

NASA Advisory Council Subcommittee Recommendation

Subcommittee Name: Planetary Science

Chair: Sean Solomon

Date of Public Deliberation: 9 January 2009

Date of Transmission to Science Committee: 21 January 2009

Short title of the proposed Recommendation

The Mars science community should re-evaluate the current Mars Exploration Program architecture.

Short description of proposed Recommendation

The PSS recommends that the Mars Exploration Program Analysis Group (MEPAG), and the Mars community more broadly, reevaluate the Mars Exploration Program (MEP) architecture to identify the best options currently available, including Mars Sample Return (MSR), to maximize the opportunities for achieving scientific goals of the highest priority.

Major reasons for proposing the Recommendation

Although the PSS applauds PSD for following the subcommittee's guiding principles in developing a solution to funding the increase in MSL mission cost, we cannot fail to note that this solution will have a large impact on the Mars Exploration Program in the areas of technology and infrastructure development, flight missions in the next decade, and scientific return over that time frame.

In response to an earlier SMD directive to focus the MEP on developing an MSR mission, as well as the redirection of MEP funding to other SMD priorities, considerable effort was expended in developing a program architecture that would lead to the development of the first elements of a sample return capability by the end of the next decade. The broad objectives of that architecture were supported by the PSS. The change in the allocation of MEP funds resulting from the MSL launch delay will substantially alter the pace of Mars exploration after MSL, notably including the postponement by several years or more of an MSR mission.

In the nearer term, the removal of virtually all technology funds essentially eliminates the possibility of a landed mission by NASA that utilizes the 2016 launch window. Such a mission was envisioned to be a precursor to MSR, performing detailed investigation of one of the key surface locations for habitability, and was to have included significant technology development in sample handling and caching in preparation for sample return. NASA's effort toward the 2016 opportunity is now likely to be directed instead toward a joint ESA-NASA effort in support of ESA's ExoMars mission. Although such a partnership would result in a more scientifically ambitious mission than either agency could initiate on its own, such a mission would not involve all of the technological and

infrastructure developments of the previous mission concept for the 2016 opportunity. The reduction in entry, descent, and landing (EDL) infrastructure funding will constrain the development of NASA's EDL capability and may affect future efforts to achieve precision landing both on Mars and on other solar system bodies.

Reductions in funding for currently operating missions may reduce the scientific return from those missions and constrain or limit options for those missions to contribute toward landing site selection for future missions, including sample return. Moreover, the delay in the launch and operation of the MSL mission highlights the need to maintain a reliable communication system at Mars that can support not only that mission but later landed missions as well. Mars Odyssey has been in operation since 2001 and Mars Reconnaissance Orbiter (MRO) since 2005, so these spacecraft presumably have several years of operational capability remaining, particularly MRO. Even with MAVEN scheduled to launch in 2013, PSD should evaluate communication needs at Mars in light of the MSL delay and its implications for later MEP missions.

Consequences of no action on the proposed Recommendation

In the absence of this recommendation, the Mars Exploration Program may proceed with a sub-optimal architecture, limiting progress toward the achievement of important scientific and programmatic goals.