

Martian Moons eXploration (MMX) Mission SALMON-2 Community Announcement

NASA's Science Mission Directorate (SMD) intends to release a Program Element Appendix (PEA) to the Stand Alone Missions of Opportunity Notice (SALMON-2) on or about June 1, 2016. This PEA will solicit proposals for one instrument investigation to be implemented on the Martian Moons eXploration (MMX) mission, which is being developed by the Japan Aerospace Exploration Agency (JAXA) for launch in 2022.

In JAXA's current mission profile, MMX will be placed in a quasi-satellite orbit around Phobos, where remote sensing and in situ observations will characterize the surface, interior, and environment. Surface characterization will enable selection of one or more landing sites. The spacecraft will land on Phobos and collect at least 10 g of regolith samples. After ascent, MMX will maneuver to a Mars orbit permitting multiple flybys of Deimos for characterization of the surface, interior, and environment. Further observations of Mars will be made to probe the water cycle and dust interactions in the atmosphere-surface system and to constrain mechanisms for atmospheric escape. The spacecraft will then return the collected Phobos samples to Earth. Total mission duration is expected to be approximately five years, with approximately three years spent in the Mars system.

NASA SMD intends to solicit proposals for one Principal Investigator (PI)-led science investigation involving the development of a Neutron and Gamma-Ray Spectrometer instrument, to be integrated with and deployed on the MMX spacecraft. The total MMX science payload is expected to comprise the Neutron and Gamma-Ray Spectrometer and the following instruments that are not solicited in this PEA:

- Sampler and Re-entry Capsule
- Wide angle multiband camera
- Near-Infrared spectrometer
- Telescopic camera
- Light detection and ranging
- Circum-Martian dust monitor
- Ion mass spectral analyzer

The total payload resources, including mass, power, and data for the instrument complement will be described in a document in the MMX Program Library, which will be made available upon release of the PEA.

Together, these instruments will be expected to achieve the following mission science objectives:

1. Determine whether Phobos is a captured asteroid or the result of a giant impact;
 - a. If the former, understand the delivery of primordial material to the rocky planet region and constrain the initial conditions for Mars's surface environment evolution;
 - b. If the latter, understand satellite formation from impacts and evaluate how the initial evolution of Mars's environment was affected by the moon forming event;
2. Constrain the origin of Deimos;
3. Study surface processes on airless small bodies in Mars orbit;

4. Gain insight into Mars surface environment evolution;
5. Better understand the behavior of the Mars atmosphere-ground system and water cycle dynamics.

Proposals will be solicited for science investigations requiring the development and operation of space-based instruments, designated as Class B (high priority, low risk as defined in NPR 8705.4, Risk Classification for NASA Payloads) on a platform to be provided by JAXA.

Participation in this PEA will be open to all categories of U. S. organizations, including educational institutions, industry, not-for-profit organizations, Federally Funded Research and Development Centers (FFRDC's), NASA Centers, the Jet Propulsion Laboratory (JPL), and other Government agencies. Proposing PIs are permitted and expected to assemble their instrument teams from any and all of these organizations.

Proposing PIs are responsible for complete space flight investigations, including instrument hardware, all mission operations, and data analysis, that address any or all of the mission science objectives. It is expected that one or two participating Japanese scientists selected by JAXA will be integrated into the selected instrument team.

Other important aspects of the intended PEA are expected to be:

- Submission of a Notice of Intent to Propose, by the deadline given below, is a mandatory prerequisite for submission of a full proposal.
- The development cost cap for the selected investigation will be \$15M in real-year (RY) dollars, for Phases A through D.
- Evaluation and selection for funding will be done using a single step selection process; no competitive Phase-A (Step 2) or down selection is planned. Normal instrument Phase-A activities will be conducted by the selected investigation team following selection.
- Proposers responding to this PEA must indicate any International Traffic in Arms Regulations (ITAR) sensitive material in their proposals.
- JAXA representatives will participate in the review of proposals and will provide comments to NASA; redacted versions of all submitted proposals will be provided to JAXA to enable this participation.
- JAXA will perform an accommodation study and provide input to NASA prior to selection

The PEA may contain provisions that differ from this notice, in which case the PEA itself takes precedence.

The following schedule describes the anticipated major milestones of the MMX instrument PEA:

PEA Release Date	June 1, 2016
Preproposal Conference (webinar).....	approximately 2 weeks after PEA release
Notice of Intent to Propose (mandatory) Deadline	approximately 3 weeks after PEA release
Proposal Submittal Deadline	90 days after PEA release
Selection Announced (target)	November 2016

Instrument Delivery Date for Integration Tests Mid-2020

NASA has not approved the issuance of a SALMON-2 PEA for any MMX instrument investigation, and this notification does not obligate NASA to issue the PEA or to solicit proposals. Any costs incurred by prospective investigators in preparing submissions in response to this notification or the planned PEA are incurred completely at the submitter's own risk.

Questions regarding this announcement may be addressed to Dr. Thomas S. Statler, MMX Program Scientist, Science Mission Directorate, NASA Headquarters, Washington, DC 20546-0001. E-mail may be sent to Thomas.S.Statler@nasa.gov; the subject line should consist of the character string "MMX PEA" (without quotation marks).