator programs, enhanced support for Mars data analysis, and increased participation by scientists in extended missions, all of which can serve to ensure that the Mars science community is ready to implement novel, high science value mission concepts as soon as possible.*

**MEP Draft Future Plan, III**

- One of the four initiatives in the MEP future plan is the support and furtherance of Diversity, Equity, Inclusion, and Accessibility (DEIA), in response to the “State of the Profession” chapter in the Decadal Survey recommendations for improving DEIA in the planetary community.
- MEPAG applauds the efforts that NASA PSD and specifically, MEP (as codified in the MEP future plan), is making with respect to DEIA issues; however, during our meeting, it was apparent that: (1) members of the community are not aware of all the programs that exist, (2) on what the programs are focused and how they are conducted, or (3) their reach with respect to underserved populations, which may make it difficult to discern where gaps may exist (e.g., in the areas of recruitment and retention).

- *MEPAG is excited to see the MEP implement these initiatives as soon as possible;, it would be of great benefit if PSD were also to develop a website identifying (and linking to) ongoing DEIA initiatives in the MEP and more broadly within the Division (including those conducted by missions), and the opportunities for community engagement. Engaging the cross-AG IDEA (aka DEIA) Working Group to support identification of gaps or other key information may be beneficial.*

**MEP Draft Future Plan, IV**

- Lower cost, small-class missions are a key, and welcome, component of the MEP draft future plan that would enable continued progress in addressing outstanding critical questions in Mars science; they represent an important scientific bridge across the expected 15-year gap between the launch of Mars 2020 and the Decadal-recommended medium class (Search for Life) mission.
- These missions are a source of enthusiasm in the community; MEPAG envisions that they may have the potential to offer additional opportunities for diverse members of the community to become involved in MEP flight missions, with substantial consequences for maintaining scientific expertise in the community without them.

- *MEPAG encourages NASA to identify lessons learned from SIMPLEx and CLPS and to incorporate these into the proposed new low-cost mission program within MEP (these lessons learned have value to non-MEPAG constituencies as well).*
- *MEPAG also encourages NASA to regularly engage the MEPAG community regarding issues specific to carrying out small-class missions at Mars (such as planetary launch windows and mass of communications hardware if relay is absent).*

## Mars Sample Return

- After nearly 50 years of study, and as reaffirmed by the latest Decadal Survey, Mars Sample Return remains the highest scientific priority of the PSD and the MEP as well as an Agency priority. The MEPAG community is pleased that the US contribution to this international mission appears to be on track to complete the KDP-C milestone this calendar year and supports the convening of a second Independent Review Board to assess the MSR Program's progress.
- Nonetheless, there is genuine concern in the MEPAG community about the possibility of increases in costs for MSR and SRP and the pressure that could place on the draft future plan for the Mars Exploration Program and the broader Planetary Science Division budgets and priorities.

- *MEPAG encourages the PSD, MSR, and Sample Receiving Project (SRP) Program leadership to continue to openly engage with the MEPAG and PSD community on the known or anticipated impacts of MSR and SRP costs on other priorities and what mitigations are being pursued to minimize those impacts (e.g., following Decadal Survey recommendations). Providing information to these communities, as soon as possible, will permit them to proactively adapt to an evolving budgetary landscape and update exploration priorities for the next decade as needed.*

## Mars Sample Receiving Project, I

- Work on the MSR SRP represents an important and exciting opportunity to articulate to the broader science community and the public the specific Solar System-level science that can be achieved from the combination of Mars exploration efforts to date with comprehensive analysis of returned samples.
- Interactions and collaborations between sample scientists (e.g., in MEPAG, ExMAG, and internationally) and scientists in other disciplines is critical; working together on the SRP will lead to getting the best science out of the laboratory studies and understanding their implications for the past, present, and future exploration of Mars and other planetary bodies.
- The MEPAG community understands that planning for the SRP, including the cost and details of the process guiding allocation of samples to the broader community is still in progress and looks forward to future updates, as well as the results of an upcoming Measurement Definition Team.
- *The call for volunteers to participate in a Measurement Definition Team is a welcome opportunity for wide community participation in keeping with previous such invitations and MEPAG looks forward to the announcement of the MDT membership.*

## Mars Sample Receiving Project, II

- Despite regular updates to the MEPAG community and past opportunities for community participation in SRP planning activities, there remain concerns and confusion about science community involvement in the SRP planning process as well as the cost of its associated facility.

- *MEPAG encourages NASA to: 1) continue to regularly engage with MEPAG and update the wider sample science community beyond MEPAG on SRP progress and opportunities to participate in this key aspect of deriving the best science from the samples once they are returned from Mars, as well as 2) follow Decadal Survey recommendations with respect to cost (where the total cost of MSR was stated to include NASA's contribution to the Sample Receiving Facility).*

## Moon to Mars

- As noted at the *Science Objectives for Human Exploration of Mars Workshop* in 2022, the Moon to Mars effort will benefit from early, vigorous communication among the stakeholders with respect to the high-priority science that could be accomplished by crewed missions to Mars; MEPAG continues to have concerns as to how science community input will be integrated into planning efforts on an ongoing, iterative basis.

- *MEPAG looks forward to a near-term demonstration by NASA of the formal pathway by which science planning will be integrated into Moon to Mars strategic planning and strongly supports the immediate inclusion of science discussion and input into the ongoing development of detailed, Moon to Mars objectives that will reduce risk and maximize science return.*

## Extended missions

- The 2023 Decadal Survey and the Academies' study "Extending Science: NASA's Space Science Mission Extensions and the Senior Review Process (2016)" asserted the exceptional value of extended missions (EM). EM continue to return valuable science data heading into a period with no new missions on the near-term horizon. The cost of continuing to collect science data and perform data analysis via EM is incremental relative to the cost of new missions.
- Extended missions will provide ongoing support for developing and maintaining multi-generational community expertise through this gap period, ranging from students and early career researchers to mid-career and senior members whose expertise and mentoring efforts will ensure a strong, stable community.

- *Although MEPAG understands the MEP budget is constrained at present, preserving the science budgets of extended Mars missions at levels consistent with the Academies' study recommendation (i.e., to account for inflation), in addition to current programmatic needs, is a very high priority. MEPAG considers this support crucial for workforce stability through the gap between launch opportunities.*

## Infrastructure

- Mars orbiters are conducting critical science and rover data relay but are operating long beyond their design lifetimes. The need for continued reconnaissance science and systematic monitoring has been identified by several studies, and the orbiters' relay burden will not decrease given the anticipated lack of missions to be launched in the next 5-10 years -- the loss of these critical assets would be damaging to future science.
- As acknowledged by Initiative 2 of the draft MEP future plan, we must address critical/aging infrastructure; approaching future communication relay, reconnaissance, and critical event coverage needs by design, rather than by happenstance, will maximize resources for the entire MEP, especially for small-class missions with potentially limited communications capabilities.
- *MEPAG encourages the MEP to provide specific details on an infrastructure plan as soon as possible, including a target launch date and the feasibility of re-engagement with the International Mars Ice Mapper, to ensure adequate support of current assets and enable planning for future missions before we are faced with a gap.*