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June 12th, 2006

Dr. Michael Meyer
Mars Exploration Program Lead Scientist
Planetary Science Division
Science Mission Directorate
NASA Headquarters
300 E Street SW
Washington, DC 20546

Dear Michael:

The purpose of this letter is to summarize the outcome and findings of the recent Mars2009 Science Laboratory (MSL) Landing Site Workshop held in Pasadena, CA, on May 31-June 2, 2006.

The workshop was well attended on all three days, with more than 100 participants on the first day and nearly 100 on days two and three. Attendees included Principal and Co-Investigators from MSL, Principal and Co-investigators from major experiments expected to be used to certify the sites, and many scientists unaffiliated with MSL. This robust attendance coupled with feedback we've received from a number of participants highlights the Mars community's interest in MSL landing site activities.

The objective of the workshop was to hear about the complete range of proposed landing sites for MSL and learn how each fared with respect to stated mission, planetary protection, and engineering constraints. A major outcome of the workshop is a rank ordering of the proposed sites for use in future targeting for imaging by the Mars Reconnaissance Orbiter (MRO) and other orbital assets. It is intended that all of the proposed sites will remain under consideration until or unless new data show them to be in violation of engineering or planetary protection constraints or introduce significant risk to achieving mission science objectives. A table showing the rank order, location, elevation (from abstracts), science target, and the proposer(s) for each of the sites, is presented on the last page of this letter.

A quick review of the table demonstrates that a wide variety of sites were proposed at the workshop. A total of 33 general sites were proposed that incorporated 94 landing ellipses (multiple ellipses were proposed for some sites) that span a considerable range of latitudes and elevations on Mars. The sites farthest north and south are at 23^0N and 57^0S,

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Center for Earth and Planetary Studies
6th at Independence SW
Washington DC 20560-0315

respectively, with all of the sites ranked in the top 50% falling between 23^0N and 28^0S. By contrast, all of the sites lie between +1 km and -4.5 km (MOLA datum) with all of the sites ranked in the top 50% falling below -0.4 km. Only one proposed site is located at an elevation above 0 km.

During the meeting of the Landing Site Steering Committee that followed the workshop, there was discussion about timely production and access to MRO higher-level data products, discussion of how Mars Express data products might best be used in MSL site selection activities, and how best to assess the proposed sites against the habitability science objective. MSL is working with the MRO Project and teams to ensure rapid access to data, but all were cautioned that some data products (e.g., from CRISM) will likely require some time to mature and special products should not be expected early in the MRO mission. With respect to Mars Express, some of the instruments have already expressed an interest in providing data for MSL site selection activities. The Committee felt that the NASA Headquarters was best positioned to request data from the Omega science team. All agreed that assessment of proposed sites relative to habitability science objectives would be included as a prominent topic in advance of and during the second workshop.

There was also considerable discussion during the Steering Committee meeting regarding the existing range of latitudes and elevations accessible by MSL. The Project and NASA Headquarters asked whether the Committee felt these ranges might be reduced after consideration of the proposed sites. For example, leaving the latitude range unchanged from the current +/-60 degrees and dropping the elevation limit to +1 km would not eliminate any sites from consideration. Reducing the latitude limits to between +/-30 degrees latitude and elevation limits to +1 km would eliminate a total of 4 of the proposed sites from consideration. All four of these sites were ranked in the lower 50% of those proposed; three of these were ranked in the lower 33%. Further reduction of the elevation limit to 0 km would eliminate one additional site from consideration that was also ranked in the lower 50% of those proposed.

Although new sites will likely be proposed in the coming months, due at least in part to discoveries made by MRO, a majority of the Committee believes that the proposed sites are likely to be representative of those deemed of high priority for MSL. Hence, some reduction in both the latitude and elevation range accessible to MSL could likely be accommodated with limited impact to the mission science return. Reductions in the latitude range to less than +/-30 degrees and/or elevations of less than 0 km, however, could significantly impact mission science and are opposed by a majority of the Committee.

Sincerely,

John Grant and Matt Golombek
Co-Chairs, MSL Landing Site Steering Committee

On behalf of the MSL Landing Site Steering Committee

LANDING SITES PRIORITIZED AT FIRST MSL WORKSHOP				
NAME	**LOCATION**	**ELEVATION**	**TARGET**	**PROPOSER**
Nili Fossae Trough	~22ºN, ~75ºE	-0.6 km	Phyllosilicates	J. Mustard
Holden Crater Fan	26.4ºS, 325.3ºE	-2.3 km	Layered Materials	R. Irwin, J. Grant, Malin, Edgett, Rice
Terby Crater	28°S, 73°E	-5 km	Layered Material	S. Wilson, Cohen, Dobrea
Marwth Vallis	22.3ºN, 343.5ºE	~-2 km	Phyllosilicates	J-P Bibring
Eberswalde Crater	24.0°S, 326.3°E	-0.8 and -0.4 km	Delta	J. Schieber, J. Dickson, Rice
Gale Crater	4.6°S, 137.2°E	-4.5 km	Interior Layered Deposits	J. Bell, N. Bridges
W Candor East	Various	-4 km	Sulfate Deposits	N. Mangold
N Meridiani	2.7°N, 358.8°E	-1.5	Sedimentary Layers	Edgett/Malin
Juventae Chasma	5°S, 297°E	-2 km	Layered Sulfates	J. Grotzinger
Nilo Syrtis	~23°N, ~76°E	<-2.0 km	Phyllosilicates	Mustard
Melas Chasma	9.8°S, 283.6°E	-1.9 km	Paleolake	C. Quantin
E. Meridiani	0°, 3.7°E	~-1.3 km	Sedimentary Layers	B. Hynek
Athabasca Vallis	10N, ?ºE	-2.4 km	Cerberus Rupes Deposits	D. Burr
Iani Chaos	2°S , ~342°E	Below -2 km	Hematite, Sulfate	T. Glotch
Nili Fossae Crater	18.4ºN, 77.68ºE	-2.6 km	Valley Networks, layers	J. Rice
Eos Chasma	~11°N, ~320°E	~-4 km	Chert	Hamilton
Meridiani Crater Lake	5.6°N, 358°E	~-1.5 km	Crater lake sediments	L. Posiolova
NE Syrtis Major	~10ºN, ~70ºE	~1 km	Volcanics	R. Harvey
Margaritifer basin	12.77ºS, 338.1ºE	-2.12 km	Fluvial Deposits	K. Williams
E. Melas Chasma	11.62°S, 290.45°E	Below-2 km	Interior Layered Deposits	M. Chojnacki
Hellas/Dao Vallis	40ºS, 85ºE	Below -2 km	A major valley	L. Crumpler
Xanthe/Hypanis Vallis	11ºN, 314ºE	Below -2 km	Delta	L. Crumpler
Becquerel Crater	21.8°N, 351°E	-2.6 to -3.8 km	Layered Sedimentary Rocks	J. C. Bridges
SW Arabia Terra	2-12°N, 355-348°E	-1 km	Sed. Rocks, Methane	C. Allen
Gullies/Hale Crater	35.7°S, 323.4°E	–2.4 km	Gullies	W. E. Dietrich
W. Arabia	8.9°N, 358.8°E	-1.2 km	Sedimentary Rocks	E. Heydari
Argyre	56.8ºS, 317.7ºE	-1.5 km	Glacial Features	J. Kargel
NW Slope Valleys	~0, 145°E	~-2 km	Flood Features	J. Dohm
W. Meridiani	1.8°S, 7.6°E	~-1.0 to -1.5 km	Sediments, Hematite	H. Newsom

Elysium/Avernus Colles	1.0ºS, 169.5ºE	Below -2 km	High iron abundance	L. Crumpler
Meridiani Bench	7.5ºN, 354ºE	~-1 to –1.5 km	Layered Sediments	A. Howard
SML CratersS	49°S, 14°E	Above -0.5 km	Recent Climate Deposits	M. Kreslavsky
Isidis Basin Escarp	5-15ºN, 80-95ºE	Below -2 km	Volatile sink	L. Crumpler