MSR Campaign Science Group Update

MEPAG Hybrid Meeting #40

Washington, DC

April 12, 2023

Brandi L. Carrier[1]

[1]Jet Propulsion Laboratory, California Institute of Technology

MCSG Overview

- Competitively selected group of community experts that can be drawn upon by the MSR Campaign for scientific assessment, input, and recommendations
- Represents the scientific interests of the broad international science community who are stakeholders in the scientific planning for MSR, until such time as investigation PIs & MSR Sample Science Team (MSST) are selected
- Not empowered with decisional authority on agency matters; they provide the highest-level expert assessment available
- MCSG Reports to the MSR Campaign Lead Scientists, while the Joint Science Office (JSO) coordinates and supports MCSG activities

MCSG Participants

Co-Chairs


Michael Meyer


Gerhard Kminek

Joint Science Office


Dave Beaty


Elliot Sefton-Nash


Brandi Carrier


Fiona Thiessen


Tim Haltigin

Selected Members

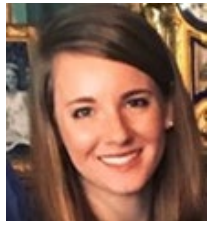

Audrey Bouvier


Andy Czaja


Nicholas Dauphas


Kate French


Lydia Hallis


Rachel Harris


Ernst Hauber


Laura Rodriguez


Susanne Schwenzer


Andrew Steele


Kim Tait


Michael Thorpe


Tomo Usui


Jessica Vanhomwegen


Michael Velbel


Maria-Paz Zorzano

Ex Officio


Sam Edwin


Ken Farley


Danny Glavin


Andi Harrington


Lindsay Hays


Aurore Hutzler


Mini Wadhwa

Recent MCSG Topics

MCSG meeting week of Feb. 20, Madrid, Spain, selected topics:

- **Formulation of scientific objectives for the Sample Receiving Project (SRP):**
  - Extensive discussion of the scientific objectives for the SRP—this was further revised via post-Madrid processing.
- **Planning for the Measurement Definition Team 1 (MDT-1) for SRP**
- **Planning for gas analysis in the SRF**
- **Planning for sample tube opening & sample extraction in the SRF**
- **Is cross-contamination between solid samples an issue?**
- **SRP Research and Development Planning**
- **Discussion of SRP Level 2 Science Requirements Review Process**

Draft Scientific Objectives for MSR Sample Receiving Project

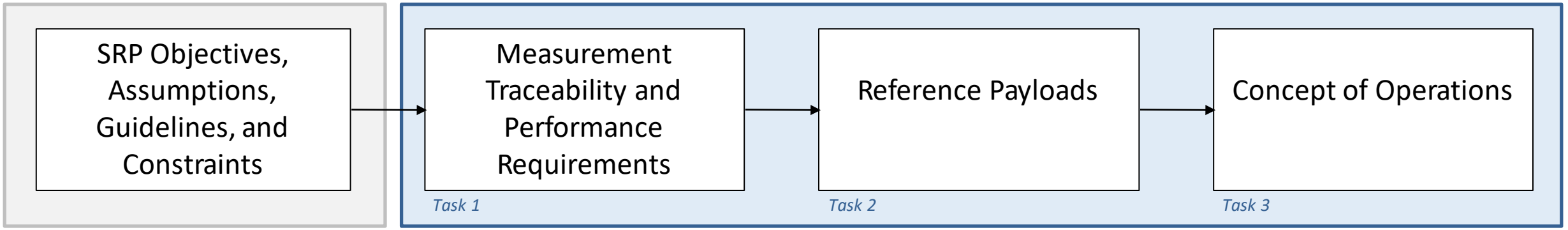
The analysis of returned samples from Mars is unprecedented. The Sample Receiving Project will support detailed scientific investigations, both within and outside of containment, to significantly advance our understanding of the geologic and astrobiological history of Mars. These investigations will combine a broad array of advanced laboratory instruments and sample preparation methods impossible to achieve through *in situ* robotic exploration missions. Such analyses will provide a greater understanding of chemical composition and diversity and examine small-scale features from known geologic contexts at higher sensitivity, lower detection limits, and finer spatial resolution than ever before.

1. **Reconstruct the formation and alteration history of the returned samples to transform our understanding of the geological processes and environments of Mars**
2. **Determine the astrobiological significance of the martian geological record represented by the samples.**
3. **Provide new insights into planetary-scale formation and evolution in the inner Solar System.**
4. **Identify and characterize potential risks and opportunities for future human missions.**

MDT-1 Overview

Define the instrumentation that would be needed for the MSR Sample Receiving Facility to achieve the objectives of the sample safety assessment, initial sample characterization, and science

Modeled after M2020 SDT



Provided as "top-down" input from Agencies.

Draw inputs from existing documentation where applicable; remainder tasked to MDT

MDT-1

- **Opportunity for Science Community Involvement**

- NASA and ESA are planning to charter a Measurement Definition Team (MDT) to assess the measurement and instrumentation needs for the high-containment MSR SRP facility to process samples brought back from Mars and accomplish sample safety assessment, curation, and science. There will be an open call for membership and early career individuals are encouraged to apply. We expect the applications for this committee to be accepted in late spring 2023, with an anticipated committee timeline between September 2023 and July 2024.

- If you are interested in receiving more information as it becomes available, please register your interest at: https://science.nasa.gov/solar-system *(link title: Mars Sample Receiving Project Measurement Definition Team 1 - Indication of Interest)*

Upcoming Topics & Activities

- **Further discussion of SRP Research and Development Planning:**
  - Includes analog investigations and technical R&D
- **Review of SRP Level 2 Science Requirements:**
  - JSO to formulate L2 science-related requirements, MCSG to review them and provide feedback