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A FRAMEWORK FOR MARS SAMPLE RETURN: WHO GETS ACCESS AND WHAT ISSUES MUST
BE ADDRESSED

Abstract

The space industry is in an age where we are beginning to look at human exploration on the surface of other planets. Leading the charge is the NASA-ESA collaboration of the Mars Sample Return campaign to bring samples back from the surface of Mars via robotic missions ahead of future crewed missions to Mars.

As exciting as it is knowing that one day soon humans will have physical access to a Martian sample, there are many questions regarding sample policy that must be addressed besides the extensive work of research organisations like COSPAR and MEPAG. This work is done under the auspices of the Space Generation Advisory Council by young scientists and engineers which were part of the Space Generation Congress (SGC) 2021 Mars Sample Return working group. Using a foundation of current and past sample return policy framework, we focus, from a science and engineering point of view, on how it is decided which research projects are most important and engage the stakeholders, global scientific community and general public.

This paper recommends a Mars sample return framework that takes into account these aforementioned issues. Furthermore, we are addressing questions such as; how do we guarantee findings are disseminated sufficiently, how do we ensure that sample protection measures are adhered to, and how to avoid conflict of interest? With the importance of commercial Martian space explorations in the future, the paper will address questions for both commercial and institutional exploration missions. Additionally, with the growing capacities of space emerging nations, such a framework shall consider mechanisms to foster equal opportunities for all nations to benefit from future Martian exploration endeavors. By the end of this paper, a first draft of such an equitable Mars sample return framework will be proposed and additional concerns that need to be addressed will be highlighted.