National Aeronautics
and Space Administration

March 27, 1995
AO-95-OSS-02

Announcement of Opportunity

Medium-class Explorer Missions

(MIDEX)

Notice of Intent Due: May 10, 1995 **Proposals Due: June 27, 1995**

I. DESCRIPTION OF THE OPPORTUNITY

A. General Provisions

The National Aeronautics and Space Administration (NASA) announces the opportunity to conduct space science investigations in the Explorer Program using scientific payloads on spacecraft launched using NASA's Med-Lite expendable launch vehicles. The Office of Space Science (OSS) is initiating a series of medium-class scientific missions that can be launched at a rate of one mission per year. These missions are intended to provide rapid execution of scientific investigations, with no more than 3 years elapsing from the start of a mission's design and development phase until its launch. Mission operations are expected to be completed within 2 years.

This Announcement of Opportunity (AO) invites proposals for two Medium-class Explorer (MIDEX) missions. The opportunity is restricted to the scientific disciplines that are listed in Section II. This solicitation is open to all categories of organizations: educational institutions, industry, nonprofit institutions, NASA Field Centers, and other governmental agencies, as well as non-U.S. research institutions.

For this solicitation, NASA intends to select and confirm two missions, one that can be launched in 1999 and the other in 2000. NASA intends to solicit MIDEX investigations every 2 years beginning with this AO and to select and confirm two missions for flight from each AO.

Total cost for definition and development of each mission through launch plus 30 days, excluding the launch vehicle and mission operations and data analysis (MO&DA) costs following the first 30 days in orbit, is not to exceed $70M in FY 1994 dollars. Missions are expected to be ready for launch after completing a 10 month (or less) definition and subsequent 3 year (or less) development period after selection through this AO.

The MIDEX program seeks to produce missions with the highest possible science value per unit cost. Investigations proposed at or near the $70M cost cap will be selected if the science is compelling. However, a balance will be sought between lower and higher cost missions that will allow a launch approximately every 12 months within the MIDEX funding profile.

In initiating the MIDEX program, NASA intends to capitalize on the project management and technical expertise at the NASA Goddard Space Flight Center (GSFC) and the investment in the design and development of small spacecraft by industry and by GSFC. Consequently, in response to this AO, NASA anticipates that one of the selected investigations will use a GSFC-developed spacecraft and the other will utilize a spacecraft procured from industry. Proposers have two basic options for the spacecraft component of their mission:

- NASA-Provided Spacecraft

  An investigator may submit a proposal to provide a scientific investigation and an instrument , and propose to utilize a spacecraft provided by NASA. Within 1 month of selection of an investigation, NASA will examine the merits, feasibility, and cost effectiveness of using a GSFC-developed spacecraft or a spacecraft procured from industry. For any mission selected by NASA to use a spacecraft procured from industry, GSFC, with the participation of the investigator, will select and contract for the spacecraft/mission definition, design, and development. Guidelines for this approach are given in Appendix F.

- PI-Mode

  The Principal Investigator (PI) takes full responsibility for all aspects of the mission, including the instrument and spacecraft definition, development, integration, and test; ground system, science operations, mission operations, and data analysis. The PI may elect to use a NASA Center or a Federally Funded Research and Development Center (FFRDC) that he/she selects, to assist in discharging his/her responsibility for managing the mission. It is NASA's intention, through this mode, to provide qualified proposers with the maximum flexibility to conduct their investigations consistent with NASA's responsibility for managing the MIDEX program. In this case, GSFC will provide the minimum necessary oversight needed to fulfill NASA's obligations to the taxpayer. Such proposals are required to include compelling programmatic rationale, including demonstrated capability for managing flight programs on this scale, technical justification, and detailed management plans for carrying out the investigation using this approach. Guidelines for this approach are given in Appendix H.

For investigations wishing to use a spacecraft provided by NASA, the costs for the definition and development of the instrument and science operations and preparations through launch plus 30 days must not exceed $40M in FY 1994 dollars, which must include a realistic budget reserve, with a minimum of 15 percent, depending on the instrument complexity, new technology, and maturity. Guidelines for allocating capabilities and proposal costs between the instrument and the NASA-provided spacecraft are given in Appendix F.

Investigations using a spacecraft provided and funded by a non-NASA partner will also be considered. In this case, GSFC will provide the minimum necessary oversight of the spacecraft development to ensure safety and proper preparation for launch. For missions with significant contributions by non-U.S. or domestic partners, the total mission cost, including the U.S. dollar value of the contribution, but excluding launch vehicle and MO&DA costs, shall not exceed $70M (FY 1994 dollars) including a minimum 15 percent budget reserve.

GSFC will tailor the management and administration of the contracts under any of the above approaches to ensure a cost effective team approach, while meeting NASA's obligations to the taxpayer.

A final selection under this AO will be made for definition studies with subsequent potential confirmation for development and flight. It is the intent of this AO to solicit missions and attendant investigations that will be sufficiently mature scientifically and technically to proceed directly into the hardware design and development phase following a 10-month (or less) mission-definition phase. However, assessment of the full impact of technical constraints on small satellite missions can only come from a thorough review of requirements and an analysis of conceptual designs. NASA, therefore, requires the successful completion of mission definition activities before investigations selected under this AO can be confirmed for development and flight by the NASA Associate Administrator for Space Science.

Effective management is included among the selection criteria in order to ensure that the Principal Investigator has the means to meet the requirement of containing the cost and meeting the schedule of these missions. The definition phase will conclude with delivery of a detailed development plan and a cost proposal for mission development and operations. During the definition phase, NASA will reevaluate the scientific, technical, and cost status of the investigation before determining whether to confirm the mission for development.

B. Selection of Primary and Alternate Missions

In order to ensure that the vitality and opportunity of the MIDEX program is not threatened by difficulties uncovered during definition, NASA intends to ultimately select more missions through this AO than it will confirm for development and flight. Two primary missions will be selected and funded for definition. Upon successful completion of a confirmation review to be conducted during the definition phase, these missions will be approved for development and eventual flight. Two missions will be selected as alternates through this AO but will not undergo definition unless one of the primary missions fails to be confirmed. In this event, an alternate would be selected based upon programmatic considerations and would proceed through definition and, if confirmed, replace the unconfirmed primary mission in the MIDEX mission queue for development and eventual flight. Only those investigations confirmed for development will continue within the Explorer Program after the end of the definition phase. Missions which are not confirmed will not receive additional Explorer funding and will not be considered for development or flight through this AO, but can repropose to future opportunities.

If an investigation is confirmed for development following the definition phase, the investigator is expected to lead the preparation of flight scientific instrumentation, support instrument integration into the spacecraft, support launch operations, and lead the preparations for acquisition of flight data, its analysis, the publication of results from the mission, and the placement of mission data into the appropriate NASA data archive. In the PI-Mode, the investigator will also lead the development of the spacecraft, lead the preparations for launch and early orbit operations, and lead the preparations for mission operations. Proposers should note that, typically, scientific instrumentation should be delivered, fully qualified, approximately 10 months before launch.

Of the two primary investigations selected through this AO, one will proceed directly into mission definition with confirmation anticipated within 1 year of selection. The other primary investigation will enter an extended definition phase with anticipated funding not to exceed $500,000 for the first year. After the first year, the second investigation will proceed into full mission definition with confirmation anticipated within 2 years of selection under this AO. The two investigations selected as alternates each will be provided with limited funding for 1 or 2 years to conduct preparatory definition studies and to maintain a nucleus of the investigation team. If, during the course of definition or confirmation, either of the primary investigations should prove, in NASA's judgment, to be technically or programmatically infeasible, then the appropriate alternate selection will proceed into mission definition.

The full mission definition phase will last up to 10 months with costs based on amounts included in the proposals. Responses to this AO should include costs and approaches for the three possibilities of proceeding immediately into a full definition phase, entering an extended definition for 1 year followed by a full definition phase, or entering a very low funding level as an alternate. Following confirmation, a 3-month bridge phase will provide for initial development of the investigation while the options for the development and MO&DA phases of the contract are negotiated. The cost of the bridge phase will also be based on proposed amounts included in the response to this AO.

C. Two-Step Proposal and Evaluation Process

NASA is aware of the burdens placed upon proposers and their institutions and other participating organizations in responding with detailed proposals to open Announcements of Opportunity. In response to expressed concerns, NASA plans to conduct a two-step negotiated procurement process for this AO.

Proposers responding to this AO should first submit a Step-One Proposal, with detailed emphasis on the planned science investigation and instrumentation required. This proposal should include:

- detailed discussion of the planned scientific investigation, including plans for the analysis of the data
- description of the technical approach, including new technology, if any
- an outline of the cost and management plan

Further information regarding the preparation of Step-One Proposals is provided in Appendices F and H.

The Step-One Proposals will be evaluated based on the criteria given in Section VII.B below. Based on this evaluation, NASA will select a number of investigations for further consideration. These investigations will be provided the opportunity to submit additional information (Step-Two Proposal), including a detailed technical plan, detailed cost plan, and a detailed management plan, as described in Appendices F and H. This Step-Two Proposal will be evaluated in accordance with the evaluation criteria listed in Section VII.C below. Based upon this evaluation, NASA plans to select two investigations for definition and two as alternates as described earlier.

Because cost is a key selection criterion and limited cost detail will be available in the Step-One Proposal, initial evaluations and selections using the Step-One Proposals will be made assuming that the proposed costing is a not-to-exceed value. If at any time during selection, confirmation, or development, the anticipated total cost of the mission is determined to exceed that originally proposed in the Step-One Proposal, NASA reserves the right to terminate evaluation or funding of the mission.

For each primary investigation selected, NASA intends to issue a single contract covering all phases of the mission, including MO&DA. Appendix G contains information regarding the contracting approach. Contracts for definition will be based on the selected proposals with award anticipated within 1 month of selection.

The NASA GSFC, Greenbelt, Maryland, will manage activities associated with the study and implementation phases of the missions.

D. Mission Operations and Data Analysis Phase

The MO&DA phase is funded outside of the Explorer Program and begins at launch plus 31 days. It includes mission and science operations, formulation and execution of the science observing program, data processing, scientific analysis and interpretation, creation of the final mission archival data sets, and delivery of all data and software packages to the National Space Science Data Center (NSSDC). It is NASA's preference not to grant data rights. Proposers must provide justification for the need for, and duration of, any proprietary rights for the PI for any data obtained as part of the mission's scientific investigation.

Total costs for the portion of the MO&DA phase funded by NASA may not exceed $5M per year (in FY 1994 dollars) and may not exceed a grand total of $15M (FY 1994). This assumes 2 years of mission operations plus 1 year for completion of data processing, all science analysis, and creation of final data sets and archives. Proposers should note that:

- proposers are encouraged to find less costly ways to execute these MO&DA functions, and may, therefore, stretch these funds over a longer observing or analysis period;

- "mission operations" includes all flight operations, spacecraft and instrument control, monitoring, commanding, uplinking and downlinking (data receiving). If required, orbit determination can be provided by NASA;

- NASA does not intend to fund MIDEX investigations selected under this AO above and beyond the $15M (FY 1994) cap from the discipline MO&DA programs.

E. International Cooperation

NASA recognizes that international cooperation offers potential scientific, technical, and financial benefits to all partners, and NASA welcomes international participation in the MIDEX program. Opportunities for bilateral cooperation are offered in this AO. Non-U.S. participation can include instruments, the spacecraft, flight system components, mission operations, communications, data systems, or a combination of these. The scope of a proposed cooperative mission is expected to be consistent with the size, cost, and schedule of other missions in the MIDEX program as outlined in Section I.A above. All international participation will be conducted on a no-exchange-of-funds basis. All proposed missions are expected to be developed in close coordination with the appropriate U.S. scientific community.

F. Partnerships with Other U.S. Institutions

Besides the usual approach, in which U.S. investigators propose for NASA funding of their investigation, other U.S. domestic agencies and institutions may propose a partnership with NASA in which they contribute, from their resources, scientific instruments, the spacecraft, the launch vehicle, mission operations, communications, data systems, or a combination of these. The scope of a proposed cooperative mission is expected to be consistent with the size, cost, and schedule of other missions in the

MIDEX program as outlined in Section I.A above. All proposed missions are expected to be developed in close coordination with the appropriate civil-space scientific community.

II. MIDEX PROGRAM OBJECTIVES

A. Scientific Objectives

The scientific objective of the Explorer Program described in this AO is to conduct important scientific research in the space science disciplines served by the Explorer Program. These areas are astrophysics (radio, submillimeter, infrared, visible, ultraviolet, x-ray, and gamma-ray astronomy, gravitational astrophysics and relativity) and space physics (ionospheric, thermospheric, and mesospheric physics; magnetospheric physics; cosmic and heliospheric physics; and solar physics).

B. Programmatic Objectives

The MIDEX program seeks to conduct scientific investigations of modest programmatic scope that can be launched within 4 years of initial selection and which include a 10-month (or less) detailed definition phase and a 3-year (or less) development phase. The program intends to provide a continuing opportunity for quickly implemented flights of medium-class free-flyers to conduct focused investigations that complement major flight missions, prove new scientific concepts, or make other significant contributions to space science. It is the goal of the program to obtain a flight frequency of one flight per year. The scope of each mission is expected to be such that a single PI will have responsibility for all science decisions.

The proposed inclusion of new technology to achieve performance enhancements and reduce costs, as well as the potential for transfer of those technologies to a broader community, are important aspects of the MIDEX program and will be considered in the selection of new missions. Additionally, inclusion of the public and education communities are goals of the OSS. The MIDEX program is committed to identifying appropriate techniques to capture and hold public interest and to provide education program activities that support the Nation's educational initiatives.

III. BACKGROUND

The Explorer Program provides several classes of flight opportunities for scientific investigations in the scientific disciplines of space physics and astrophysics. Recent changes to the Explorer Program are designed to increase the number of flight opportunities in response to recommendations from the scientific community. These changes include providing new classes of Explorer missions and modifying the mission selection procedure to ensure that appropriately sized missions are chosen for each Explorer class.

Explorer Program classes will continue to be characterized by the scope of the mission, based primarily on definition and development cost and secondarily on instrument and spacecraft payload size and mass and launch vehicle capabilities. The current Explorer Program classes are:

- "University Explorers (UNEX)," characterized by a definition and development cost not to exceed $5M (in FY 1994 dollars), under consideration for launch on the NASA Ultra-Lite launch vehicle. Two launches per year are anticipated for this program, which is not yet approved.
- "Small Explorers (SMEX)," characterized by the scope of investigations achievable for no more than $35M (in FY 1994 dollars) in definition and development costs and which can be launched within the capabilities of the Pegasus launch vehicle. It is NASA's intent to launch one SMEX mission per year.
- "Medium-class Explorers (MIDEX)," characterized by the scope of investigations achievable for definition and development costs of no more than $70M (in FY 1994 dollars) and which can be launched within the capabilities of the NASA Med-Lite launch vehicle. NASA intends to launch one MIDEX mission per year.
- "Delta-class Explorers," characterized by the scope and capability of investigations conducted on spacecraft launched by a Delta-class launch vehicle. NASA plans that the Delta-class missions already in the program, the X-Ray Timing Explorer (XTE) and the Advanced Composition Explorer (ACE), will be the last of the Delta-class Explorers.

The restructuring of the Far Ultraviolet Spectroscopic Explorer (FUSE) is being conducted outside of this AO. This AO is concerned only with missions that are characterized as Medium-class Explorers, or MIDEX.

IV. PROPOSAL OPPORTUNITY PERIOD

This AO is for a single opportunity to submit proposals to the address listed in Section VIII according to the schedule given in Section IX.

V. SUPPLEMENTARY PROPOSAL PREPARATION INFORMATION

The information contained in Sections VI through X of this Announcement supplements the information from NASA Handbook (NHB) 8030.6B, "Guidelines for Acquisition of Investigations" that is reproduced in Appendices E, F, and H. Appendix F provides guidelines for proposal preparation for investigations proposing to use a NASA-provided spacecraft. Appendix H provides proposal guidelines for the PI-Mode.

Those proposing in the PI-Mode must be aware of the provisions NASA requires in major subcontracts, such as that for the spacecraft. Guidance in this area is provided in Appendix G.

VI. REQUIREMENTS AND CONSTRAINTS

A. Programmatic Requirements

The MIDEX program is intended to provide quick implementation of scientific opportunities for space science investigations. Therefore, strict criteria regarding scientific and technical feasibility, cost, and development schedule will be applied during selection of the missions. Evaluation criteria are listed in Section VII of this AO.

NASA intends that all launches it provides for missions selected in this program will use the capability of the Med-Lite expendable launch vehicle as defined in Appendix A.

NASA ground systems which are available for operation of and communications with the satellite, as well as data handling, are described in Appendix C.

In order to demonstrate mission feasibility, the proposal's technical plan must describe a spacecraft suitable for performing the proposed investigation, the overall system architecture, and how the mission concept satisfies the scientific requirements. Appendix B provides the baseline for the NASA provided spacecraft, and examples of other small spacecraft missions developed by NASA. Unless the spacecraft is provided by a non-U.S. or domestic partner, or is included in the PI's proposal as PI-provided, each description should be based on the information in Appendix B. For the selected missions, spacecraft definition will be accomplished during the mission definition phase.

Proposals submitted in response to this AO must cover the entire program, including definition, development, launch, mission operations, data analysis, migration of the data into the public domain, and preparation of adequate documentation and ancillary data for analysis by scientists other than those participating in the prime mission phase. Proposed missions are expected to be able to accomplish their primary science objectives within approximately 2 years, with data analysis extending up to 1 year beyond. Further instructions and guidelines for preparing the proposal are given in Appendices E through H. The proposal must be valid for a period of at least 12 months following submission.

Every MIDEX mission proposed in response to this AO should have both a "Baseline Mission" and a ''Minimum Science Mission.'' The Baseline Mission refers to that mission which, if fully implemented, will accomplish the entire set of scientific objectives identified for the mission at the initiation of the definition phase. Any alteration of the mission which results in a reduction of the mission's ability to accomplish the Baseline Mission set of scientific objectives as identified at the beginning of definition will be considered a "descoping" of the mission. The resulting set of achievable scientific objectives must be reviewed to ensure that the mission remains at or above the Minimum Science Mission. The differences between the Baseline Mission and the Minimum Science Mission will be assessed in order to determine the mission's resiliency in the event that development problems lead to reductions in scope.

The Minimum Science Mission is the minimum science component below which the mission will not be considered justifiable for the proposed cost. The Minimum Science Mission must be identified and documented in the AO response. A plan for the prioritized descoping of mission capability from the Baseline Mission to the Minimum Science Mission in the event of cost or schedule growth shall be developed during the definition phase. In addition, the mission team will negotiate a set of performance metrics during the definition phase for program evaluation, including cost, schedule, and others as appropriate. Failure to maintain a level of science return at or above the Minimum Science Mission or violation of the agreed upon metrics will result in the mission being reviewed for possible termination.

In addition to the Principal Investigator and Co-Investigators, key personnel will include an experienced project manager. The responsibilities and essential qualifications of the project manager are to be described in the Management Plan. If a specific individual cannot be identified at the time this proposal is submitted, then the process for finding this individual should be described as part of the Management Plan, and a letter of commitment from the identified individual must be received prior to the start of mission definition. Key personnel must be approved by NASA.

Responses to this AO will be accepted from Principal Investigators at U.S. institutions or from international partners proposing to lead a cooperative mission as described in Section I.E. U.S. investigators who propose missions involving international participation or U.S. domestic agencies and institutions should indicate in their proposals the contemplated division of responsibility between NASA and the other partners. Additional requirements for non-U.S. proposers are given in Section X and in Appendix E.

Potential non-U.S. or domestic cooperative partners may obtain guidance concerning scientific goals and programmatic needs from the appropriate NASA Headquarters Science Discipline Chief responsible for the scientific discipline of the proposed investigation. Proposers who need help in identifying the appropriate Science Discipline Chief should contact Mr. John Lintott at the address in Section VIII.I. Mission proposals received from potential cooperative partners will be selected in competition with all other mission proposals.

All missions will adhere to NASA's plan for the use of metric units. Exceptions may be granted to cover those systems that may incur considerable expense or delay.

B. New Technology and Technology Transfer

NASA is committed to successfully infusing new technologies into its programs and strengthening the mechanisms by which it transfers technologies to the private sector, including the nonaerospace sector. The means by which NASA's Office of Space Science plans to implement these processes is described in the OSS Integrated Technology Strategy, which is available from the Explorers Project Library at the address listed in Section VIII.I.

For MIDEX missions, "new" technologies may be infused through a number of mechanisms, such as the use of a novel invention which has only been tested in a ground laboratory or testbed, or the use of a product or approach in existence for some time for ground applications or for commercial or military purposes, but never before used as a part of a NASA flight mission.

NASA's Office of Space Access and Technology (OSAT) sponsors and operates technology transfer programs to facilitate the transfer and commercial use of space technology. Through a collaborative agreement with the OSS, these tools and facilities will be available to MIDEX mission teams and potential proposers in addressing this aspect of their work.

C. Educational and Public Outreach

MIDEX investigations should include activities which will enhance the level of understanding and awareness of space science by the public. Public information programs that will inform the public by mass media or other means, or other innovative ideas for bringing space science to the public are encouraged. Educational activities coordinated with educational institutions are also encouraged. Such activities might include substantial participation by teachers and students in the investigation and the development and utilization of programs that will involve educational institutions at any level in the investigation. Further information is available from the Office of Space Science's Education Strategy Plan, available from Mr. John Lintott at the address provided in Section VIII.I.

D. Small and Small Disadvantaged Businesses

MIDEX contracts will be required to contain a plan to meet the small and small disadvantaged business subcontracting goals as set forth in Appendix E, Section XIII. Contracting and subcontracting with small businesses or other organizations owned and controlled by socially and economically disadvantaged individuals (including women), historically black colleges and universities, and other minority educational institutions is mandatory, as explained in Appendix E, Section XIII. Investment in these entities reflects NASA's commitment to increasing the participation of these entities in the aerospace community, and is to be viewed as an investment in our future. Proposal responses to this AO should include a statement regarding the intent to comply with NASA's Small and Small Disadvantaged Business goals. Selected investigations will be expected to develop an appropriate plan to comply with these goals.

VII. PROPOSAL EVALUATION, SELECTION, AND IMPLEMENTATION

A. Evaluation of Proposals

Proposals received in response to this AO will be reviewed and selected in accordance with the procedures stated in NHB 8030.6B as modified by this section. All non-U.S. proposals received will go through the same evaluation, selection, and confirmation process as proposals originating in the U.S. Note specifically that contractors selected by NASA may participate in the evaluations. Evaluation panels, using scientific peers and technical experts, will evaluate the scientific and technical strengths and weaknesses of each proposal and will provide the NASA Headquarters Explorer Program Office with a report summarizing these strengths and weaknesses. Proposals will also be evaluated for management and cost.

NASA will conduct a two-step negotiated procurement for this AO as described in Section I.C. Proposers should first submit a Step-One Proposal with emphasis on the scientific investigation per the requirements in Section I.C and Appendix F or H. This Step-One Proposal will be evaluated based on the criteria given in Section VII.B below.

Based on this evaluation, NASA will select several investigations for further consideration. These principal investigators of the selected investigations will be requested to submit a detailed technical, management, and cost proposal (a Step-Two Proposal) in accordance with the requirements of Appendix F or H. This proposal will be evaluated in accordance with the criteria listed in Section VII.C below. Based upon this evaluation, NASA plans to select two investigations for definition and two as alternates as described in Section I.B.

A committee consisting of full-time Government employees will be appointed by the Associate Administrator for Space Science. This committee will, upon consideration of the reports of the evaluation panels and other NASA reports, categorize all Step-Two Proposals in accordance with the category definitions contained in NHB 8030.6B.

On the basis of these categorizations, and the review and recommendation of the Explorer Program Office and the categorization committee, the Associate Administrator for Space Science will select the Step-Two Proposals to be supported as the primary investigations for definition as well as the alternates. By the completion of the definition phase, the Associate Administrator will also confirm each of the selected missions for development and flight or choose an alternate for definition.

B. Evaluation Criteria for Step-One Proposals

The selection of investigations that best meet the scientific and programmatic objectives stated in the AO is the fundamental aim of the investigation acquisition process. To achieve this aim, the criteria listed below have been established for the evaluation of all Step-One Proposals submitted in response to this AO. The first two criteria will be the primary evaluation criteria and are of equal importance:

1. The overall scientific and technical merit of the proposed mission, including the proposed Minimum Science Mission, and its likely contribution to space science;
2. The total proposed cost and the adequacy of the proposed approach to fulfill the objectives of the mission for the proposed cost.

The following criterion will also be included in the evaluation, but is of less importance than the above:

3. The adequacy and completeness of the data reduction and analysis plan, including arrangements for the timely release of data to the public domain.

C. Evaluation Criteria for Step-Two Proposals

The criteria listed below have been established for the evaluation of all Step-Two Proposals submitted in response to this AO. The first three criteria will be the primary evaluation criteria and are of equal importance:

1. The overall scientific and technical merit of the proposed mission, including the proposed Minimum Science Mission, and its likely contribution to space science;
2. The total proposed cost, and the realism of the proposed cost;
3. The adequacy of the proposed approach to fulfill the objectives of the mission and the adequacy, as evaluated by the government, of the proposed approach

to implement the total mission for less than $70M (in FY 1994 dollars) including definition and development through launch plus 30 days, excluding launch vehicle, and for not more than $15M (FY 1994 dollars) thereafter.

The following two criteria are of equal weight, but of less importance than the above criteria:

4. The overall merit of the management plan submitted in accordance with Appendix F or H, including:

   (a) The experience, level of commitment, and prior performance of the investigator's institution in providing the necessary support to ensure that the investigation can be completed satisfactorily;

   (b) The capabilities of the key personnel and their prior experience in NASA programs; and

5. The adequacy and completeness of the data reduction and analysis plan, including arrangements for the timely release of data to the public domain.

The following criterion will also be considered during the evaluation, but is of less importance than all of the above criteria.

6. The proposed approach to implementing:

   (a) advanced technologies, their benefits for the mission and their applicability and transferability to other organizations, including the commercial sector;

   (b) subcontracting goals for small and small disadvantaged businesses and the degree to which they are expected to be met;

   (c) educational and public outreach programs, including the potential impact on different educational levels, public information programs and their potential to excite and involve the public.

The confirmation-for-development criteria are the same as the selection criteria with the addition of “investigator-team performance during the definition phase" under item 4 above.

VIII. PROPOSAL SUBMISSION INFORMATION

A. Address

All proposals should be sent to the following address:

MIDEX Proposal Office
Code SZ-1
Suite 400
400 Virginia Avenue, SW
Washington DC 20024

The procedures for submission of non-U.S. proposals or U.S. proposals with non-U.S. participants are contained in Section X and Appendix E.

B. Format of Step-One Proposals

The Step-One Proposal must be written in English and submitted in one volume, containing a detailed Investigation Plan, description of the Technical Approach, and an outline of the Management and Cost Plans. The portion of cost that pertains to non-U.S. or non-NASA provided contributions of a cooperative mission should be summarized in U.S. dollars. However, total mission costs, including non-NASA contributions, must be included in each proposal. The spacecraft management mode (NASA-provided spacecraft or PI-Mode) should be identified. Instructions, guidelines, and additional information regarding Step-One Proposal format and proposal preparation are provided in Appendices E through H of this AO.

The Step-One Proposal for a NASA-provided spacecraft is limited to the equivalent of 30 single-spaced, typewritten pages, or 40 single-spaced, typewritten pages if proposing to use a PI-provided spacecraft. Each page throughout the Step-One Proposal must have 12 point or larger characters, approximately 15 characters per inch, and 1-inch margins using 8 1/2 by 11-inch sheets, without reduction. Each side of a sheet of paper on which material appears is considered one page. Preparatory cover sheets, letters, Investigation Summary Form, and tables of contents are not included in the page limit. Proposals must use metric units. Do not submit audio or video tapes. NASA will not review any pages in excess of the limit.

In order to help recycle proposals after the review process, please submit all proposals and copies on plain white paper only (e.g., no cardboard stock or plastic covers; no colored paper, etc.) and bound in a manner that may be easily disassembled. To conserve paper and ease proposal handling, two-sided copies are preferred.

C. Step-One Proposal Cost Information

The Step-One Proposal submitted in response to this AO should include the estimated total (definition and development through launch plus 30 days) cost of the investigation and the mission, which must not exceed $70M (in FY 1994 dollars), <u>including</u> all contingencies, reserves, integration, and testing activities. The Step-One Proposal should also include the total estimated cost for the MO&DA Phase, beginning 31 days after launch, which must not exceed $5M per year (FY 1994 dollars) with a total not to exceed $15M (FY1994 dollars).

For investigations utilizing a NASA-provided spacecraft, the estimated instrument cost should be provided (which must not exceed $40M in FY 1994 dollars), including a realistic budget reserve, with a minimum of 15 percent, depending on the instrument complexity, new technology, and maturity. In addition, it is NASA's experience that development cost estimates often increase during the definition phase as the investigation becomes better defined. Such growth can occur in the instrument or the spacecraft or both. For this reason, proposers are encouraged to include in their budget plans a reserve of at least 5 percent of the instrument cost to cover this possibility. This is in addition to the minimum 15 percent budget reserve for the development phase.

Costs should be presented without extensive supporting documentation but in sufficient detail to show that all significant elements have been included. At the desired level of study for a proposal, reliable costs can be obtained by referencing elements (e.g., instruments, spacecraft components, operations) to other missions of similar size, scope, and development approach with additions and deletions as appropriate. Parametric derivation of costs using another mission of similar size, scope, and development approach as a baseline can also provide reliable cost information.

Since limited cost detail will be available in the Step-One Proposal, initial selection will be made without extensive costing evaluation. However, if at any time during evaluation, selection, confirmation, or development, the anticipated total cost of the mission is determined to exceed that proposed during Step One, NASA reserves the right to terminate evaluation or funding of the mission.

D. Step-One Proposal Quantity

Twenty (20) separately bound copies of the Step-One Proposal must be submitted. One clean, unbound, completely black and white copy of a quality suitable for reproduction, must also be submitted.

E. Certification

The Step-One Proposal must be signed by an official of the PI's institution authorized to certify institutional support and sponsorship of the investigation, and the management and the financial parts of the proposal. For proposals offering a partnership with other U.S. institutions or agencies, the proposal also must be signed by an official authorized to certify institutional or agency support and sponsorship of this investigation. In the case of non-U.S. proposals or U.S. proposals that include non-U.S. participation, the non-U.S. sponsoring agency must certify support and sponsorship of their participation.

Non-U.S. endorsements must be received by NASA according to the schedule in Section IX. If a non-U.S. proposal or a U.S. proposal with non-U.S. participation is selected, NASA will arrange with the sponsoring non-U.S. agency for the proposed participation on a cooperative (no exchange of funds) basis, in which NASA and the sponsoring agency will each bear the cost of discharging their respective responsibilities.

F. Format and Quantity for Step-Two Proposals

The Step-Two Proposal should be submitted upon request only following the initial evaluation of the Step-One Proposals. Format requirements for Step-Two Proposals are the same as for Step-One Proposals as outlined above <u>except</u> that the management, cost, and technical approach summaries of the Step-One Proposals should be replaced with a detailed technical plan and the management and cost volumes as described in Appendices F and H. The detailed Technical Plan is limited to 25 pages. The Management Volume is limited to 20 pages and the Cost Volume can be of any length necessary to convey the appropriate information. The Science Investigation Plan from the Step-One Proposal does not need to be resubmitted with the Step-Two Proposal. However, any changes in the Investigation Plan that occur as part of the preparation of the Step-Two proposal <u>must</u> be <u>explicitly</u> noted and submitted with the Step-Two Proposal.

Twenty (20) separately bound copies of the Step-Two Proposal must be submitted upon request. One clean, unbound, completely black and white copy, of a quality suitable for reproduction, must also be submitted.

G. Notice of Intent

To assist NASA's planning of the peer review, a written and signed Notice of Intent to propose must be submitted by all U.S. and non-U.S. prospective proposers. This notice should be sent to the following address according to the schedule in Section IX:

MIDEX Proposal Office
Code SZ-1
Suite 400
400 Virginia Avenue, SW
Washington DC 20024
FAX: (202) 479-0856

In cases where investigators or team members from nondomestic institutions are to participate, their names, addresses, and affiliations must be included in the Notice of Intent, even if details of their participation cannot be formalized by the deadline for receipt of the Notice of Intent.

The Notice of Intent should include the following information:

1. Names, addresses, telephone numbers, and electronic mail addresses of the Principal Investigator and all Co-Investigators.
2. Name(s) and address(es) of sponsoring organization(s).
3. Brief statement of specific objectives of the investigation.
4. The mode of spacecraft development (i.e., NASA-provided or PI-mode).

Preparers of non-U.S. proposals and U.S. proposals that contain non-U.S. participants should also send a copy of the Notice of Intent to the NASA International Relations Division at the address given in Section VIII.I for submission of non-U.S. proposals. Material in a Notice of Intent is for information only and is not binding on the signatories.

H. Preproposal Conference

A preproposal conference will be held for potential proposers at the GSFC on April 25, 1995, in the Building 8 auditorium beginning at 8:30 am. Individuals planning to attend the preproposal conference are requested to notify:

Ms. Debbie Chipouras
Code 410
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, MD 20771
Telephone: (301) 286- 6133
FAX: (301) 286-1698
E-Mail: MIDEX_AO@ccmail.gsfc.nasa.gov

Due to space limitations, attendees will be limited to two (2) per investigation. Please provide the number of persons attending and the names, addresses, organizational affiliations, and citizenship of the attendees. This information must be received by no later than April 11, 1995, in order to arrange clearance onto the GSFC. Attendees are also encouraged to submit questions so that replies can be prepared in advance of the conference.

I. Contacts for Additional Information

All inquiries of a programmatic, scientific, or technical nature must be submitted in writing via FAX or E-Mail.

Inquiries of a programmatic nature should be directed to:

Mr. John Lintott
Astrophysics Division
Code SZ
NASA Headquarters
Washington, DC 20546-0001
FAX: (202) 358-3096
E-Mail: MIDEX@gm.ossa.hq.nasa.gov

Inquiries of a scientific nature should be directed to the appropriate NASA Scientific Discipline Chief. If the NASA Discipline Chief is not known, please contact Mr. Lintott to determine the appropriate name and telephone number.

Inquiries of a technical nature should be directed to:

MIDEX AO
Explorers Project Office
Code 410
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, MD 20771
FAX: (301) 286-1698
E-Mail: MIDEX_AO@ccmail.gsfc.nasa.gov

Requests for reference documentation from the Explorers Project Library should be directed to:

Explorers Project Library
Code 410
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, MD 20771
Telephone: (301) 286-6133
FAX: (301) 286-1698
E-Mail: MIDEX_DOC@ccmail.gsfc.nasa.gov

Informational copies of the notice of intent and proposals which involve non-U.S. participation should be sent to:

Ms. Shiron Gaines
Reference: AO-95-OSS-02
Code IR
National Aeronautics and Space Administration
Washington, DC 20546-0001
USA
Telephone: (202) 358-1664

IX. PROPOSAL SCHEDULE

The following key dates pertain to this Announcement:

Date of release	March 27, 1995
Preproposal Briefing	April 25, 1995
Notice of Intent due	May 10, 1995
Step-One Proposal due	June 27, 1995 4:00 PM, Eastern Daylight Time
Latest date to accept non-U.S. government endorsement	September 26, 1995
Target date for announcement of initial selections from Step-One Proposals	September 27, 1995
Target date for Step-Two Proposal submission	December 27, 1995
Target date for announcement of final selections	March 15, 1996
Target date for initiation of definition study	April 1, 1996

X. SPECIFIC GUIDELINES FOR NON-U.S. PROPOSERS

For proposals with non-U.S. involvement, an information copy of the entire proposal and a letter of transmission from the sponsoring non-U.S. institution must be sent to the NASA International Relations Division at the address given in Section VIII.I according to the schedule in Section IX. Non-U.S. participation should be incorporated into the prime proposal submitted by the U.S. investigator, with the International Relations Division copy accompanied with adequate information to identify and highlight the role of the non-U.S. contribution in the U.S. investigation.

NASA recognizes that additional time is frequently required to obtain formal governmental approval of a proposal submission, and will, therefore, accept non-U.S. government endorsements according to the schedule in Section IX. Non-U.S. government endorsements are to be sent to the NASA International Relations Division. In any case, the required copies of the proposal for review purposes should be submitted to the address in Section VIII.A according to the schedule in Section IX.

XI. LIST OF APPENDICES

The following appendices are part of this announcement and are available separately as described in Section XII:

A. The NASA Med-Lite Expendable Launch Vehicle
B. The NASA-Provided Medium Explorer Spacecraft
C. Medium Explorer Ground System and Operations
D. Performance Assurance Approach for MIDEX Missions

E. General Instructions and Provisions
F. Guidelines for Investigations Proposing a NASA-Provided Spacecraft
G. Additional Information and Requirements
H. Guidelines for Investigations Proposing the PI-Mode
I. MIDEX AO Reference Documents Available from the Explorers Project Library
J. MIDEX AO Acronyms
K. Required Certification Forms

XII. ELECTRONIC VERSIONS OF AO AND APPENDICES

Appendices A – K, as well as the text of this AO, are available electronically from the NASA FTP server. You can connect from an Internet host with the command "ftp.mercury.hq.nasa.gov. You should use "anonymous" for the user name, and enter your email address for the password. Files containing the AO and the Appendices in various formats are located in a directory entitled "/pub/astrophysics/AOs/MIDEX". Download the file entitled "README" which contains a listing of the MIDEX AO files and information about retrieving the files electronically

If you are unable to retrieve the Appendices electronically from the FTP server, you can request a paper hardcopy version from:

Explorers Project Library
Code 410
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, MD 20771
Telephone: (301) 286-6133
FAX: (301) 286-1698
E-Mail: MIDEX_AO@ccmail.gsfc.nasa.gov

The MIDEX program provides a rapid and low-cost opportunity for important space science investigations. I look forward to receiving many scientifically compelling, imaginative, and innovative proposals.

Wesley T. Huntress, Jr.
Associate Administrator for
Space Science