**MARS SAMPLE RETURN SCIENCE PLANNING: A STATUS UPDATE.** L.E. Hays¹, G. Kmink², B.L. Carrier³, D.W. Beatty³, E. Sefton-Nash², F. Thiessen², T. Haltigin⁴, B.L. Teece⁵. ¹NASA Headquarters (lindsay.hays@nasa.gov), ²European Space Agency-ESTEC, ³Jet Propulsion Laboratory, California Institute of Technology, ⁴Canadian Space Agency.

**Introduction:** The NASA & ESA Mars Sample Return (MSR) Campaign is intended to return scientifically selected samples that have been collected from the Jezero Crater region of Mars by NASA’s Mars 2020 (M2020) Perseverance Rover. M2020 placed a First Depot of samples in Jezero Crater in early 2023 [1] and continues to augment its onboard sample collection for potential delivery to Earth as early as 2033.

**Guiding Principles for Scientific Participation:**

The Joint Science Management Plan for MSR has several guiding principles that are meant to optimize the MSR science return and to ensure that the international science community remains engaged throughout the planning and analysis phase of MSR, including:

- **Transparency:** Access to samples must be fair and processes must be as transparent as possible.
- **Science Maximization:** Management and sample-related processes must optimize the scientific productivity of the samples.
- **Accessibility:** International scientists must have multiple opportunities to participate throughout the MSR process.
- **One Collection:** The returned samples should be managed as a single collection even if housed in separate facilities.
- **Return on Investment:** Agencies providing the investments required to execute the MSR campaign should receive demonstrable benefits for enabling the samples’ delivery to Earth.

These guiding principles have been derived from many decades of science planning activities that have covered the entirety of the sample lifecycle phases. Many of these reports themselves build on each other, and provide a rich background and context upon which today’s planning occurs.

**MSR Campaign Science Organization:** The MSR Campaign, being a connected series of multiple missions, under dual agency leadership, has a science leadership structure that reflects the complexity of the campaign. The MSR Campaign science leadership includes two MSR Lead Scientists, one from each NASA and ESA. For the mission elements, there are individual Project or Principal Scientists, and for the Sample Receiving Project, there is a Project Scientist from each NASA and ESA. The MSR Campaign Science Group (MCSG) are a competed group of international scientists that are serving as a project science group until Investigation PIs & MSR Sample Science Team (MSST) are formed, and that can be called upon for scientific assessment, input, and recommendations. The MCSG reports to the MSR Campaign Lead Scientists. A more complete explanation of this organization will be provided via this presentation.

**Status Updates:** There are several recent, ongoing, or upcoming science planning activities related to MSR science planning. The context for these will be given in this presentation, and include:

- Recent activities and discussions by the MCSG.
- Reports of the Gas and Rock sample teams who have been tasked with questions related to extraction of the samples from their sample tubes.
- Acquisition of analogue samples [2] for engineering, science, curation, and planetary protection developments and planning for research activities [3].
- Activities of the Measurement Definition Team (MDT), working to describe the measurements needed to accomplish the MSR scientific objectives.

**References:**


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