



Mars Sample Return Facility: a longstanding topic of discussion.

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For over 50 years, a Mars Sample Return (MSR) mission has been the endeavor of the planetary science community. While robotically-enabled Mars science has been a significant element in space programs throughout the world, returning to Earth pristine geological and atmospheric samples for scientific study is the next big step in Mars exploration. Numerous MSR studies have debated what would be the ideal mission architecture to retrieve Martian samples, and equally numerous studies have been working on requirements and implementation plans for the critical Earth-bound part of the mission, the Sample Receiving and Curation Facility.

In the past few years, another round of international MSR studies, workshops and general science community discussions has been revitalized (EURO-CARES, iMars2, iMOST, IMEWG, etc.). The United States 2013-2022 Planetary Science Decadal Survey report (NRC, 2011) also recommended the concept of a sample caching rover to enable MSR as its highest priority flagship class mission, after Mars Science Laboratory (MSL) program. The NASA Mars 2020 mission, a sample caching rover, is currently being assembled with a launch date in mid-2020. Along with NASA MSR ambitions, MSR is also an important part of the European Space Agency's (ESA) exploration program. After retracing the over 50 years of historical MSR efforts, we will reflect on how the latest international MSR developments are building upon new technologies and bringing new skills from the private industry into the space sector, and how this current effort is now equipped to succeed.

The goal of this presentation is to summarize the consensus of engineering concepts and scientific requirements amongst the various MSR studies over time. This discussion will focus on future notional aspects of a Mars Sample Return facility that will still have to be agreed upon by various stakeholders in conjunction with the scientific community. In addition, we will reflect on which steps will have to be done outside the control of the scientific community; including how national and international agencies and actors maybe involved and how some are already getting ready for these steps.