

NASA Advisory Council Subcommittee Recommendation

Subcommittee Name: Planetary Science

Chair: Sean Solomon

Date of Public Deliberation: 2-3 October 2008

Date of Transmission to Science Committee: 9 October 2008

Short title of the proposed Recommendation

Retraction of unqualified support for 2009 launch of MSL

Short description of proposed Recommendation

The PSS reaffirms its support for the Mars Science Laboratory (MSL) mission, its scientific goals, and the advances in our understanding of the past and present habitability of Mars that will be enabled by the successful completion of the mission. However, the PSS retracts its earlier recommendation that NASA make every effort to remain on schedule for a 2009 launch for MSL.

Major reasons for proposing the Recommendation

The Mars Exploration Program has been very successful over the past decade with its strategic and competed missions designed under the theme of “Follow the Water.” The major reservoirs of near-surface water are now well delineated on a global scale. The interaction of water with the surface and interior is recorded in the mineralogy of water-bearing minerals that define the history of this interaction. Recent landed and orbital spacecraft have revealed over a dozen unique assemblages of geology and aqueous mineralogy that are highly promising targets to explore for habitability. The next steps in exploring Mars are to assess analytically the habitability of such promising sites.

MSL will carry ten instrument packages and has the overall science objective to explore and quantitatively assess a region of Mars as a potential habitat for life, past or present. The SkyCrane system provides mass savings that will enable a greater proportion of delivered mass to be devoted to instrument payload. The rover will carry an analytical laboratory with two instruments of unprecedented capability, a Gas Chromatograph–Mass Spectrometer, which includes a Harriet cell Tunable Laser System, and an X-Ray Diffractometer for state-of-the-art mineral identification. An instrument new to planetary exploration is ChemCam, a laser-induced breakdown spectroscopy for meters-distant remote sensing of elemental and chemical composition. With an instrument complement that will include the capability to detect and measure organic compounds, MSL will characterize the nature of current and ancient Martian environments and will constitute the first astrobiology mission since Viking.

That said, the PSS is extremely troubled by the continued escalation of cost for the MSL mission and by the sustained inability of project management to estimate cost reliably. The subcommittee has been presented with MSL cost increase issues at each of its previous three meetings, and PSS has heretofore recommended that solutions to cost problems be found that preserve the integrity of the most important capabilities of the

payload as well as a development schedule that permits a timely launch of a fully tested spacecraft. In the report of our October 2007 meeting, the PSS urged “*that NASA and the developers of ChemCam make every effort to ensure that this important instrument fly on the MSL mission.*” In the report of our March 2008 meeting, the PSS recommended “*that NASA make every effort to solve MSL’s cost growth problems in 2008 and 2009 so that the mission may remain on schedule for its 2009 launch.*” In the report of our meeting in June 2008, a time when it appeared that all cost growth issues had been identified and a plan to meet the cost increases had been worked out, we wrote that “*we remain optimistic that the technical and fiscal challenges posed by this mission will be met so that a timely launch can be completed.*”

The latest increases to mission cost, and the demanding schedule between now and a 2009 launch, have substantially changed our views. Our confidence that a 2009 launch can be accomplished at low mission risk has been reduced, and we no longer believe that we have seen the last of the cost increases for this project.

Consequences of no action on the proposed Recommendation

In the absence of this recommendation, previous PSS recommendations on this topic will stand. As they no longer represent the position of the PSS, they would constitute an incorrect portrait of the PSS’s position.