

NASA Advisory Council Subcommittee Recommendation

Subcommittee Name: Planetary Science

Chair: Sean Solomon

Date of Public Deliberation: 3-4 March 2008

Date of Transmission to Science Committee: 28 March 2008

Short title of the proposed Recommendation:

Requirements for Mars Sample Return Mission success

Short description of the proposed Recommendation

The PSS endorses the return of appropriately selected and documented samples from Mars as the highest-priority scientific objective for Mars exploration over the next 10-15 years. The PSS recommends that NASA take the necessary budgetary, partnering, and planning steps – including needed strategically linked precursor missions – to enable the launch of a Mars Sample Return mission by 2020,

Major reasons for proposing the Recommendation

The decision last year to make a Mars Sample Return mission by 2020 an overarching goal of NASA's Mars Program was a bold and creative move. Mars sample return has been a long-term goal of the space agency for more than three decades, and the unique ability of a Mars Sample Return (MSR) mission to return well-chosen, documented samples from a diversity of scientifically interesting geological units offers the promise to advance substantially our understanding of the evolution of Mars as a planet and the conditions that have affected its potential habitability to living organisms as functions of space and time. The Mars Exploration Program (MEP), however, has recently faced a series of challenging budgetary issues, including the progressive growth in the cost of MSL, the slipping of the launch of a Mars aeronomy orbiter under the Scout Program from 2011 to 2013 because of a conflict-of-interest between the review team and at least one proposing organization, and the transfer of funding from the Mars Program's budget to SMD's Earth Science Program. Compared with the budget expected as recently as several months ago, such a protracted reduction has substantially changed the constraints under which missions after 2013 can be envisioned and a coherent plan leading up to an MSR mission by 2020 can be accomplished.

The PSS believes, on the basis of presentations by the Mars Exploration Program Director and the Mars Exploration Program Assessment Group, that the current MEP budget for 2009-2013 *is not adequate to launch a scientifically compelling Mars Sample Return mission by 2020*, even if major international partners for such an undertaking are recruited. This statement is made with the expectation that MSR must be preceded by strategically linked precursor missions that validate enabling technology and establish needed infrastructure (e.g., communications, sample collection). Further, the PSS was given to understand that possible launch windows for sample return missions two to ten or more years after 2020 are not as energetically favorable and would substantially restrict mission capability, although few supporting details were available at the time of

our meeting. If the 2020 launch window offers the best opportunity for more than a decade, then it is imperative that steps be taken in the very near term to sharpen the definition of the MSR mission concept, secure the needed partnerships, and determine the requisite technical capabilities and precursor missions.

Consequences of no action on the proposed Recommendation

In the absence of an appropriately funded and phased Mars Exploration Program, the success of a Mars Sample Return Mission is imperiled and the continued scientific return from the previous investments in the program will be reduced, perhaps greatly.