



**National Aeronautics  
and Space Administration**

**October 27, 1997  
AO 97-OSS-05**

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# **Announcement of Opportunity**

**NEW MILLENNIUM MARS MICROPROBE  
SCIENCE TEAM**

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OMB Approval No. 2700-0085

**NEW MILLENNIUM MARS MICROPROBE  
SCIENCE TEAM**

Announcement of Opportunity  
Soliciting Proposals for  
Basic Research in Space Science

AO 97-OSS-05  
Issued: October 27, 1997  
Notice of Intent Due: November 28, 1997  
Proposals Due: January 27, 1998

Office of Space Science  
National Aeronautics and Space Administration  
Washington, DC 20546-0001

# **ANNOUNCEMENT OF OPPORTUNITY (AO)**

## **SCIENCE TEAM FOR THE MARS MICROPROBE**

### **1. DESCRIPTION OF OPPORTUNITY**

#### **1.1 INTRODUCTION**

This NASA Announcement of Opportunity (AO) solicits proposals for research investigations using data from the New Millennium Mars Microprobe Mission from individual investigators who wish to participate as Science Team Members. Although the primary role of the New Millennium Program is to validate new technologies by actual flight to enable future science missions, these validation flights also offer opportunities to collect valuable science data. Potential Science Team members are advised that participants in the mission must accept the risks associated with low cost, rapid development, technology validation missions that could result in changes in instrument or mission design to accommodate schedule and budget constraints.

The Mars Microprobe Mission is the second of the New Millennium Program Deep Space Missions (Deep Space 2 or DS 2) designed to enable science missions in the 21st century. The goals of the mission include both flight validation of new technologies to enable future planetary science network missions and the collection of meaningful science data. The objectives of the solicitation offered through this AO are to enhance the science data return from DS 2 and to maximize the contribution of the Mars Microprobe Mission to the future exploration and scientific understanding of Mars.

The Mars Microprobe Mission will be carried out by two identical probes to be carried as a secondary payload on the 1998 Mars Surveyor Lander Mission. Separation of the Microprobes will occur after the 1998 Lander and cruise stage separate. The microprobes will use a self-orienting, thermally advanced protective aeroshell for its single-stage passive entry, descent, and landing. The Microprobes will penetrate through the aeroshell and into the Martian surface upon impact. During penetration, each microprobe will separate into two sections, a surface (aftbody) module and a subsurface (forebody) module, which are connected via a tether. The aftbody will remain near the surface to communicate with the Mars Relay on the Mars Global Surveyor spacecraft and will provide a platform for meteorological measurements. Instruments mounted within each probe will collect data on g-forces during entry and at impact, on atmospheric pressure, on soil water content, and on soil temperature. The primary mission will last a minimum of 2 Martian days (50 hrs) and could last 30 or more days depending on battery performance.

Participation as a Mars Microprobe Science Team member is open to individuals in all categories of organizations: industry, educational institutions and other nonprofit organizations, NASA and other U.S. Government agencies, and foreign organizations. Proposals submitted are expected to be for individual investigators to participate as Science Team members and not for the complete Team.

A Proposal Information Package (PIP) provides background information and specific technical details for the DS 2 mission, which may be updated up until 2 weeks before proposals are due. This PIP is needed for preparing the proposal and is available via the World Wide Web (WWW) Universal Record Locator <<http://www.hq.nasa.gov/office/oss/>> (open "Research Opportunities" from the menu). Paper copies are available from the address given in the section "Proposal Submission Information."

#### **1.2 PROGRAM SCOPE**

This AO permits competitive selection of investigations in which the Principal Investigators will be members of the Mars Microprobe Science Team to review mission sequences; reduce, analyze,

and archive data to be collected; and publish scientific results. In addition to these responsibilities, the Science Team will be asked to evaluate performance of the instrument technologies and their potential for use on future missions. The Science Definition Team that provided recommendations on the selection of and requirements for instruments on the Mars Microprobe Mission disbanded prior to the release of this AO. The resulting instruments and their technical details are reported in the PIP.

The opportunities for science data acquisition that will be provided include the following instrument technology validations and engineering instruments to validate the microprobe design:

**Instrument Technologies:**

- 1) Subsurface soil sampling/water detection experiment
- 2) Atmospheric pressure sensor
- 3) Soil conductivity temperature sensors

**Engineering Instruments:**

- 4) Soil penetration single-axis accelerometer
- 5) Atmospheric descent single-axis accelerometer

The Science Team will be selected in early 1998, about 12 months prior to launch. Funding for this program comes from the New Millennium Mars Microprobe budget and NASA's Office of Space Science. A total of \$1.2 million is available, with \$400 K available in Fiscal Years (FY) 1998, 1999, and 2000. It is anticipated that 7-9 proposals will be selected.

### **1.3 SCHEDULE**

The Notice of Intent (NOI) to propose should be submitted by November 28, 1997, to the address given in Section 3. It should contain: name of proposer, institution, address, telephone number, title of proposal, and a brief abstract. The information in the NOI is not binding.

The proposal deadline is given in Section 3, "Proposal Submission Information." The proposals will be evaluated by a science peer review panel. Proposal selections are expected to be announced by February 1998 and expected to support research for the period from issuing of awards to the selected investigations through early 1998 to January 2001.

#### **Schedule of DS 2 Events**

##### **1997**

July	Instrument design complete
October	Instrument qualification models available for calibration

##### **1998**

January	Instrument calibration completed, hardware delivered
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##### **1999**

January 3-17	Launch window
December 3	Arrival at Mars
2 to 30+ days	Microprobe Mission duration (depends on battery performance)

##### **2000**

July	Data submitted to Planetary Data System
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### **1.4 FORMATION OF SCIENCE TEAM**

#### **Mars Microprobe Science Team**

The Mars Microprobe Science Team will provide guidance for all scientific aspects of the mission, including the operations plan and resource allocations. The Science Team will be

chaired by the Mars Microprobe Project Scientist, Dr. Suzanne Smrekar at the Jet Propulsion Laboratory, and vice-chaired by the Mars Microprobe Program Scientist, Dr. Michael Meyer at NASA Headquarters. The Science Team will work with the Project Manager to optimize the science return from the mission and to resolve operational conflicts among different experiments.

### Responsibilities of the Science Team

The Science Team plays a vital role in the DS 2 project through providing advice and contributing to the validation of new technology instrumentation. Furthermore, the Science Team will maximize the science to be gained from the mission, interact with the planetary science community, and further our understanding of Mars. Toward this end, the Science Team will:

- Replace the current Science Definition Team;
- Provide science input for mission planning prior to launch;
- Conduct additional characterization of engineering models of instruments for science data interpretation, as needed;
- Reduce and validate scientific data;
- Prepare raw and reduced data for archiving in the Planetary Data System for future use by the scientific community;
- Analyze, interpret, and publish findings in peer reviewed literature; and
- Support liaison efforts between the New Millennium DS 2 Mission and the scientific community.

All instruments will be calibrated will be completed prior to selection of the science team.

### General Rules for Data Rights, Use, and Publication

The following general rules apply to rights, use, and publication of Mars Microprobe data:

1) there is no proprietary period for any data collected by the probe or instrument; 2) much of the data will be released early in the form of Public Information Office releases and World Wide Web postings; 3) science instrument data are subject to a validation period of no more than six months from the time of acquisition to allow proper calibration, formatting, and archiving at which time they will be deposited in the Planetary Data System (PDS) and be available to the entire scientific community; 4) data deposited with the PDS will contain the appropriate calibration information and ancillary data that will be updated throughout the period of investigation; and 5) it is expected that all Science Team investigators will publish their results in a timely manner in the open scientific literature.

Conflicts and problems involving the provision and use of data will be resolved by the ScienceTeam and Project Scientist, or if necessary, by the Program Scientist.

## **2. OBJECTIVES**

### **2.1 SCIENTIFIC OBJECTIVES**

Since the Mars Microprobe is a technology-driven mission rather than a science driven mission, the following objectives are based on the anticipated science return from the selected technology validation instruments and engineering instruments. In addition, comparisons between measurements at each probe and measurements made on the Mars Surveyor 1998 lander (see PIP), when they become available, could be part of the investigations proposed.

- Primary Objectives

Determine if ice is present in the subsurface.

Measure the local atmospheric pressure.

Characterize the thermal properties of the subsurface near the forebody.

*Objectives enabled by engineering measurements:*

Measure the atmospheric density profile during entry.

Determine if layering is present in the near surface deposits.

Applicable References

The following three references provide an overview of the polar layered deposits, the dynamics of the Martian atmosphere, and recently reduced thermal inertia data, respectively:

- 1) Thomas, P., S. W. Squyres, K. Herkenhoff, A. Howard, and B. Murray, Polar deposits of Mars, in *Mars*, eds. H. H. Kieffer, B. M. Jakosky, and C. W. Snyder, and M. S. Matthews, University of Arizona Press, pp. 835-933, 1992.
- 2) Zurek, R. W., J. R. Barnes, R. M. Haberle, J. B. Pollack, J. E. Tillman, and C. B. Leovy, Dynamics of the atmosphere of Mars, in *Mars*, eds. H. H. Kieffer, B. M. Jakosky, and C. W. Snyder, and M. S. Matthews, University of Arizona Press, pp. 835-933, 1992.
- 3) Paige, D. A., and K. D. Keegan, Thermal and albedo mapping of the polar regions of Mars using Viking thermal mapper observations, 2, South polar region, *Journal of Geophysical Research*, 99: 25,993-26,014, 1994.

**2.2 INSTRUMENTS**

The instrument package for the Mars Microprobe Mission is designed to demonstrate that valid scientific measurements of both Mars atmospheric conditions and the subsurface soil characteristics can be obtained with the probe. The instrument package includes a descent accelerometer to measure atmospheric drag on the microprobe, a high-g (10-20 Kg) accelerometer to measure the deceleration at impact of the microprobe forebody in the soil, an aftbody mounted sensor to record the surface atmospheric pressure, a pair of temperature sensors to measure the rate of cooling of the soil after impact, and an experiment to collect a sample of Martian soil and test for the presence of subsurface water ice. The specific objectives of each of these instruments and a baseline for their implementation is provided in the Proposal Information Package (PIP).

Primary Instruments

Capability

Soil Sampling/Evolved Water Experiment

- sample volume: 100 ml
- minimum measurable water content in analysis chamber: 50 ppm
- accuracy: 20 ppm

(Note: only a gross measurement of the sample mass will be possible)

Atmospheric Pressure Sensor

- range: 0-25 mbar
- precision: 0.01 mbar
- accuracy: 0.03 mbar
- drift: 0.1 mbar

Soil Conductivity Temperature Sensors  
(2 sensors in nose and aft of forebody)

- operating range: -110 to 0°C
- precision: 0.02°C between 0 and -70°C
- precision: 0.01°C between -70 and -110°C
- accuracy: 0.5°C

## Secondary Instruments

Soil Impact Accelerometers

Atmospheric Deceleration Accelerometers

## Capability

- 1 axis (parallel to velocity vector)
- range: : 10-30,000 g's
- total sampling rate: 25 kHz
- precision: 10g's
- 1 axis
- range: 1-40 g's
- sampling rate: 20 Hz
- precision: 25 mg

### **3. PROPOSAL SUBMISSION INFORMATION**

#### **3.1 INFORMATION ON THIS OPPORTUNITY**

Detailed information for preparing a proposal in response to this Announcement of Opportunity is included in the following appendices. Appendix A provides general instructions and provisions relevant to submitting a proposal. Appendix B provides guidelines for preparing a proposal in response to an Announcement of Opportunity.

Note that a management plan is not required. Appendix C contains sample forms and certifications required for proposal submission. Technical information about the mission itself is contained in the Proposal Information Package (PIP). The complete AO and PIP are available electronically via the World Wide Web, on the date of issue, and can be accessed through the Office of Space Science home page at: <<http://www.hq.nasa.gov/office/oss/>>. Upon request, paper copies are also available from Jorge Scientific (address below).

Identifier: AO 97-OSS-05

Submit Proposals and Notices of Intent to: MARS MICROPROBE SCIENCE OPPORTUNITIES  
Jorge Scientific  
400 Virginia Avenue, SW, Suite 700  
Washington, DC 20024  
Phone: 202-554-2775

Notices of Intent Due: November 28, 1997 (may be submitted electronically to <[hlancast@leda.hq.nasa.gov](mailto:hlancast@leda.hq.nasa.gov)>)

Proposal Due Date: 4:30 PM EST, January 27, 1998

Number of Copies Required: 20 (including signed original)

Selecting Official: Science Program Director for Solar System Exploration,  
Office of Space Science

Additional information may be obtained from:

Dr. Michael Meyer  
Code SR  
Office of Space Science  
NASA Headquarters  
Washington, DC 20546  
phone: (202) 358-0307  
fax: (202) 358-3097  
E-mail: [mmeyer@hq.nasa.gov](mailto:mmeyer@hq.nasa.gov)

## 4. PROPOSAL EVALUATION, SELECTION, AND PREPARATION INFORMATION

### 4.1 EVALUATION CRITERIA

Five criteria for evaluation of investigations are listed below. The first three are considered primary and of equal importance while the last two criteria are secondary and of lesser importance than the first three:

1. The scientific and technological merit of the proposed investigation and its contribution to the objectives of the mission and to the fundamental understanding of Mars.
2. The proposal's relevance to the specific opportunity described in this AO, including overall balance of the Mars Microprobe Science Team in terms of the proposed scientific investigations and technical expertise.
3. Reasonableness and total amount of costs.
4. The commitment of the proposer's institution, as measured by the willingness of the institution to provide the necessary support (logistics, facilities, etc.) to ensure that the investigation can be completed satisfactorily.
5. The commitment of the proposer to education/outreach activities. Education/public outreach are now expected to be part of each flight program and research discipline. NASA strongly encourages researchers to actively engage in education/public outreach and it is suggested that the proposer may coordinate activities with existing Mars Exploration education/outreach activities.

Factors determining the scientific and technical merit of a proposal (criteria 1) will include the following, of approximately equal priority:

- A clear understanding of the technical capabilities of the instrument(s) related to the proposed investigation.
- A demonstration of the ability to relate the potential results of the experiments to both specific scientific questions for Mars and a broader understanding of Mars.
- The feasibility of the proposed investigation using the instrument(s) and the data expected to be returned from them, and a clear statement of the approach to data interpretation.
- The ability, capabilities, and commitment of the investigator to participate in instrument calibration and planning, collection, reduction, evaluation and archiving of the data to be placed in the PDS in a reasonable amount of time (nominally six months or less). A description of the specific data products that will be produced by the investigation should be included.

### 4.2 SPECIAL CONDITIONS ON PROPOSED INVESTIGATIONS

#### Proposer Eligibility

Proposals for the New Millennium Mars Microprobe Science Team requesting funding will be entertained from any U.S. organization employing the Principal Investigator or any nonaffiliated member of the U.S. scientific community. Proposals from non-U.S. entities are also eligible to propose, but such investigations, if selected, will be subject to established NASA procedures for such international agreements, including their implementation on a no exchange of funds basis. Details on submission of foreign proposals is provided in a later section "Guidelines for non-U.S. Participation."

## Exclusions on Proposals

Proposals falling into one or more of the categories listed below will be considered as nonresponsive to this AO and will be **excluded** from further evaluation.

1. Proposals involving the provision of hardware or modification of existing hardware. (Final designs for both the probe and the instruments will be completed by the time the Science Team is selected through this AO and no major additional modifications will be considered.)
2. Proposals involving only the use of data.

(It is intended that all Science Team members will be functioning members of the investigation team and will have specific responsibilities involving data collection and preparation of the data for archival in the PDS. Individuals seeking only data will be able to obtain them subsequently from the PDS.)

## Funding Levels and Budget Items

Science Team investigations to be proposed are to represent research by **individual scientists** from their respective institutions (proposals involving groups of scientists will only consider one person as a Team member). A limited number of subordinate individuals, particularly students, may be considered if their inclusion is appropriate to the investigation. Proposed budgets should include only major items such as proposer's salary, necessary supplies, travel, publication costs, etc. No major hardware items, such as workstations, will be provided.

Proposals should specify periods of performance extending from the expected selection date through January 2001. All proposals must include separate budgets for each year. Awards will be made annually upon receipt and acceptance of a brief progress report that demonstrates adequate progress was achieved from the previous year's award.

**NOTE:** NASA Civil Service labor and supporting NASA Center infrastructure must be costed on a full cost accounting basis. If NASA guidance for full cost accounting has not been fully developed by the closing date for proposal submission, NASA Centers may submit full cost proposals based on the instructions in the NASA Financial Management Manual, Section 9091-5, Cost Principles for Reimbursable Agreements. If any NASA costs are to be considered as contributed costs, the contributed item(s) must be separately funded by an effort complimentary to the proposed investigation, and the funding sources must be identified. Other Federal Government elements of proposals must follow their agency cost accounting standards for full cost. If no standards are in effect, the proposers must then follow the Managerial Cost Accounting Standards for the Federal Government as recommended by the Federal Accounting Standards Advisory Board.

## **4.3 EVALUATION AND SELECTION PROCEDURES**

### Evaluation Process

All valid proposals received in response to this AO will be evaluated in accordance with the provisions of NASA Federal Acquisition Regulations (FAR) Supplement 1872.0 (Acquisition of Investigations). All proposals will be subjected to a preliminary screening to determine their suitability and responsiveness to the AO. Proposals that are not responsive to the intent of the AO will be handled as technical correspondence and returned to the proposer. Those proposals that are responsive to the AO will be assessed by reviewers who are scientific and technical peers of the proposers to determine the scientific and technical merit of each proposal, expressed in terms of its strengths and weaknesses.

## Categorization Process

After these evaluations, an Ad Hoc Categorization Subcommittee of the Space Science Steering Committee (SScSC; see below), consisting of U.S. civil servants, will consider the totality of all evaluations, including additional information regarding overall funding, in order to categorize the proposals according to the following definitions

Category I: Well-conceived and scientifically and technically sound investigations pertinent to the goals of the program and the Announcement's objectives and offered by a competent investigator from an institution capable of supplying the necessary support to ensure that the investigation can be delivered on time and within budget.

Category II: Well-conceived and scientifically and technically sound investigations which are recommended for acceptance, but at a lower priority than Category I.

Category III: Scientifically and technically sound investigations which require further development. (does not apply to this AO)

Category IV: Proposed investigations which are recommended for rejection for this particular opportunity, for scientific, technical, cost, or other reasons.

## Selection Process

Following the evaluations described above, the NASA Program Office (Research Program Management Division, Office of Space Science) will develop a selection recommendation. This recommendation and all the peer review and categorization materials on all proposals will be submitted to the Space Science Steering Committee for review. Selection of investigations for this AO has been delegated by the Associate Administrator for Space Science to the Acting Science Program Director for Solar System Exploration.

## **4.4 PROPOSAL GUIDELINES**

General provisions and information that must be provided with each proposal is described in Appendix A "General Instructions and Provisions" and Appendix B "Guidelines for Proposal Preparation." In addition, the material immediately below supplements the requirements given in Appendices A and B, by providing additional details on the required format and contents for all proposals submitted in response to this AO. Where this material is different from that in Appendices A and B, the material below takes precedence.

### Notices of Intent to Propose

Notices of intent should indicate the title of the proposal, a list of participants, and a short description of the investigation. This information will help the Program Office plan for the efficient receipt, management, and review of proposals. Providing this information does not imply any commitment to submit a proposal, nor is the information contained therein binding on the proposer.

### Proposal Format and Content

The format and content of the proposal are described in Appendix B and amended by the following.

Each proposal must include the following initial standard pages (examples are included in Appendix C): 1) a cover page containing the proposal title and reference to the Mars Microprobe Science Team AO; 2) the proposer's name, address, telephone and fax numbers, E-mail address, and institutional affiliation, and essential signatures; 3) names and addresses of other

essential personnel; 4) a proposal summary providing a brief description of the proposed investigation; 5) a summary budget page and a budget page for each year. These standard pages should be followed by a concise description of the proposed investigation, not to exceed 10 single-spaced typewritten pages in length in type no smaller than 12 point. This statement should specifically include the following information:

1. a description of the proposed investigation, its scientific and technical justification, and the methods by which it will be carried out;
2. specific and clear identification of the detailed data types needed to carry out the investigation;
3. a justification of the proposed role as a Science Team member during the instrument characterization phase (where appropriate), a plan for data validation, what data products will be produced and archived, and why the proposed investigation cannot be carried out simply through postmission access to the data;
4. existing facilities that are available to support the proposed research (no hardware acquisition will be allowed);

Not included in the page count but needed to complete the proposal are:

1. a detailed budget for each year of the investigation for which funding is requested (e.g. Appendix C) and a justification for the proposed budget;
2. vitae of Principal Investigator and Co-Investigators (if any), including relevant publications list;
3. a list of the Principal Investigator's current and pending support;
4. and the three institutional certifications (see Appendix C).

#### **4.5 PROPOSAL SUBMISSION**

Twenty copies (including signed original) of each proposal should be sent to:

MARS MICROPROBE SCIENCE OPPORTUNITIES  
Jorge Scientific  
400 Virginia Avenue, SW, Suite 700  
Washington, DC 20024  
phone 202-554-2775

The original of the proposal must carry the original signatures of the proposer and institutional official authorized to commit the institution to the proposed investigation. Faxed or E-mailed proposals are not acceptable.

#### **4.6 GUIDELINES FOR NON-U.S. PARTICIPATION**

NASA welcomes proposals from outside the U.S., although non-U.S. institutions are not eligible for funding from NASA. Proposals from non-U.S. entities should not include a cost plan. Proposals from outside the U.S., and U.S. proposals that include non-U.S. participation, must be endorsed by the respective government agency or funding/sponsoring institution in that country from which the non-U. S. participant is proposing. Such endorsement should indicate that the proposal merits careful consideration by NASA, and, if the proposal is selected, sufficient funds will be made available to undertake the activity as proposed.

In addition to sending the required number of copies of the proposals to the designated address, one copy of the proposal along with a Letter of Endorsement from the sponsoring non-U.S. agency must be forwarded to:

Ms. Bettye Jones  
(AO 97-OSS-05)  
Space Science and Aeronautics Division  
Code IS  
NASA Headquarters  
Washington, DC 20546-0001  
USA

All proposals must be typewritten in English. All non-U.S. proposals will undergo the same evaluation and selection process as those originating in the U.S. All proposals must be received before the established closing date. Sponsoring non-U.S. agencies may, in exceptional situations, forward a proposal without endorsement to the above address, if endorsement is not possible before the announced closing date. In such cases, however, NASA's International Science and Aeronautics Division should be advised when a decision on endorsement can be expected.

Successful and unsuccessful proposers will be contacted directly by the NASA Research Program Management Division, Office of Space Science. Copies of these letters will be sent to the sponsoring government agency. Should a non-U.S. proposal or a U.S. proposal with non-U.S. participation be selected, NASA's International Science and Aeronautics Division will arrange with the non-U.S. sponsoring agency for the proposed participation on a no-exchange-of-funds basis, in which NASA and the non-U.S. sponsoring agency will each bear the cost of discharging their respective responsibilities. Depending on the nature and extent of the proposed cooperation, these arrangements may entail:

1. a letter of notification by NASA; and
2. an exchange of letters between NASA and the sponsoring governmental agency, or
3. a formal Agency-to-Agency Memorandum of Understanding (MOU)

## **5. CONCLUSION**

NASA's New Millennium Program will enable 21st-century science missions through the identification, development, and flight-validation of key advanced technologies. These critical technologies will be validated so that future science missions can take advantage of them without assuming the risks inherent in their first use. The Mars Microprobe Mission is the second New Millennium Deep Space Mission and broad based participation in this endeavor will enable progress in technology validation and in our understanding of Mars. Your participation in this important activity is invited and encouraged.

Carl B. Pilcher  
Acting Science Program Director  
for Solar System Exploration

## **LIST OF APPENDICES**

This entire document and the PIP are available electronically via the World Wide Web and can be accessed through the Office of Space Science home page at: <<http://www.hq.nasa.gov/office/oss/>>.

Appendix A:           General Instructions and Provisions

Appendix B:           Guidelines for Proposal Submission

Appendix C:           Format and Certification Forms

## **APPENDIX A**

### **GENERAL INSTRUCTIONS AND PROVISIONS**

#### **I. Instrumentation and/or Ground Equipment**

By submitting a proposal, the investigator and institution agree that NASA has the option to accept all or part of the offeror's plan to provide the instrumentation or ground support equipment required for the investigation, or NASA may furnish or obtain such instrumentation or equipment from any other source as determined by the selecting official. In addition, NASA reserves the right to require use, by the selected investigator, of Government instrumentation or property that becomes available, with or without modification, that will meet the investigative objectives.

#### **II. Tentative Selections, Phased Development, Partial Selections, and Participation with Others**

By submitting a proposal, the investigator and the organization agree that NASA has the option to make a tentative selection pending a successful feasibility or definition effort. NASA has the option to contract in phases for a proposed experiment, and to discontinue the investigative effort at the completion of any phase. The investigator should also understand that NASA may desire to select only a portion of the proposed investigation and/or that NASA may desire the individual's participation with other investigators in a joint investigation, in which case the investigator will be given the opportunity to accept or decline such partial acceptance or participation with other investigators prior to a selection. Where participation with other investigators as a team is agreed to, one of the team members will normally be designated as its team leader or contact point.

#### **III. Selection Without Discussion**

The Government reserves the right to reject any or all proposals received in response to this AO when such action shall be considered in the best interest of the Government. Notice is also given of the possibility that any selection may be made without discussion (other than discussions conducted for the purpose of minor clarification). It is, therefore, emphasized that all proposals should be submitted initially on the most favorable terms that the offeror can submit.

#### **IV. Foreign Proposals**

See Appendix B, Section II, paragraph 3.

#### **V. Treatment of Proposal Data**

It is NASA policy to use information contained in proposals and quotations for evaluation purposes only. While this policy does not require that the proposal or quotation bear a restrictive notice, offerors or quoters should place the following notice on the title page of the proposal or quotation and specify the information, subject to the notice, by inserting appropriate identification, such as page numbers, in the notice. Information (data) contained in proposals and quotations will be protected to the extent permitted by law, but NASA assumes no liability for use and disclosure of information not made subject to the notice.

#### **RESTRICTION ON USE AND DISCLOSURE OF PROPOSAL AND QUOTATION INFORMATION (DATA)**

The information (data) contained in [insert page numbers or other identification] of this proposal or quotation constitutes a trade secret and/or information that is

commercial or financial and confidential or privileged. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offeror, be used or disclosed for other than evaluation purposes; provided, however, that in the event a contract is awarded on the basis of this proposal or quotation the Government shall have the right to use and disclose this information (data) to the extent provided in the contract. This restriction does not limit the Government's right to use or disclose this information (data) if obtained from another source without restriction.

#### **VI. Status of Cost Proposals (U.S. Proposals Only)**

The investigator's institution agrees that the cost proposal is for proposal evaluation and selection purposes, and, that following selection and during negotiations leading to a definitive contract, the institution will be required to resubmit or execute a Standard Form (SF) Form 1411 "Contract Pricing Proposal Cover Sheet" and certifications and representations required by law and regulation.

#### **VII. Late Proposals**

The Government reserves the right to consider proposals, or modifications thereof, received after the date indicated, should such action be in the interest of the Government.

#### **VIII. Source of Space Transportation System Investigations**

Investigators are advised that candidate investigations for Space Transportation System (STS) missions can come from many sources.

#### **IX. Disclosure of Proposals Outside Government**

NASA may find it necessary to obtain proposal evaluation assistance outside the Government. Where NASA determines that it is necessary to disclose a proposal outside the Government for evaluation purposes, arrangements will be made with the evaluator for appropriate handling of the proposal information. Therefore, by submitting a proposal, the investigator and institution agree that NASA may have the proposal evaluated outside the Government. If the investigator or institution desire to preclude NASA from using an outside evaluation, the investigator or institution should so indicate on the cover. However, notice is given that if NASA is precluded from using outside evaluation, it may be unable to consider the proposal.

#### **X. Equal Opportunity (U.S. Proposals Only)**

By submitting a proposal, the investigator and institution agree to accept the following clause in any resulting contract:

#### **EQUAL OPPORTUNITY**

During the performance of this contract, the Contractor agrees as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.
2. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. This shall include, but not be limited to, (a) employment, (b) upgrading, (c) demotion, (d) transfer, (e) recruitment or recruitment advertising, (f) layoff or termination, (g) rates of pay or other forms of compensation, and (h) selection for training, including apprenticeship.
3. The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.

4. The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.
5. The Contractor shall send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding the notice to be provided by the Contracting Officer, advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.
6. The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.
7. The Contractor shall furnish to the contracting agency all information required by Executive Order 11246, as amended, and by the rules, regulations, and orders of the Secretary of Labor. Standard Form 100 (EEO-1), or any successor form, is the prescribed form to be filed within 30 days following the award, unless filed within 12 months preceding the date of award.
8. The Contractor shall permit access to its books, records, and accounts by the contracting agency or the Office of Federal Contract Compliance Programs (OFCCP) for the purposes of investigation to ascertain the Contractor's compliance with the applicable rules, regulations, and orders.
9. If the OFCCP determines that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, the contract may be canceled, terminated, or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts, under the procedures authorized in Executive order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended, the rules, regulations, and orders of the Secretary of Labor, or as otherwise provided by law.
10. The Contractor shall include the terms and conditions of subparagraph 1 through 9 of this clause in every subcontract or purchase order that is not exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each Subcontractor or vendor.
11. The Contractor shall take such action with respect to any subcontract or purchase order as the contracting agency may direct as means of enforcing these terms and conditions, including sanctions for non-compliance; provided, that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

## **XI. Patent Rights**

1. For any contract resulting from this solicitation awarded to other than a small business firm or nonprofit organization, the clause at NFS 1852.227-70, "New Technology," shall apply. Such contractors may, in advance of contract, request waiver of rights as set forth in the provision at NFS 1852.227-71, "Requests for Waiver of Rights to Inventions."
2. For any contract resulting from this solicitation awarded to a small business firm or nonprofit organization, the clause at FAR 52.227-11, "Patent Rights--Retention by the Contractor (Short Form)" (as modified by NFS 1852.227-11), shall apply.

## APPENDIX B

### GUIDELINES FOR PROPOSAL PREPARATION

The following guidelines apply to the preparation of proposals in response to an AO. The material is a guide for the proposer and not intended to be encompassing or directly applicable to the various types of proposals which can be submitted. The proposer should provide information relative to those items applicable or as required by the AO.

#### I. Cover Letter

A letter or cover page should be forwarded with the proposal signed by the investigator and an official by title of the investigator's organization who is authorized to commit the organization responsible for the proposal.

#### II. Table of Contents

The proposal should contain a table of contents.

#### III. Identifying Information

The proposal should contain a short descriptive title for the investigation, the names of all investigators, the name of the organization or institution and the full name, address, and telephone number of the Principal Investigator.

### SECTION 1 -- INVESTIGATION AND TECHNICAL PLAN

#### 1. Investigation and Technical Plan

The investigation and technical plan generally will contain the following:

**a. Summary.** A concise statement about the investigation, its conduct, and the anticipated results.

**b. Objective and Significant Aspects.** A brief definition of the objectives, their value, and their relationships to past, current, and future efforts. The history and basis for the proposal and a demonstration of the need for such an investigation. A statement of present development in the discipline field.

**c. Investigation Approach**

- 1) Fully describe the concept of the investigation.
- 2) Detail the method and procedures for carrying out the investigation.

#### 2. Data Reduction and Analysis

A discussion of the data reduction and analysis plan including the method and format. A section of the plan should include a schedule for the submission of reduced data to the Planetary Data System.

### SECTION 2 -- MANAGEMENT PLAN AND COST PLAN

#### A. Management Plan

The management plan should summarize the management approach and the facilities and equipment required. Additional guidelines applicable to non-U.S. proposers contained herein:

## 1. Management

a. The management plan set forth gives the approach for managing the work, the recognition of essential management functions, and the overall integration of these functions.

b. The management plan gives insight into the organization proposed for the work, including the internal operation and lines of authority with delegations, together with internal interfaces and relationships with the NASA major subcontractors and associated investigators. Likewise, the management plan usually reflects various schedules necessary for the logical and timely pursuit of the work, accompanied by a description of the investigator's work plan and the responsibilities of the support personnel.

## 2. Facilities and Equipment

All major facilities, laboratory equipment, and ground-support equipment (GSE) (including those of the investigator's proposed contractors and those of NASA and other U.S. Government agencies) essential to the experiment in terms of its system and subsystems are to be indicated, distinguishing insofar as possible between those already in existence and those that will be developed in order to execute the investigation. The outline of new facilities and equipment should also indicate the lead time involved and the planned schedule for construction, modification, and/or acquisition of the facilities.

## 3. Additional Guidelines Applicable to Non-U.S. Proposers Only

The following guidelines are established for non-U.S. responses to NASA's AO. Unless otherwise indicated in a specific announcement, these guidelines indicate the appropriate measures to be taken by non-U.S. proposers, prospective non-U.S. sponsoring agencies, and NASA leading to the selection of a proposal and execution of appropriate arrangements. They include the following:

a. Where a "Notice of Intent" to propose is requested, prospective non-U.S. proposers should write directly to the NASA official designated in the AO and send a copy of this letter to the Space Science and Aeronautics Division, Code IS, NASA Headquarters, Washington, DC 20546-0001, U.S.A.

b. Unless otherwise indicated in the AO, proposals will be submitted in accordance with this Appendix excluding cost plans. Proposals should be typewritten and written in English.

c. Persons planning to submit a proposal should arrange with an appropriate non-U.S. governmental agency for a review and endorsement of the proposed activity. Such endorsement by a non-U.S. organization indicates that the proposal merits careful consideration by NASA and that, if the proposal is selected, sufficient funds will be available to undertake the activity envisioned.

d. An endorsed original of the proposal and letters of endorsement from the non-U.S. governmental agency should be sent to:

Ms. Bettye Jones  
(AO 97-OSS-05)  
Space Science and Aeronautics Division  
Code IS  
NASA Headquarters  
Washington, DC 20546-0001  
USA

These documents must arrive before the deadline established for each AO.

e. Those proposals received after the closing date will be treated in accordance with NASA's provisions for late proposals. Sponsoring non-U.S. government agencies may, in exceptional situations, forward a proposal directly to the above address if review and

endorsement is not possible before the announced closing date. In such cases, NASA should be advised when a decision on endorsement can be expected.

f. Successful and unsuccessful proposers will be contacted directly by the NASA Program Office coordinating the AO. Copies of these letters will be sent to the sponsoring Government agency.

g. NASA's Space Science and Aeronautics Division will then begin making the arrangements to provide for the selectee's participation in the appropriate NASA program. Depending on the nature and extent of the proposed cooperation, these arrangements may entail:

(1) A letter of notification by NASA.

(2) An exchange of letters between NASA and the sponsoring non-U.S. governmental agency.

(3) An agreement or Memorandum of Understanding between NASA and the sponsoring non-U.S. governmental agency.

## **B. Cost Plan (U.S. Investigations Only)**

The cost plan should summarize the total investigation cost by major categories of cost as well as by function.

1. The categories of cost should include the following:

a. **Direct Labor**--List by labor category, with labor hours and rates for each. Provide actual salaries of all personnel and the percentage of time each individual will devote to the effort.

b. **Overhead**--Include indirect costs. Usually this is in the form of a percentage of the direct labor costs.

c. **Materials**--This should give the total cost of the bill of materials including estimated cost of each major item. Include lead time of critical items,

d. **Subcontracts**--List those over \$25,000, specify the vendor and the basis for estimated costs. Include any baseline or supporting studies.

e. **Special Equipment**--Include a list of special equipment with lead and/or development time.

f. **Travel**--List estimated number of trips, destinations, duration, purpose, number of travelers, and anticipated dates.

g. **Other Costs**--Costs not covered elsewhere.

h. **General and Administrative Expense**--This includes the expenses of the institution's general and executive offices and other miscellaneous expenses related to the overall business.

i. **Fee** (if applicable).

2. Separate schedules, in the above format, should be attached to show total cost allocable to the following:

a. Principal Investigator and other personnel costs.

b. Data reduction and analysis including the amount and cost of computer time.

3. If the effort is sufficiently known and defined, a funding obligation plan should provide the proposed funding requirements of the investigations by quarter and/or annum keyed to the work schedule.

## Appendix C

### PROPOSAL FORMS KIT

1. PROPOSAL COVER SHEET - FORM A
2. ABSTRACT FORM - FORM B
3. BUDGET SUMMARY FORM - FORM C
  - In addition to this form, an organization may include its own budget forms.
4. BUDGET PER YEAR FORM - FORM D
  - In addition to this form, an organization may include its own budget forms.
5. CURRENT AND PENDING SUPPORT FORM - FORM E
6. CERTIFICATION FOR DRUG-FREE WORKPLACE - FORM F
  - This form requires a signature.
7. CERTIFICATION FOR DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITIES - FORM G
  - This form requires a signature.
8. CERTIFICATION REGARDING LOBBYING (if >\$100,000) - FORM H
  - This form requires a signature.
9. MAILING FORM UPDATE

## PROPOSAL COVER PAGE

AO#:	AO Title:
Program:	

Principal Investigator			
<i>Title</i>	<i>First Name</i>	<i>Middle Name</i>	<i>Last Name</i>
Department			
Company/Institution			
Street Address		City/Town	
State	Zip/Postal	Country	
Telephone	Fax	E-Mail Address	
Principal Investigator's Signature			Date

Proposal Title
----------------

Co-Investigator(s) Name	Institution	E-mail

### Institutional Endorsement

Name of Authorizing Official	
Title	
Institution	
Signature	Date

### Budget Summary

	Year 1	Year 2	Year 3	Total Funding
Amt. Requested				

# ABSTRACT

Principal Investigator			
<i>Title</i>	<i>First Name</i>	<i>Middle Name</i>	<i>Last Name</i>
Proposal Title			



## Specific Costs

1. Direct Labor (salaries, wages, and fringe benefits). Enclosures should list number and titles of personnel, amount of time devoted to the grant, and rates of pay.
2. Other Direct Costs:
  - a. Subcontracts - Enclosures should describe the work to be subcontracted, estimated amount, recipient (if known), and the reason for subcontracting this effort.
  - b. Consultants - Identify consultants to be used, why they are necessary, time to be spent on the project, and rates of pay.
  - c. Equipment - List separately and explain the need for items of equipment exceeding \$1,000. Describe the basis for the estimated cost.
  - d. Supplies - Provide general categories of needed supplies, the methods of acquisition, estimated cost, and the basis for the estimate.
  - e. Travel - List the proposed trips individually, describe their purpose in relation to the grant, provide dates and destinations where known, and explain how the cost for each was derived.
  - f. Other - Enter the total of any other direct costs not covered by 2.a. through 2.e. Enclose an itemized list explaining the need for each item and the basis for the estimate.
3. Indirect Costs - Identify indirect cost rate(s) and base(s) as approved by the cognizant Federal agency, including the effective period of the rate. If unapproved rates are used, explain why and include a computational basis for the indirect expense pool and corresponding allocation base for each rate.
4. Other Applicable Costs - Enter the total of any other applicable costs not covered by 1. through 3. Enclose an itemized list explaining the need for each item and the basis for the estimate.
5. Subtotal - Estimated Costs - Enter the sum of items 1., 2.a., through 2.f., 3., and 4.
6. Less Proposed Cost Sharing (if any) - Enter the amount proposed, if any. If cost sharing is based on specific cost items, identify each item and amount in enclosures.
7. Less Carryover Funds (if any) - Enter the dollar amount of any funds that are expected to be available for carryover from the prior budget period.
8. Total Estimated Costs - Enter the total after subtracting items 6. and 7. from item 5.



**LIST CURRENT AND PENDING RESEARCH SUPPORT FROM ALL OTHER SOURCES**

Include all current research support for all other sources. Also include the proposed project and all other research requiring a part of the PI's time. State the number of person months regardless of the source of the support.

Name of Principal Investigator \_\_\_\_\_

A. Current Support

- 1. Source of Support \_\_\_\_\_
- 2. Project Title \_\_\_\_\_
- 3. Award Amount \_\_\_\_\_
- 4. Period of Award \_\_\_\_\_
- 5. Person-Months \_\_\_\_\_

B. Pending Proposals (including supplement applications)

- 1. Source of Support \_\_\_\_\_
- 2. Project Title \_\_\_\_\_
- 3. Award Amount \_\_\_\_\_
- 4. Period of Award \_\_\_\_\_
- 5. Person-Months \_\_\_\_\_

**Other Agencies to which this proposal, or parts thereof, has been submitted:**

\_\_\_\_\_

**Duplicate this page as many times as needed to provide a complete list.**

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**Certification Regarding Drug-Free Workplace Requirements  
Grantees Other Than Individuals**

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This certification is required by the regulations implementing the Drug-Free Workplace Act of 1988, 34 CFR Part 85, Subpart F. The regulations, published in the January 31, 1989 Federal Register, require certification by grantees, prior to award, that they will maintain a drug-free workplace. The certification set out below is a material representation of fact upon which reliance will be placed when the agency determines to award the grant. False certification or violation of the certification shall be grounds for suspension of payments, suspension or termination of grants, or government wide suspension or debarment (see 34 CFR Part 85, Sections 85.615 and 85.620).

This grantee certifies that it will provide a drug-free workplace by:

- (a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;
- (b) Establishing a drug-free awareness program to inform employees about -
  - The dangers of drug abuse in the workplace;
  - The grantee's policy of maintaining a drug-free workplace;
  - Any available drug counseling, rehabilitation, and employee assistance programs, and
  - The penalties that may be imposed upon employees for drug abuse violations in the workplace;
- (c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a);
- (d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will -
  - Abide by the terms of the statement; and
  - Notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five days after such conviction;
- (e) Notifying the agency within ten days after receiving notice under subparagraph (d)(2) from an employee or otherwise receiving actual notice of such conviction;
- (f) Taking one of the following actions, within 30 days of receiving notice under subparagraph (d)(2) , with respect to any employee who is so convicted -
  - Taking appropriate personnel action against such an employee, up to and including termination; or
  - Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;
- (g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraph (a), (b), (c), (e), and (f).

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Organization Name

PR/Award Number or Proposal Name

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Name and Title of Authorized Representative

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Signature

Date

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**Certification Regarding  
Debarment, Suspension, and Other Responsibility Matters  
Primary Covered Transactions**

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This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 34 CFR Part 85, Section 85.510, Participant's responsibilities. The regulations were published as Part VII of the May 26, 1988 Federal Register (pages 19160-19211).

- (1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:
  - (a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
  - (b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
  - (c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and
  - (d) Have not within three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.
- (2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

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Organization Name

PR/Award Number or Proposal Name

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Name and Title of Authorized Representative

---

Signature

Date

---

**Certification Regarding Lobbying**

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Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000, and not more than \$100,000 for each such failure.

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Organization Name

PR/Award Number or Proposal Name

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Name and Title of Authorized Representative

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Signature

Date