

A.2.17 2002 Mars Advanced Radar for Subsurface and Ionospheric Sounding (MARSIS) Participating Scientist

1. Scope of Program

1.1 Roles and Responsibilities of MARSIS U.S. Participating Scientists

Proposals are solicited from personnel employed only at U.S. organizations to carry out investigations as Participating Scientists (PS's) on the Mars Advanced Radar for Subsurface and Ionospheric Sounding (MARSIS) on the European Space Agency's Mars Express mission.

Investigators selected through this NRA will become MARSIS U.S. Participating Scientists (PS's) and join the current members of the MARSIS team. The selected MARSIS U.S. PS's will coordinate their activities and analyses with the present PI's and Co-Investigators (Co-I's) on MARSIS. PS's selected under this NRA will have full rights of access to MARSIS data and are expected to participate in data analysis, archiving, and publication. In addition, each selected U.S. PS is expected to participate in mission operations, and must describe such participation in the proposal. The PI for MARSIS is Prof. Giovanni Picardi of the University of Rome, and the Co-Principal Investigator is Dr. Jeffrey Plaut of the NASA Jet Propulsion Laboratory. The MARSIS instrument is described in greater detail in its Proposal Information Package (PIP) at URL <http://mars.jpl.nasa.gov/marsis/pip>.

The role of a MARSIS U.S. Participating Scientist as solicited through this NRA is to:

- Provide science input for mission planning and instrument operations and calibration;
- Reduce and validate scientific data;
- Analyze, interpret, and publish results and findings in peer reviewed literature;
- Support education and public outreach efforts of the Mars Exploration Program.

Instruments onboard the Mars Express orbiter will be used to study the Martian ionosphere, atmosphere, surface, and subsurface. Mars Express mission parameters and launch capability are optimized for the launch opportunity between late May and late June 2003. The launch will be performed on a Soyuz/Fregat launcher from Baikonur, Kazakhstan. NASA will contribute to the Mars Express mission's scientific payload in a number of ways, including bilateral cooperation with the Italian Space Agency for the development, delivery, and operation of the MARSIS instrument.

1.2 Background of Mars Express Mission and MARSIS

The Mars Express orbiter will conduct the following seven experiments:

- High-Resolution Stereoscopic Camera (HRSC)
- Observatoire pour la Minéralogie, l'Eau, les Glaces et l'Activité (OMEGA)

- Planetary Fourier Spectrometer (PFS)
- Spectroscopic Investigation of the Characteristics of the Atmosphere of Mars (SPICAM)
- Mars Advanced Radar for Subsurface and Ionospheric Sounding (MARSIS)
- Analyser of Space Plasmas and Energetic Atoms (ASPERA)
- Mars Radio Science Experiment (MaRS)

Mars Express will also carry a 70 kg lander called Beagle 2, targeted to land in Isidis Planitia and operate for 60 Sols. Background information about Mars Express is available at the World Wide Web site: <http://sci.esa.int/marsexpress/>.

The primary science objective of MARSIS is to detect, map, and characterize subsurface material discontinuities in the upper crust of Mars, including boundaries of:

- Liquid water-bearing zones,
- Icy layers,
- Geologic units, and
- Geologic structures.

Secondary MARSIS science objectives are to: (1) characterize and map the elevation, roughness, and electromagnetic properties of the surface; and (2) probe the ionosphere of Mars to characterize the interaction of the solar wind with the ionosphere and upper atmosphere of Mars. Low frequency (0.1 – 5 MHz) radar waves will be directed towards the planet from a 40 m long antenna that will be unfurled once Mars Express is in Mars orbit. Analysis of the echoes produced should reveal much about the composition and structure of the top several km of the crust.

NASA has established a Mars Express/NASA Project located at the Jet Propulsion Laboratory that is responsible for the overall execution of the NASA portions of ESA's Mars Express Mission, including support of U. S. Co-Investigators and Participating Scientists and study of telecommunication interoperability aspects of the Mars Express mission.

The MARSIS U.S. Participating Scientist activities are to be undertaken in a manner consistent with the Mars Exploration Program Policy. The following general rules apply to data rights, use, and publication of MARSIS data:

- (i) ESA's Mars Express Science Working Team (Project Science Group) has adopted a policy that there is no proprietary period for any data collected by the spacecraft or instruments. However, science instrument data may require a validation period of up to six months from the time of receipt of data. After validation, the relevant archive volumes will be transferred to the ESA Science Data Archive and the Planetary Data System (PDS) which will make them available to the general scientific community.

- (ii) Data deposited in the PDS will contain the appropriate calibration information and ancillary data. Later versions of archive data may be delivered to PDS as algorithms and ancillary information are updated.
- (iii) During the generation/validation period, use, analysis, or release of raw and derived products should be done only with the agreement of the MARSIS PI. It is expected that all investigations will publish their results in a timely manner in the open scientific literature.
- (iv) Subsets of data will be released prior to formal publication as a form of public outreach and education; such data release may be available as postings on the Internet and will conform to the Mars Express Public Release Policy.

2. Programmatic Information

It is anticipated that this NRA will be the only such solicitation for proposals in support of MARSIS U.S. Participating Scientists. Continued funding of multiyear projects is contingent upon availability of funds and annual assessment of performance and relevance of the research effort to Mars Express mission and program requirements.

It is anticipated that up to five investigations will be selected through this solicitation. Starting in Fiscal Year 2003, total available funding for each Participating Scientist investigation is expected to be about \$40-50K per year for four years.

The schedule for proposals for this opportunity are as follows:

Notice of Intent to Propose Due Date	July 17, 2002
Proposal Due Date	September 19, 2002

See information listed in the Summary of Solicitation of this NRA for all appropriate information on how to prepare and submit a proposal.

Proposals should identify scientific ideas and unique theoretical and analytical capabilities that best meet the scientific objectives of the MARSIS instrument as described in this Announcement. Key projected milestones, accomplishments, and deliverables during each year of the proposed investigation should be identified.

The evaluation criteria contained in Appendix C, Section C.2, of the *NASA Guidebook for Proposers* (see Section 5 of the summary of solicitation for this NRA) shall be used to evaluate submitted proposals, where it is understood that the scientific and technical merit of a proposal will include judgment of the following factors, of equal priority:

- A clear understanding of the MARSIS instrument and its scientific and technical capabilities, particularly those related to the proposed investigation;

- The feasibility of the proposed investigation using MARSIS, and the data returned from it, and a clear statement of the instrument data required for the proposed investigation; and
- The ability, capability, and commitment of the investigator to participate in planning, collection, reduction, and evaluation of the data to be submitted to the PDS, including a description of the specific data products that will be produced by the investigation.

IMPORTANT INFORMATION

As discussed in the Summary of Solicitation of this NRA, the Office of Space Science (OSS) is now using a single, unified set of instructions for the submission of proposals. This material is contained in the document entitled *NASA Guidebook for Proposers Responding to NASA Research Announcement-2001* (or NASA Guidebook for Proposers for short) that is accessible by opening URL <http://research.hq.nasa.gov/>, and linking through the menu item -Helpful References- or may be directly accessed online at URL <http://www.hq.nasa.gov/office/procurement/nraguidebook/>. This NRA's Summary of Solicitation also contains instructions for the electronic submission of a Notice of Intent (NOI) to propose and a proposal Proposal Cover Page, which now also includes the required Budget Summary and the mailing address for the submission of a proposal.

Questions concerning this program element may be directed to the Mars Express Program Scientist:

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