LAYING THE GROUNDWORK: ADVANCE PLANNING IN PREPARATION FOR SCIENTIFIC ANALYSIS OF SAMPLES RETURNED FROM MARS.

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Introduction: The Mars Sample Return Science Planning Group (MSPG) was instituted by ESA and NASA in November 2018. It is an international team with a brief to ensure that planning activities undertaken by the two space agencies in support of Mars Sample Return (MSR) are co-ordinated and consistent. MSPG is using several approaches during 2019 to identify issues and concerns for different potential international partners, and to formulate and propose mechanisms through which the international scientific community can achieve the shared scientific objectives of MSR. A series of workshops has been scheduled to establish and document positions amongst a diverse set of sample scientists related to planning assumptions and/or potential requirements involving the handling and analyses of returned samples.

The first workshop was held in Columbia, Maryland between 14th – 16th January 2019. Its theme was 'Science in Containment', and its scope covered the initial examination of samples and formulation of strategies for how much sample science should or must be planned for within containment. The report from the workshop can be found at https://mspg.jpl.nasa.gov. The second workshop will be held in Leicester, UK between 1st-3rd May 2019. Its theme is 'Contamination Control', and its scope will cover high-level strategies related to future preparation of science-driven contamination control requirements associated with sample handling and analisys. The third workshop, focused on reconciling science and Sample Safety Assesmment Protocol (SSAP) recommendations, will tentatively be held in summer 2019.

Workshop 1: A key planning question related to a potential future Mars Sample Return Campaign is "To what extent does MSR science need to be done in containment?" The answer will determine the character of the science-sourced requirements of the Sample Receiving Facility (SRF), including the number and definition of additional supporting science-related facilities (both within and outside containment). The first workshop focused on investigations that need to be performed while under biological quarantine, which is how we define here as being "in containment". The workshop concluded with 11 findings, two of which were assigned of higher import than the others:

Major Finding #1: It appears that a large majority (> 90%) of the MSR-related science investigations, as identified by iMOST, can be performed acceptably on sterilized samples, thus potentially enabling the analysis of MSR samples in uncontained laboratories without a dependency on the results from SSAP testing.

Major Finding #2:The scientific community, for reasons of scientific quality, cost, timeliness, and other reasons, strongly prefers that as many sample-related investigations as possible be performed in PI-led laboratories outside containment.

Workshop 2: The overarching topic of MSPG Workshop #2 (May 1-3, 2019 in Leicester, UK) is the potential impact of science-driven contamination control requirements, derived from the requirements on the sample caching system on Mars 2020, and their implications for the possible future Sample Receiving Facility. The challenge considered is what is practical in terms of managing potential contamination during sample transportation, characterization, manipulation, processing and analysis.

Other Processes: A set of Town Hall meetings and MSPG related presentations have been scheduled for several major 2019 planetary science conferences in both the United States and Europe (and Japan?). The same kinds of topics have been, and will be, discussed, and community feedback will be compiled. Finally, certain kinds of issues, particularly related to the overall scientific governance of MSR, are being studied by the MSPG committee itself, using large analogous science operations here on Earth.

The Findings from Workshops 1 and 2 will be presented and discussed at the Annual Meeting, alongside preparatory material for Workshop 3. Input from the sample science community is especially welcomed and encouraged in response to this presentation and the MSPG findings in general.