EXTENDED VERSION
Notice of Intent to Release a Solicitation
for NASA Mars Science Laboratory Investigations
14 November 2003

The National Aeronautics and Space Administration (NASA) Office of Space Science (OSS) intends to release a Mars Exploration Program Announcement of Opportunity (AO) mid-March, 2004 to solicit proposals for Mars Science Laboratory (MSL) space flight science investigations. These investigations will respond to the overall MSL science objective to explore and quantitatively assess a specific locality on Mars as a potential habitat for life, past or present. This mission will use a variety of instruments carried on a rover platform that will operate under its own power and telemetry and is expected to remain active for at least one Mars year. Proposals in response to this AO will be due 90 days after its formal release.

The solicited MSL investigations include the following groups of landed, in situ investigations: 1) analytic laboratory investigations that provide and use instruments or instrument systems to analyze Martian atmosphere (gas) samples and/or regolith, rock, ice samples provided by the MSL Sample Acquisition, Processing, and Handling System; 2) remote sensing investigations that provide and use instruments or suites of instruments to be mounted on the MSL Rover Mast; 3) contact instrument investigations that provide and use instruments to be mounted on a robotic arm (or arms) to be provided by MSL; and 4) investigations that provide and use individual instruments mounted elsewhere on the MSL Rover including a sensor to assess the radiation environment at the local martian surface.

Proposals may be submitted for science investigations that involve a single instrument or for (a) suite(s) of instruments. Individual instruments selected for any group of investigations that are provided by more than one Principal Investigator (PI) may have one of the PIs designated as the suite Team Leader by NASA and given additional integration and operation responsibilities. NASA reserves the right to add instruments to a selected proposed suite and/or not to select instruments proposed as part of an instrument suite.

Investigations for this solicitation are to support the following overall science objectives, with A-C representing the science floor of the MSL mission:

A. Assess the biological potential of at least one target environment identified prior to MSL or discovered by MSL.
B. Characterize the geology and geochemistry of the landing region at all appropriate spatial scales (i.e., ranging from micrometers to meters).
C. Investigate planetary processes of relevance to past habitability, including the role of water.
D. Characterize the broad spectrum of surface radiation, including galactic cosmic radiation, solar proton events, and secondary neutrons.

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In addition, investigations may also support the following lower priority objective:

E. Investigate the presence of known toxic materials, such as Cr VI, as part of the basic geochemical surveys of martian regolith or rocks.

MSL emphasizes the use of rover mobility to provide multiple sampling opportunities for the primary (group 1) analytic laboratory investigations. Investigations in groups 2 and 3 have dual roles and are expected to be used to locate and select suitable sampling targets as well as conducting their associated scientific investigations.

Participation in this AO will be open to all categories of organizations (foreign and domestic), including educational institutions, industry, not-for-profit organizations, Federally Funded Research and Development Centers, NASA Centers and other Government agencies. PIs are responsible for and may assemble their investigation teams (Co-Investigators) from any and all of these organizations. The PI is responsible for the complete investigation including the experiment hardware, software, operations planning and execution, data analysis, archiving and publication of results. All Co-Investigators named to an investigation must have a substantial well-defined role in the investigation.

For all groups of investigations selected with this AO, a total of $85M (Real Year Dollars) is anticipated for development, including all investigators' reserves from selection through launch plus 30 days. An additional amount not to exceed $50M (RY) is anticipated for the MSL operations phase (one Martian year baseline) including reserve. Management of reserves is discussed in the Payload Information Package (PIP) in section 10.1 and specifically requires that the commitment of any proposed cost reserves be reviewed and approved by a process led by the MSL Payload Manager and involving the PI, and Project Scientist, as appropriate.

Given the submission of proposals of merit, NASA intends to select investigations in groups 1, 2 and 3 and may select investigations in group 4 if resources permit. Investigations selected in all groups will be funded to begin Phase A/B design activities. Investigations that successfully complete Phase A/B, including a Preliminary Design Review/Confirmation Review, may then be confirmed and funded for Phase C/D, detailed design and development. NASA reserves the right to de-select investigations at PDR/Confirmation even if they have successfully completed Phase A/B should resource limitations present a problem.

Note that the AO may contain provisions that differ from this notice, in which case the provisions in the AO will take precedence. Supporting material to aid prospective proposers may be found in the draft PIP and other documents on the MSL Library in the Mars Science Laboratory Acquisition Program website (http://centauri.larc.nasa.gov/msl). These materials are subject to revision until the release of AO. Proposers are advised to visit the Website regularly to obtain updates that will be announced on the cover page of the Acquisition Program website.

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Questions or comments about this intention to release an MSL Investigations AO must be addressed in writing or by email to the NASA Program Scientist for the Mars Science Laboratory: Dr. Michael Meyer, Ref.: MSL-FBO 2003, Solar System Exploration Division, Code SE, Office of Space Science, National Aeronautics and Space Administration, Washington, DC 20546-0001; E-mail: michael.a.meyer@nasa.gov. Responses to all inquiries will answered by E-mail and also posted weekly at the Frequently Asked Questions (FAQ) location of the MSL Acquisition Program website at http://centauri.larc.nasa.gov/msl. Anonymity of persons/institutions who submit questions will be preserved.

Important characteristics of this intended AO are expected to be:

- MSL is to launch no later than Dec. 31, 2009.
- The MSL mission description and other needed proposal information may be found in the MSL Library at URL website http://centauri.larc.nasa.gov/msl.
- Responsibility for the MSL mission project implementation has been assigned to the Jet Propulsion Laboratory by the Mars Exploration Program (MEP) at NASA Headquarters. It is the JPL MSL Project's responsibility to provide the launch system, spacecraft, landing systems, the Rover, and its Sample Acquisition, Processing and Handling capabilities, and payload accommodations as well as mission systems engineering, assurance, and management.
- The PI for each Selected investigation will be responsible for all aspects of their investigation including instrument design, development, test, and delivery to JPL per the MSL project schedules that can be viewed at the MSL Library.
- Planetary Protection requirements and the scientifically-driven desire for organic cleanliness will place constraints on instrument development, integration, and operations. Although the MSL mission specifically excludes investigations for extant martian life, the spacecraft, Rover, and instruments may still require sterilization and will place limits on background organic contamination.
- Mass, power, and other allocations for MSL investigations are defined in the Draft PIP located in the MSL Library. Data sample and acquisition capabilities and interfaces that are provided by the MSL are also defined in this website.
- It is anticipated that Phase A/B design (including reserve) for all investigations selected through this AO will be funded at no more than $10M (RY). This amount will be divided among the investigation groups estimated as 70-85% for group 1, 10-20% for group 2, 5-10% for group 3. Phase A/B funding for any investigation(s) selected for group 4 investigations will be provided by slightly decreasing the proportion of funds available for groups 1-3. Investigations that successfully complete Phase A/B will then be funded for Phase C/D. The total funding available for Phase C/D is $75M (RY), which will be allocated in approximately the same proportions as defined for Phase A/B above.
- Due to the cost constrained nature of MSL, proposed life cycle costs for any investigation may not increase during Phase A/B by more than 15 percent without being subject to cancellation.

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• The total costs for all investigations proposed to this AO will not exceed the funding profile shown in Section 10 of the PIP, which can be found in the MSL Acquisition Library.
• Proposals submitted in response to this intended AO will be evaluated by peer review principally on the basis of scientific and technical merit of the proposed investigation. In addition, technical, management, and cost risk will also be evaluated by peer review to determine the investigations' feasibility for implementation.
• Radioisotope Power Sources (RPSs) are being considered for use as the primary Rover power source. The final decision on this implementation will not occur until Phase B for the Flight System. Thus, proposed investigations must meet design and verification requirements that allow for the radiation environments and extended lifetime afforded by this option. Requirements information can be found in Section 3.7.2 of the PIP document in the MSL Acquisition Library.
• Investigations that plan to fly small quantities of radioactive material for heating, calibration, or other reasons must clearly define such intentions in their proposals.
• Contributions of any kind, whether cash or non-cash (property and services), to MSL investigations by organizations other than the NASA Office of Space Science (OSS) are welcome. However, for U.S. PI led investigations the sum of such contributions may not exceed one third of the proposed total development cost of an investigation. In addition, for investigation suite proposals, no more than one instrument or one third of the suite (whichever is greater) may be contributed. In all cases, contributions must be identified by source and amount in the proposal.
• Investigations and investigators proposed by foreign partners are to be provided on a no-exchange-of-funds basis to NASA and will be evaluated in the same way as all other proposals for science merit, relevance, feasibility, and risk. Such proposals must include a signed letter of endorsement from the individual responsible for approving and funding the proposed activity in the organization. The signed letter will be due at proposal due date. Proposals lacking such letters, or letters judged inadequate by NASA, may be cause for rejection of the proposal without further review.
• All data from MSL investigations will be nonproprietary and must be made available to the science community and public through the Planetary Data System as soon as possible following calibration and validation, but no later than 6 months from receipt..
• All proposals will be required to include in their overall planning a firm commitment to NASA's Education and Public Outreach, and the small disadvantage business program.
• Solicitation for investigations by MSL Facility Instrument Scientists, Interdisciplinary Scientists, and Participating Scientists will not be included in this AO. MSL Facility Instrument Scientists and Interdisciplinary Scientists may be selected before MSL Project PDR while the Participating Scientist opportunity is expected to bring additional scientists into the mission team near the time of launch. Because these additional investigations will be competed, proposers to

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the MSL AO should constrain the number of Co-investigators to only those who have a substantial role in development as well as operations of the mission.

• A Project Science Group (PSG) that will be co-chaired by the MSL Project Scientist from the Jet Propulsion Laboratory and the MSL Program Scientist from NASA Headquarters will be formed soon after selection. Each selected PI will be a member of this group, which will meet regularly throughout the lifetime of the MSL 2009 mission to optimize the scientific return of the mission.

The following additional elements are being considered for this AO:

- NASA is considering flying a contributed active neutron spectrometer to provide an in-situ analysis of the hydrogen content of the bulk surface, and
- NASA is investigating the potential inclusion of a separately funded 1 kg radiation environments sensor (ref. science objective D), which might be competed as an investigation through the released MSL AO.

The following schedule describes the anticipated major milestones of this intended MSL Investigations AO:

AO release	~ March 2004
Pre-proposal Conference	AO Release + 2 wks
Notice of Intent to Propose due	AO Release + 4 wks
Proposals due by 4:30 p.m. EDT	AO Release + 90 d
Non-U.S. Letters of Endorsement due	Proposal Due Date
Selections announced (target)	Proposal Due Date + 4 mos
Instrument Phase A/B start	Selection plus 2 wks
Confirmation of investigation(s) (target) for detailed design/development	Selection + 10 mos

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