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Why Mars Sample Return is of Increasingly Compelling Interest to the International Mars Exploration Community

David Beaty (1), Elliot Sefton-Nash (2), Sanjay Vijendran (2), Michael Meyer (3), Brandi Carrier (1), Monica Grady (4), Harry McSween (5), Charles Edwards (1), Thiag Kumaraswamy (2), and Yael Asher (2)

(1) Jet Propulsion Laboratory, Mars Program Office, PASADENA, United States (bcarrier1983@gmail.com), (2) European Space Agency, European Space Research and Technology Centre, Noordwijk, Netherlands, (3) NASA Headquarters, Washington, DC, United States, (4) Open University, Milton-Keynes, United Kingdom, (5) University of Tennessee, Knoxville, United States

The transport to Earth of martian samples was first proposed within NASA's space science program in the 1970s. Since then it has progressively gained support from the international Mars exploration community. There have been developments in several areas surrounding Mars Sample Return (MSR) that have changed within the past decade or so that have caused interest to increase:
1. Martian meteorites.: Although the number of martian meteorites has now grown to over 100, it has become apparent that thelimited types of samples which survive the ejection process and the loss of sample context will continue to constrain what is possible using meteorites.
2. Mission results: Fabulous new results have been obtained by the in-situ exploration program (of particular note, MSL and the expected results to come from Exo-Mars). These results have emphasize the additional value that would come from analyzing Mars samples using the greater spatial focus, increased resolution and large diversity of instrumentation available in terrestrial laboratories.
3. Human exploration: We have a greatly improved understanding of the ways in which the risks, performance and cost of putting humans on Mars can be improved by acquiring advance information—especially sample-related information.
4. Astrobiology: Although the search for extra-terrestrial life has long been the key driver of Mars exploration, we now have a much better understanding of the potential for preservation in the geologic record, the evolution of Mars as a habitable planet, and (by means of the study of biochemistry on Earth) the details of biological processes. This allows for far more effective search strategies.
5. Instruments: We are seeing unprecedented improvements in our ability to prepare and analyze very small samples. Highly visible examples are the work on Hayabusa asteroid samples (JAXA) and the Stardust comet samples (NASA).
6. Engineering: Over the past decade there have been substantial improvements in the capability of the world's space agencies to acquire and preserve samples (most notably, the M-2020 sampling system), the development of the Mars Ascent Vehicle, and critical progress in breaking the chain of contact.

As recently summarized at the 2018 2nd International MSR Conference:
The scientific exploration of Mars and the search for extra-terrestrial life have advanced to the point that the return of samples from Mars is more important than ever to enable the next big discoveries in Mars exploration. Capitalising on major engineering progress in recent years by the world's space agencies and industries, we are technically ready to start the development of the flight missions associated with retrieving the samples. In parallel, planning for the potential receipt and evaluation of the samples has started, and should accelerate, as well as for the processes associated with making the samples available to the world's science community. Given the nature and scope of the Mars Sample Return campaign, we expect that engaging the public early and keeping them involved throughout will be a particularly important component of this effort. We have the opportunity and the motivation to make the Mars Sample Return campaign an international endeavour and a reality for all humankind.