



Planning for an International Mars sample Return Mission

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The return of samples from Mars, although technologically challenging, is essential for answering critical scientific questions that cannot be addressed by purely in situ mission. It is only through detailed terrestrial laboratory study of carefully chosen rock, regolith, ice and atmosphere samples that information related to habitability and life (including geological context, geochronology, and planetary evolution) can be obtained. Furthermore, it is only through careful analysis of returned samples that most of the surface conditions relevant for human exploration can be characterised.

The importance and complexity of such a mission necessitates a multinational effort, with particular collaboration between NASA and ESA, as well as the participation of space agencies from other countries. To this end, the International Mars Exploration Working Group (IMEWG) formed an international study group to investigate the architecture of an International Mars Sample Return mission (IMARS). IMARS has been supported by a MEPAG-sponsored multi-disciplinary science team with about 30 members, known as ND-SAG. Building from the efforts of previous groups, new concepts have emerged. The new vision for MSR emphasizes the integration of sample selection and study of the considerable data base that already exists since the Viking mission of 1976.

It is envisaged to return about 500 g of rock, regolith, dust, atmosphere (and ice?) materials, individually packaged and separated from each other. However, it is obvious that no one landing site on Mars can satisfy all the science objectives, and the currently proposed mission is best thought of as the first sample return.