

**National Aeronautics and
Space Administration**

AUGUST 19, 2004

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)
HEADQUARTERS
SCIENCE MISSION DIRECTORATE
300 E STREET SW
WASHINGTON, DC 20546-0001**

**INSTRUMENT INCUBATOR PROGRAM –2004
(IIP-2004)**

NN-H-04-Z-YF-009-N

**NASA Research Announcement
Soliciting Research Proposals For New Technology Earth Science Instruments**

Catalog of Federal Domestic Assistance (CFDA) Number: 00.000

Notice of Intent Due: September 20, 2004

Proposals Due: November 2, 2004

Executive Summary

This NASA Research Announcement (NRA), entitled "Instrument Incubator Program (IIP) –2004", solicits proposals for the Instrument Incubator Program (IIP), a technology development program in support of the NASA Science Mission Directorate (SMD). The IIP seeks proposals for technology development activities leading to new system and subsystem level suborbital and space-based measurement techniques to be developed in support of SMD science research and applications.

This NRA solicits proposals for instruments for investigating:

- Atmospheric aerosols and trace gases, including in the lower troposphere;
- Ice topographic mapping; and
- Global tropospheric winds.

Subject to availability of funding, the Government expects to make awards with annual costs in the approximate range from \$500,000 to \$1 Million. Awards will be made as grants, cooperative agreements, contracts, or inter- or intra-Government transfers depending on the nature of the proposing organization and/or program requirements. The typical period of performance for an award is three years. Contract awards are typically structured with a one year base period, and options for two additional years. Proposals resulting in the award of other types of funding instruments (e.g. grants and cooperative agreements) should be for up to three years. Organizations of every type, domestic and foreign, Government and private, for profit and nonprofit, may submit proposals without restriction on the number or teaming arrangements. Cost sharing is encouraged but not required.

I. Funding Opportunity Description

The National Aeronautics and Space Administration (NASA) announces the solicitation of proposals for the Instrument Incubator Program (IIP), a technology development program in support of the Science Mission Directorate (SMD). The IIP seeks proposals for technology development activities leading to new system and subsystem level airborne and space-based measurement techniques to be developed in support of SMD science research and applications.

1. Introduction and Background

i. Science Mission Directorate

The NASA vision is: *To improve life here*
 To extend life to there
 To find life beyond

The NASA mission is: *To understand and protect our home planet*
 To explore the Universe and search for life
 To inspire the next generation of explorers

...as only NASA can.

NASA's Science Mission Directorate is responsible for carrying out the scientific exploration of the Earth, Moon, Mars, and beyond; chart the best route of discovery; and reap the benefits of Earth and space exploration for society. A combined Earth and Space Science research endeavor is best able to establish an understanding of the Earth, other planets and their evolution, bring the lessons of our study of Earth to the exploration of the Solar System, and to assure the discoveries made here will enhance our work there and vice versa.

The Science Mission Directorate is creating an integrated Sun-Earth System research and observation program to conduct exploration of the Sun-Earth System to enable scientific understanding, facilitate exploration of the solar system, and bring practical benefits to society.

Principal goals of this program are to:

- Develop a predictive capability for solar and space physics enabling space weather forecasting and supporting the safe transit of human exploration missions to the Moon, Mars, and beyond, and;
- Investigate how the living Earth system is changing due to the Sun's variability and naturally-occurring and human induced processes, and the consequences of these changes for life on Earth.

This NASA Research Announcement is aimed at the second of these two major goals. Specifically, this NRA solicits science-driven technology development supporting future Earth system global measurements.

Within SMD, NASA's Earth system science research develops a scientific understanding of the Earth system and its response to natural or human-induced changes in order to enable improved prediction capabilities for climate, weather and natural hazards. The Earth system research program aims to acquire a deeper understanding of the components of the Earth system and their interactions. These interactions occur on a continuum of spatial and temporal scales ranging from short-term weather to long-term climate scales, and from local and regional to global scales. NASA's Earth system research also seeks to provide accurate assessments of changes in the composition of the atmosphere, the extent and health of the world's marine and terrestrial ecosystems, and geophysical phenomena that lead to natural hazards.

The long-term (2010 to 2020) vision for Earth system research includes:

- 10-year climate forecasts
- 15- to 20-month El Niño prediction
- 12-month regional rain rate
- 60-day volcano warning
- 10- to 14-day weather forecast
- 7-day air quality notification
- 5-day hurricane track prediction to +/- 30 km
- 30-minute tornado warning
- 1- to 5-year earthquake experimental forecast

The science technology program seeks to develop and adopt advanced technologies to enable mission success and serve national priorities. Technological innovation resulting in reduced size, mass and/or power requirements of future remote sensing instruments is essential to the future success of NASA science research. A major objective of the science program is to achieve more capable science missions that can be developed over a short period of time (i.e. 2 to 3 years). An effective way to achieve this objective is by identifying and developing key technologies required by NASA missions in advance.

ii. Instrument Incubator Program

The objectives of the IIP are to identify, develop and, where appropriate demonstrate new measurement technologies which:

- reduce the risk, cost, size, and development time of Earth observing instruments, and
- enable new Earth observation measurements.

The IIP is designed to reduce the risk of new, innovative instrument systems so that they can be successfully used in future science solicitations in a fast track (3 year) acquisition environment. Figure 1 shows the idealized relationship between the IIP and development of future missions.

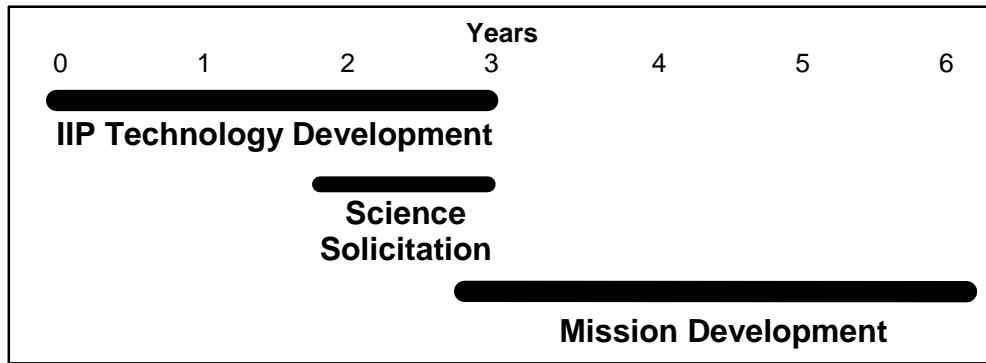


Figure 1 Idealized Relationship between IIP and Future Flight Missions

Critical to this design is the relationship between the various technology development programs that the SMD has available to enable missions. For technology infusion into NASA science missions to take place in a timely and efficient manner, appropriate funding must be applied at each stage or readiness level associated with the development of key and enabling technologies. Technology development activities are planned and initiated so that major technological risk is retired prior to a science solicitation via an Announcement of Opportunity (AO) or Request for Proposal (RFP). A focused, requirement driven approach with direct project connectivity can effectively harness advanced instrument technology capabilities and leverage developments in technology programs funded from NASA, other government agencies, private organizations, and academic institutions. Within this development environment, the IIP can rely upon the NASA ESE Advanced Component Technology (ACT) Program for advanced instrument components and subsystems and other NASA programs for space flight validation.

Technology Readiness Level (TRL) is a systematic metric/measurement system that supports assessments of the maturity of a particular technology and the consistent comparison of maturity between different types of technology (see Appendix F for TRL definitions). Figure 2 shows the Technology Readiness Levels for these programs and future science missions.

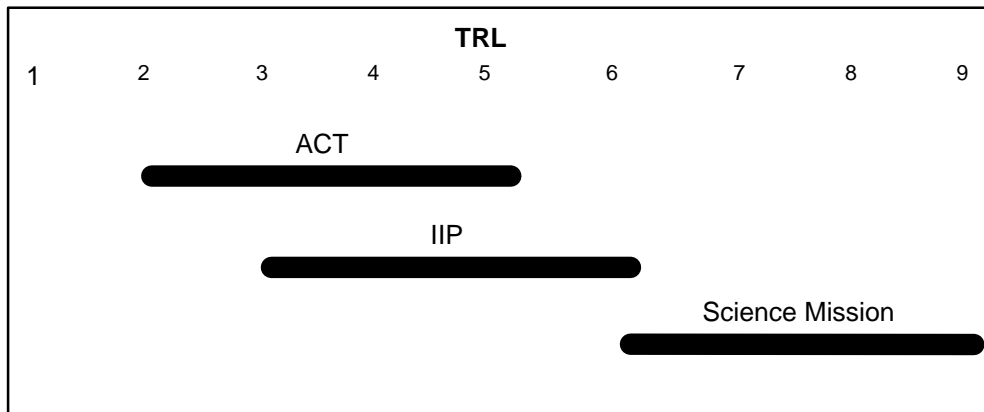


Figure 2 TRL Ranges for Technology Development Programs & Science Missions

2. NASA Research Announcement Description

i. Goals

This NASA Research Announcement solicits instrument design, engineering model construction, lab demonstrations, and field demonstrations for innovative measurement techniques that have the highest potential to meet the objectives of the IIP and the measurement capability requirements for NASA's Earth system research.

The IIP is envisioned to be flexible enough to accept instrument and measurement concepts at various stages of maturity (see Figure 3), and through appropriate risk reduction activities (such as design, construction of laboratory breadboards and engineering models, and field demonstrations on the ground or on airborne platforms), advance the system's technology readiness level to that necessary to compete successfully in future science solicitations or space flight demonstrations. The proposer must define the starting point for the instrument or measurement technique and the exit or success criteria for the proposed activity.

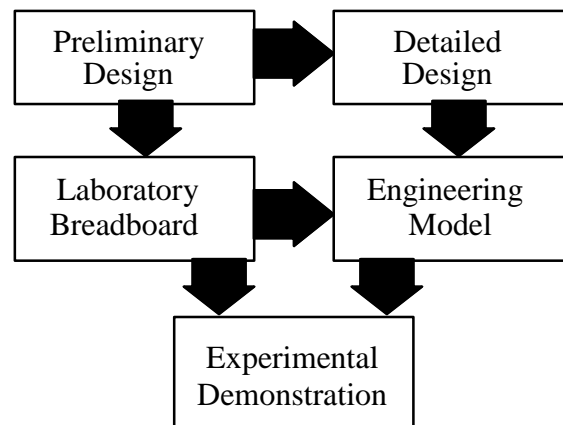


Figure 3 Entry and exit points defined by proposer

ii. Proposal Science Research Topics

One of three thematic divisions in the Science Mission Directorate is the Sun-Earth System Division. It is dedicated to understanding how the Sun and the Earth's planetary environment are connected and, using the vantage point of space, how the Earth System is changing and what are the consequences of these changes for life on Earth. NASA's Sun-Earth System program research develops a scientific understanding of the Earth system and its response to natural or human-induced changes in order to enable improved prediction capabilities for climate, weather and natural hazards (<http://earth.nasa.gov/visions>). NASA has established science focus areas to plan and manage research on complex processes of the Earth system, which are presented at <http://earth.nasa.gov/roadmaps>. These roadmaps for each science focus area have been developed with broad science community input and describe a pathway to science goals over the next decade. The science focus area roadmaps show observational requirements and science priorities and provide an account of observational milestones and new knowledge for accomplishing programmatic goals. Approximately eighteen science priority topics can be identified from the

Earth focus area roadmaps. However, some of these topics require further technology development. This NASA Research Announcement addresses the top priorities in science focus area roadmaps that are at an early stage of technologic maturity and have been chosen on the basis of appropriate phasing with the Science Mission Directorate's Earth System Science Pathfinder (ESSP) Program.

Thus using the focus area roadmaps as a guide, first-order priorities for this IIP solicitation have been established and are listed below.

These priorities identified (without particular order) and their associated focus areas are:

- I. Atmospheric aerosols and trace gases – measurements of the vertical distribution of aerosols and trace gases in the boundary layer and the lower troposphere. [*Atmospheric Composition*]

Global observations of tropospheric ozone, nitrogen oxides, carbon monoxide, hydrocarbons, and aerosols at increasing spatial and temporal resolution are necessary to understand the large-scale transport, removal, and chemical transformation of air pollution. This NRA solicits proposals for instruments that will enable advanced space based observations and provide improved characterization of the spatial and temporal distribution of absorbing aerosols and the characteristics of their optical properties and composition in Earth's atmosphere with potential for applications in the study of other planets in our Solar System, and beyond. In addition, this NRA solicits proposals for enabling instruments for measuring the characteristics of the atmospheric composition (both aerosols and trace gases) in the lowest levels of the atmosphere (boundary layer and lower troposphere) from GEO or LEO at high spatial and temporal resolutions.

- II. Ice topographic mapping – mission concepts are solicited that are targeted toward quantifying the mass of sea or land ice and how it is changing. [*Climate Variability and Change*]

A critical component of the Earth's climate system remains the behavior of ice cover on land and the seas. Recent observations indicate a decrease in sea ice extent and thickness in the Arctic, which could have a major amplifying effect on global warming in northern latitudes. Some systems (e.g., ICESat) are presently providing initial measurements of ice sheet thickness and extent; however, the presently flying or planned systems provide only limited spatial sampling. This NRA solicits proposals for ice topographic mapping instruments capable of providing precise elevation and detailed imagery data for measurements on glacial scales for detailed monitoring of ice sheet, sea ice and glacier changes.

III. Tropospheric winds – measurement of global wind profiles to advance our understanding and prediction of the total Earth system. [*Weather*]

Direct observation of the global wind field would be extremely valuable for numerical weather prediction, as well as scientific diagnostics of large-scale atmospheric transport, weather systems, and boundary layer dynamics in Earth's atmosphere and other planets in our Solar System and beyond. Because of the lack of reliable, sufficiently dense, and accurate wind observations, uncertainties in model-derived estimates of divergent flow component of the global atmospheric circulation constitute a serious limitation in our understanding of the global energy cycle and the atmospheric transport of water, energy, and chemical species.

For over 20 years, researchers have been pursuing the development of Doppler lidar techniques for measurement of atmospheric winds in clear air. Space-based lidar observations of atmospheric winds constitute a significant challenge in terms of sensitivity, accuracy and spatial coverage. Yet, given their importance to both scientific research and operational weather forecasting, the demonstration of Doppler lidar wind measurement from space could be a promising operational precursor mission. However, much technological progress leading to the development of more powerful, more energy-efficient and more reliable lasers is needed in order to realize the full potential of this active sounding technique for scientific research and applications. As part of this NRA, proposals are also being solicited for the development of suborbital (UAV) Doppler wind lidar instruments for severe storm or hurricane monitoring, both as technology precursors for future space borne applications, and as future operational airborne instruments.

Wind information can also be inferred from the motion of clouds (or patches of moist air) observed by geostationary satellites. Such measurements currently lack precision, especially in the assigned altitude level of the observed wind vectors but future high-resolution geostationary imager-sounder instruments may provide useful tropospheric wind profile information to follow, hour-by-hour the evolution of severe weather disturbances, notably hurricanes. Concepts that meet this challenge are also being sought.

First-order priorities for this IIP solicitation have been provided in this Section. NASA will consider proposals based on other compelling scientific questions/priorities also. However it remains up to the proposers to articulate in their proposal the benefits and priority of any instrument concepts addressing science topics beyond the list provided above.

3. Technology Readiness Level (TRL) Guidance

The proposer must define the starting point TRL, the exit TRL, and success criteria for their proposal activity. Past and ongoing work in the research activity should determine the entry point. Research within this NRA will be restricted to an exit TRL less than or equal to 6. The proposer should seek an alternate technology program for developments that exceed TRL 6. For this solicitation, the entry TRL can be from 3 to 5. Over the duration of the research, the activity must advance by at least one TRL. For example, an activity can enter the technology development activity at TRL 4 and exit at TRL 5 or 6. These limitations naturally preclude space qualification flights from being performed in the IIP Program. The results at the exit point should provide

convincing evidence that the instrumentation can make the proposed measurements and that an operational instrument can be built within the context of the new shorter acquisition cycles.

Each proposed instrument development should include an evaluation of feasibility, requirements analysis, instrument design, construction of breadboards, and/or construction of an engineering model. All proposed efforts should include evaluation of anticipated performance and an estimate of the entry and exit TRL. To aid in the planning of future, potential technology activities, the proposal should also include an estimate of the resources (cost and schedule) to develop a flight quality instrument and documentation of technology dependencies. An instrument or measurement design concept or actual design should be produced as well as a concept for data product generation. These items will be documented as contract deliverables.

Laboratory and field demonstrations may be funded and are expected to produce a working instrument or specific instrument subsystems (breadboard or engineering model) and data documenting performance measured either in the laboratory or in the field. The final report should document these measurements.

4. Use of Commercial Data

NASA's SMD has adopted commercial data purchases as a mainstream way of acquiring research-quality data, as these commercial capabilities become available. NASA encourages the use of commercially available data sets by Principal Investigators as long as it meets the scientific requirements and is cost-effective. When responding to a NASA Research Announcement the proposer should identify the commercial data sources intended for use and the associated cost.

5. NASA Safety Policy

Prospective proposers are advised that safety is a top priority for all of NASA's programs. Safety is the freedom from those conditions that can cause death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment. NASA's safety priority is to protect: (1) the public, (2) astronauts and pilots, (3) the NASA work force (including employees working under NASA award instruments), and (4) high-value equipment and property.

6. Availability of Funding

Funds are not currently available for awards under this solicitation. The Government's obligation to make award(s) is contingent upon the availability of appropriated funds from which payment can be made and the receipt of proposals that NASA determines are acceptable for award under this NRA.

7. Reference Material

This announcement and appendices are available on the Research Opportunities home page on the World Wide Web (WWW), at <http://research.hq.nasa.gov/research.cfm> (look under "Office of Earth Science (Code Y)").

The NASA ESE Strategic Plan and the NASA ESE Research Strategy 2002-2010 are available on the World Wide Web at <http://earth.nasa.gov/visions/>.

Additional background information relating to the science requirements is available on the [Earth Science Technology Office](#) website. Examples of instruments and measurement scenarios which meet some or all of these requirements are available on the [Earth Science Technology Integrated Planning System \(ESTIPS\)](#) website. The [ESE Science Roadmaps](#) are also available on the ESTIPS website.

The [Guidebook for Proposers Responding to NASA Research Announcements](#) (hereafter referred to as the Guidebook for Proposers) provides standard requirements for responding to NASA Research Announcements. These requirements are modified in accordance with the specific requirements of this NRA, as discussed below.

The [Grant and Cooperative Agreement Handbook](#) (hereafter referred to as the Handbook) prescribes policies and procedures relating to the award and administration of NASA grants and cooperative agreements.

II. AWARD INFORMATION

1. Funding

The U.S. Government's obligation to make awards is contingent upon the availability of appropriated funds from which payment for award purposes can be made and the receipt of proposals that are determined to be acceptable by the Government for award under this announcement. Funding of the successful proposals will be through the award of grants or contracts. No additional funds beyond the negotiated contract value will be available. An Interagency Acquisition may be used to fund awards to other U.S. Government agencies. Proposers are also encouraged to offer cost sharing. Cost-sharing proposals must include a discussion on the data-rights requested by the offerer.

Subject to availability of funding, the Government expects to make awards with an annual cost in the approximate range of \$500,000 to \$1 million.

2. Period of Performance

The minimum period of performance is 12 months. The total proposed period of performance must not exceed 36 months. The Government will award contracts for a 1-year base period, with up to two 1-year options exercisable by the Government. The Government will award grants and cooperative agreements on a multiyear basis for a period not to exceed three years. Proposals must define clear, measurable milestones to be achieved in order to warrant exercise of any options.

3. Type of Award

Awards made through this NRA may be in the form of grants, cooperative agreements, contracts, or intra- or inter-Government transfers depending on the nature of the submitting organization. A NASA awards officer will determine the appropriate award instrument for the selections resulting from this solicitation. Grants and cooperative agreements will be subject to the provisions of the *NASA Grants and Cooperative Agreement Handbook* (hereafter referred to as the *Handbook*, found at <http://ec.msfc.nasa.gov/hq/grcover.htm>). Contract awards will be subject to the provisions of the Federal Acquisition Regulations (FAR) and the NASA FAR Supplement (see <http://ec.msfc.nasa.gov/hq/library/v-reg.htm>).

III. ELIGIBILITY INFORMATION

1. Eligibility of Applicants

Participation in this program is open to all categories of U.S. and non-U.S. organizations, including educational institutions, industry, nonprofit institutions, as well as NASA Centers, and other U.S. Government agencies. Historically Black Colleges and Universities (HBCUs), other minority educational institutions, and small businesses and organizations owned and controlled by socially and economically disadvantaged individuals or women are particularly encouraged to apply. Participation by non-U.S. organizations in this program is encouraged subject to NASA's policy of no-exchange-of-funds. Further information on foreign participation is provided in Section (I) of Appendix B in the *NASA Guidebook for Proposers* (see Section IV.2.i below for location reference). There is no restriction on the number of proposals that an organization may submit to this solicitation, or on the teaming arrangements for any one proposal, including teaming with employees of NASA's Centers and the Jet Propulsion Laboratory.

2. Cost Sharing or Matching

If an institution of higher education or other nonprofit organization wants to receive a grant or cooperative agreement, cost sharing is not required. However, NASA can accept cost sharing if it is voluntarily offered (see the *Handbook*, Section B, Provision 1260.123, "Cost Sharing or Matching," which describes the acceptable forms of cost sharing). If a commercial organization wants to receive a grant or cooperative agreement, cost sharing is required unless the commercial organization can demonstrate that they do not expect to receive substantial compensating benefits for performance of the work. If this demonstration is made, cost sharing is not required, but may be offered voluntarily (see Section D, Provision 1274.204, of the *Handbook* for more information).

3. Participation in SMD Solicitations

Participation in this NRA or a subsequent similar NRA is *not* a prerequisite to selection as a science investigation as part of any future SMD NRA, AO or other solicitation. Similarly, participation in this NRA does not guarantee continued participation in the IIP or success in any future SMD

competitions. Successful participation in this NRA is intended to give innovative measurement techniques the scientific and technical pedigree they need to compete in relevant SMD solicitations against any good ideas developed elsewhere. Solicitations similar to this announcement will be issued periodically to select additional technologies for development.

4. Domestic Partnerships

This announcement encourages technology development partnerships among U.S. Government Agencies, Private Industry, and Academic Institutions. These leveraging opportunities enable cost sharing and should be mutually beneficial to each partner and the nation. A single proposal from the lead institution of the partnership is required. The proposal must satisfy the requirements of Appendix B, section (f).

5. International Participation

This announcement is open to the international technology community. International cooperative proposals, with co-investigators from U.S. institutions participating in foreign-led proposals or with co-investigators from non-U.S. institutions on the teams of proposals from U.S. institutions, are also encouraged. These proposals should be on a "no-exchange-of-funds" basis for their non-U.S. elements and should identify any requirements for NASA financial support for U.S. participants. Proposals from non-U.S. institutions are encouraged, but only on a "no-exchange-of-funds" basis. Specific instructions for proposals from non-U.S. institutions are included in Appendix B.

6. Rights to Data

In the event that a cost sharing arrangement is proposed, appropriate data rights that recognize the proposer's contributions as well as the Government's rights to access will be negotiated prior to awarding a contract or grant.

IV. PROPOSAL AND SUBMISSION INFORMATION

1. Address to Request Proposal Package

This announcement contains all required forms and materials. No additional forms or materials are required for submittal.

2. Required Proposal Forms and Proposal Submittal Guidance

i. Submittal Requirements

All information needed to apply to this solicitation is contained in this announcement and in the companion document entitled NASA Guidebook for Proposers Responding to a NASA Research Announcement – 2004 (hereafter referred to that the NASA Guidebook for Proposers) located at

<http://www.hq.nasa.gov/office/procurement/nraguidebook/> . By reference, this 2004-edition of this NASA Guidebook for Proposers is incorporated into this NRA, and proposers are responsible for understanding and complying with its procedures for the preparation and submission of their proposals. Proposals that do not conform to its standards may be declared noncompliant and returned without review.

Proposals shall be prepared and submitted in accordance with specific information provided in Appendices A-H of this announcement. These Appendices modify the general requirements of the NASA Guidebook for Proposers. Appendix A provides specific instructions for proposers to this announcement. Appendix B contains the general instructions needed for preparation of solicited proposals in response to NRAs. Appendix C provides instructions for proposal submission, including a sample of the required proposal cover sheet. Appendix D provides, the list of required declarations, and information on requisite certifications and disclosures. Appendix E contains information regarding the Notice of Intent to Propose. Appendix F contains a budget summary worksheet with instructions for its use. Appendix G defines the Technology Readiness Levels. Appendix H contains a list of acronyms. . All proposals from investigators from the U.S. and other countries will be evaluated by NASA.

Note that both the introductory material and appendices of this *NASA Guidebook for Proposers* provide additional information about the entire NRA process, including NASA policies for the solicitation of proposals, guidelines for writing complete and effective proposals, and NASA's general policies and procedures for the review and selection of proposals, as well as for issuing and managing the awards to the institutions that submitted selected proposals. A group of *Frequently Asked Questions* (FAQs) provides additional miscellaneous information about a variety of the NASA proposal and award processes and procedures. The NASA policy for proposals involving non-U.S. participants is given in Section (I) of Appendix B of this *NASA Guidebook for Proposers* .

ii. Cover Page Requirements

All proposals submitted to NASA in response to this announcement must have a completed cover sheet and information on current and pending research support from all other sources attached. Cover pages shall be prepared in accordance with the requirements of Appendix C. All applicants must provide the Dun and Bradstreet (D&B) Data Universal Numbering System (DUNS) number for their organization in the Cover Page of their proposal. This requirement applies to renewals of awards as well as to prospective new awards. The DUNS number is a unique nine-character identification number provided by the commercial company Dun & Bradstreet (D&B). Applicants may call D&B at 1-866-705-5711 to register and obtain a DUNS number, or access the D&B website at: <http://www.dnb.com/us/>. The process to request a DUNS number by telephone takes about 10 minutes, and is free of charge. The process to obtain a DUNS number through the website takes about fourteen days, and is also free of charge. Organizations will use the same DUNS number with every proposal submitted for a Federal grant and cooperative agreement. Note that the DUNS number is site-specific.

NASA also requires the applicant's organization to be registered in the Central Contractor Registration (CCR) database and obtain a Commercial And Government Entity (CAGE) code prior

to submitting a proposal. The purpose of this requirement is to help centralize information about grant recipients and provide a central location for grant recipients to change organizational information. Information for registering in the CCR and online documents can be found at <http://www.ccr.gov>. Before registering applicants and recipients should review the Central Contractor Registration Handbook, which is also located at <http://www.ccr.gov>. The process for obtaining a CAGE code is incorporated into the CCR registration.

iii. Submission Requirements

Proposal submission is comprised of two parts: Internet submission and postal submission. The Internet submission requires that the cover page, abstract, and FCA budget be submitted via the SYS-EYFUS website (<http://proposals.hq.nasa.gov/>). Detailed instructions on preparing and submitting the cover page can be found in Appendix C "Instructions for Proposal Submittal, Including Required Proposal Cover Page". On the proposal cover page, the proposer is required to select the applicable categories to which the proposal responds – reference Paragraph II (b) of this NRA. This is intended to aid in the evaluation of the proposal, and will not be used to limit the applicability of proposals from related categories. Note that an authorizing official for the proposing organization and any Co-Investigators must obtain a User ID and password in order to be added to the Cover Page. Since the information submitted to the SYS-EYFUS Web site is validated before being officially added to the database, new users should allow two weeks for this validation to occur.

A printed, signed, original of the entire proposal, twenty (20) copies, and a magnetic or optical disk containing a softcopy of the proposal submitted via the postal service or equivalent means constitutes the second part of the proposal submission. This hardcopy version of the cover page must be printed in time to acquire signatures and be included with the original hardcopy of the proposal for delivery according to this NRA schedule. Proposers are advised that they must not reformat the cover page after it is printed, as important NASA-required documentation may be lost. **Please note that submission of the electronic cover page, alone, does not satisfy the deadline for proposal submission.**

iv. Notice of Intent to Propose (NOI)

In order to plan for a timely and efficient peer review process, *Notices of Intent* (NOI's) to propose are strongly encouraged. The submission of a NOI is not a commitment to submit a proposal, nor is information contained therein considered binding on the submitter. NOI's are to be submitted electronically by entering the requested information through SYS-EYFUS Web. Appendix E contains additional details regarding submittal of NOIs.

v. Submission Dates and Times

The printed, signed original, twenty (20) paper copies and one magnetic or optical disk copy of the proposal must be physically received by 4:30 Eastern Time on November 2, 2004. The address for delivery is indicated below. Proposals that are late will be handled in accordance with NASA's policy as given in Section (g) of Appendix B of the *NASA Guidebook for Proposers* (see also its Sections 3.2 and F.23). Proposals received after the due date may be returned without review. If a

late proposal is returned, it is entirely at the discretion of the proposer to decide whether or not to submit it in response to a subsequent, appropriate solicitation.

Submit proposals to: IIP NRA
NASA Peer Review Services, Code Y
500 E Street, SW, Suite 200
Washington, DC 20024-2760
(For overnight delivery purposes only, the recipient telephone number is 202-479-9030)

Number of Copies: Twenty (20) paper copies and one magnetic or optical disk, Macintosh or IBM PC compatible format (see Appendix A, Section IV)

Acceptable Formats: Portable Document Format (PDF) (preferred), Microsoft Word, WordPerfect. Microsoft Excel for cost information (see Appendix A, Section IV)

Length of Proposal: Fifteen (15) non-reduced, single space typewritten pages (see Appendix A, Section III (J))

Proposals submitted to NASA Headquarters will cause a delay in receipt of your proposal, therefore, please adhere to "Submit proposals to:" above.

vi. Funding Restrictions

The construction of facilities is not an allowed activity. For further information on the allowability of costs, refer to the cost principles cited in the *Handbook*, Section 1260.127.

Travel, including foreign travel, is allowed as may be necessary for the meaningful completion of the proposed investigation, as well as for publicizing its results at an appropriate professional meeting.

U.S. research award recipients may directly purchase of supplies and/or services that do not constitute research from non-U.S. sources, but award funds may not be used to fund research carried out by non-U.S. organizations. However, subject to possible export control restrictions, foreign nationals may conduct research while employed by a U.S. organization.

Regardless of whether functioning as a team lead or as a team member, personnel from NASA Centers must propose budgets based on Full Cost Accounting (FCA). Non-NASA U.S. Government organizations should propose based on FCA unless no such standards are in effect; in that case such proposers should follow the Managerial Cost Accounting Standards for the Federal Government as recommended by the Federal Accounting Standards Advisory Board (for further information, see <http://www.hq.nasa.gov/fullcost/>).

V. PROPOSAL REVIEW INFORMATION

1. Evaluation Criteria

Evaluation by a NASA review team will be used to assess each proposal's applicability to SMD Science measurements and technology needs, technical merit, and cost and programmatic realism. See Appendix A for further discussion of these criteria and their relative weights.

2. Review and Selection Processes

Proposals submitted to this NRA will be reviewed and selected consistent with the policies and provisions given in Appendix C.3 and C.4 of the *NASA Guidebook for Proposers*. Selection procedures will be consistent with Section C.5 of the *NASA Guidebook for Proposer*. The NASA Deputy Associate Administrator for Science Mission Directorate shall be the Selection Official.

3. Selection Announcement and Award Dates

NASA's stated goal is to announce selections within 150 days of the proposal due date. After 150 days past the Proposal Due Date for which a proposal was submitted, proposers may contact the responsible Program Officer for the status of the selection activity.

Those proposers not selected will be notified by mail and offered a debriefing consistent with the policy in Section C.6 of the *NASA Guidebook for Proposers*.

Selection Schedule

All proposals submitted in response to this announcement are due in accordance with the dates shown in this announcement. A summary of the solicitation schedule can be found at the ESTO web site, <http://esto.gsfc.nasa.gov>.

VI. AWARD ADMINISTRATION INFORMATION

1. Notice of Award

Awards made through this NRA will be administered in accordance with the general policies given in Appendix D of the *NASA Guidebook for Proposers* and the *Handbook*. In the case of any conflict, the Handbook takes precedence. The type of award to be offered to selected proposers will generally follow the policies in Section D.1 of the *NASA Guidebook for Proposers*, although in a few cases, only contracts may be offered as specified in the Appendices.

Both the selected, as well as the nonselected proposers, will be notified consistent with the policy given in Section C.5.3 of the *NASA Guidebook for Proposers*. For selected proposers, the offeror's business office will be contacted by a NASA Awards Officer, who is the only official authorized to obligate the Government. Any costs incurred by the offeror in anticipation of an award will not be reimbursed.

2. Administrative and National Policy Requirements

This solicitation does not invoke any special administrative or National policy requirements, nor do the awards that will be made involve any special terms and conditions that differ from NASA's general terms and conditions as given in the Handbook.

3. Award Reporting Requirements

The reporting requirements for awards made through this NRA will be consistent with Exhibit G of the Handbook.

VII. POINTS OF CONTACT FOR FURTHER INFORMATION

General questions and comments about the policies of this NRA may be directed to:

Kenneth Anderson
IIP Program Manager
Earth Science Technology Office
Goddard Space Flight Center
Greenbelt, MD 20771
Telephone: 301-286-6845
E-mail: Kenneth.C.Anderson@nasa.gov

Inquiries about accessing or using the NASA proposal data base located at <http://proposals.hq.nasa.gov> should be directed by an E-mail that includes a telephone number to <proposals@hq.nasa.gov> or by calling (202) 279-9376. This help center is staffed Monday through Friday, 8:00 AM – 6:00 PM Eastern Time.

Your interest in participating in this opportunity is heartily welcomed.

Ghassem R. Asrar
Science Mission Directorate Deputy Associate Administrator

Enclosures:

- [Appendix A. Specific Guidelines for Proposers](#)
- [Appendix B. Instructions for Responding to NASA Research Announcements](#)
- [Appendix C. Instructions for Proposal Submittal, Including Required Proposal Cover Pages](#)

- Appendix D. Proposal Cover Page, and Required Certifications, Disclosures, and Assurances
- Appendix E. Notice of Intent to Propose
- Appendix F. Budget Summary
- Appendix G. Definition of Technology Readiness Levels
- Appendix H. Acronyms List

APPENDIX A SPECIFIC GUIDELINES FOR PROPOSERS

I. Evaluation Factors

The following evaluation factors will be used to evaluate the proposals. They replace and supersede those contained in *Appendix B, paragraph (i) Evaluation Factors*.

Factor 1: Applicability to SMD Earth Science Measurements and Technology Needs (40% of total evaluation weight)

1. The proposal's relevance and potential contribution to NASA's Earth Science research.
2. The potential for the measurement system to reduce the risk, cost, size, and development time of SMD systems, or to enable a new measurement that cannot now be made. Potential cost reductions should be clearly stated and substantiated to the extent possible, with supporting analysis that indicates scalability.
3. The potential of the measurement system to be integrated, once matured, into an operational agency/nongovernmental measurement system.
4. The potential for the measurement system to have commercial benefits.

Factor 2: Technical Merit (30% of total evaluation weight)

1. Feasibility and merit of the proposed technical approach to achieve the technology development objectives.
2. Degree of innovation of the proposed study or technology development concepts and approach.
3. Substantiated justification and appropriateness of the entry and exit technology readiness level (TRL).

Factor 3: Cost and Programmatic Realism (30% of total evaluation weight)

1. Adequacy and realism of proposed milestones.
2. Realism and reasonableness of the proposed cost, and comparison of costs to available funds.
3. Adherence to sound and consistent management practices appropriate to the TRL level of the proposed task.
4. Past performance and related experience in the proposed area of technology development.
5. Qualifications of key personnel, and adequacy of facilities, staff, and equipment to support the proposed activity.
6. Commitment of the organization's management to the proposed technology development (evidenced by cost and resource sharing, prior teaming arrangements, etc.). Proposers should identify any previous investment by the organization/program and provide supporting documentation.

II. Proposal Development Guidance

Proposers should periodically check the NRA website (<http://research.hq.nasa.gov>) for any updates to this NRA.

The technical proposal should address each of the items below, which supplement and/or modify the guidance provided in Appendix B.

- A. *Appendix B, Paragraph (c)(1) Transmittal Letter or Prefatory Material*. Each proposal will require a Proposal Cover Sheet and Certifications, as described in Appendices C and D.
- B. *Appendix B, Paragraph (c)(3) Abstract*. Provide an overall description of the proposal in abstract form, not to exceed 250 words.
- C. *Appendix B, Paragraph (c)(4)(i) Project Description*. The Project Description must include the following information: Items 1-5 below, and items D, E, and I.
 1. **Applicability to SMD Measurements** – Describe the benefit to future SMD science measurements (as defined in this NRA in Section II, Paragraph (b) Proposal Research Topics) that could utilize the proposed measurement system. Failure to describe relevancy to a specific research topic may be a cause for non-selection.
 2. **Description of Proposed Technology** – Provide a description of the proposed measurement system technology. Describe the technical approach and include an operational concept or use scenario of the proposed measurement system technology that addresses ESE needs. Discuss any possible commercial benefits.
 3. **Comparative Technology Assessment** – Describe the anticipated advantages of this measurement system technology compared to those currently in use - e.g., reduction of size, mass, power, volume or cost, improved performance, or enabling of a new capability not previously possible. Review the current state of the art and relate to the proposed work.
 4. **TRL Assessment** – Provide the current TRL assessment of the measurement system technology and the anticipated progression of TRL levels throughout the proposed effort. See Appendix E for guidance on Technology Readiness Levels. All TRL assessments must be substantiated. Failure to include and substantiate TRL assessments may be cause for non-selection.
 5. **Research Management Plan** – Provide a statement-of-work that concisely describes each task or milestone to be accomplished in the course of the research and development. Define the success criteria associated with each task or milestone. Also, include a milestone chart that identifies critical dates in the research and development program. At least two milestones per 12 month period should be defined; the first midway and the second near the end of the period. Identify the roles of key personnel.

6. Quad Chart: Provide a quad chart that contains the following information:

- (a) First Quadrant: Include a visual, graphic, or other pertinent information of the proposed instrument or science investigation
- (b) Second Quadrant: "Description and Objectives" – provide a short summary of the instrument design and measurement approach
- (c) Third Quadrant: "Approach" and "Co-I's/Partners"
- (d) Fourth Quadrant: "Schedule and Deliverables" and "Applications/Missions" – provide a summary of a few key deliverables (final designs, hardware completion, major tests, etc.) and identify potential future applications/measurements or missions for which the proposed instrument would be applicable

Subcontracting portions of the research project is acceptable.

- D. *Appendix B, Paragraph (c)(4)(ii) Project Description*. Complete cost information for the entire duration of the project must be provided.
- E. *Appendix B, Paragraph (c)(6) Personnel*. Include a list of key personnel and identify experience relevant to the proposed activity. *The Key Personnel list is included in the overall page count.*

Optionally, one-page resumes for Key Personnel may be supplied; these resumes are not included in the overall page count.

- F. *Appendix B, Paragraph (c)(7)(ii) Facilities and Equipment*. Before requesting a major item of capital equipment, the proposer should determine if sharing or loan of equipment already within the organization is a feasible alternative.
- G. *Appendix B, Paragraph (c)(8)(i) Proposed Costs (U.S. Proposals Only)*. Full cost accounting (FCA) is required in all proposals, including those submitted by U.S. Government agencies. To assist in the selection process, proposals that include any U.S. Government costs must submit budgets that clearly indicate the costs with FCA. Budget data entered on the Proposal Cover sheet must be in FCA. Cost sharing or matching arrangements should also be indicated, if applicable. Ensure that all costs to support reporting requirements, including travel, are included in the budget submission. Major subcontractor costs should be itemized in a manner similar to that specified in the subject paragraph. Proposed cost should not exceed six (6), non-reduced, typewritten pages, excluding those tables required in Appendix E Budget Summary. Supporting cost data is permitted in Microsoft Excel spreadsheet format. However, no imbedded, expandable tables are permitted in the spreadsheets.

A monthly cost phasing plan shall be submitted to facilitate award negotiation. The monthly cost phasing plan is included in the 6-page limit specified above.

- H. *Appendix B, Paragraph (c)(8)(ii) Proposed Costs (U.S. Proposals Only)*. Explanatory notes should accompany the cost proposal to provide clarification of items in the cost proposal that are not self-evident.
- I. *Appendix B, Paragraph (c)(11)(ii) Special Matters*. Proposers should include a brief description of the organization, its facilities, and previous work experience in the field of the proposal.
- J. *Appendix B, Paragraph (e) Length*. The maximum length of each proposal is limited to fifteen (15) non-reduced, single-spaced typewritten pages (electronic document not to exceed 2.5 Megabits) for the total of the Description of Proposed Technology, Applicability to SMD Missions, Comparative Technology Assessment, TRL Assessment, Schedule Milestones, Management Approach, Personnel (excluding optional, one-page resumes), Facilities and Equipment, and Special Matters sections. In other words, the whole proposal, excluding the Proposal Cover Sheet, Abstract and the Certifications required by Appendix D, Budget information, and optional resumes is limited to fifteen (15) pages. Each side of a sheet of paper containing text or figures is considered a page. Use type font 12 point or larger, minimum one-inch margins and standard 8.5 x 11 inch paper. As all pictures and graphs are included in the page count, proposers are encouraged to limit the use of these unless they provide unique information that cannot be derived from the printed text. *Proposals that exceed the 15 page limit will be truncated at 15 pages, and only that portion provided to reviewers for evaluation.*
- K. *Appendix B, Paragraph (f)(1) Joint Proposals*: Where multiple organizations are involved, the proposal must be submitted by only one of them. The proposal should clearly describe the role to be played by the other organizations and indicate the legal and managerial arrangements contemplated.

III. Proposal Submittal Guidance

The proposer shall submit 20 paper copies and one magnetic or optical disk (Macintosh and IBM PC compatible format) with the proposal. In order to expedite the review process, the technical proposal shall be submitted as one electronic file. That is, the disk submitted with the paper proposal shall have files for the technical proposal and the cost proposal from the certifications and representations required by Appendix D.

The following requirements apply to formatting the softcopy proposal:

- A. **Word Processor & Spreadsheet**. NASA converts all technical proposal files to PDF format for evaluation purposes. Therefore, NASA encourages proposers to submit technical proposals in PDF format. Other acceptable formats are Microsoft Word, WordPerfect, and Postscript. Cost proposals and supporting cost information may be submitted in Excel spreadsheet format.
- B. **Graphics**. For reasons of space conservation and simplicity the proposer is required to embed graphics within the document.
- C. **Limitations**. While only the paper copy will be screened for administrative compliance, the various files comprising the electronic version are required to exactly reflect the paper

version. It is the proposer's responsibility to ensure that the electronic copy of the proposal is the same as the paper copy. NASA will assume they are the same.

- D. Virus Check. The proposer is responsible for performing a virus check on all files submitted on magnetic or optical disk. As a standard part of entering the proposal files into the processing system, NASA will scan each submitted electronic file for viruses. The detection, by NASA, of a virus on any submitted electronic file may be cause for rejection of the proposal.

IV. Reporting Requirements

The following reports will be required of awarded proposals. In cases where subcontract arrangements exist, consolidated project reports, including financial reports, must be submitted and is the responsibility of the PI. The proposed budget should provide for these reporting requirements.

In this context "Annual" refers to a calendar year task effort which commences at contract award. All written reports and review presentation material should be submitted in electronic format or paper copy 10 days prior to the review.

Bimonthly technical reports:

The bimonthly technical report shall provide an overall PI assessment of the project in approximately one written page, the actual length of which depends on the level of activity during the month. The initial monthly report should include a plan for technical, schedule and resource activities for the year. Reports shall address the following:

- Summarize technical accomplishments for the preceding month including: technical accomplishments (trade study results, requirements analysis, design, etc.), technology development results, results of tests and/or demonstrations.
- Summarize schedule status including: significant tasks completed, started and expected to complete later than planned, significant tasks that are delayed starting with rationale for each, and recovery plans as appropriate.
- Technology Readiness Level assessment: Provide an assessment of the entry Technology Readiness Level (TRL) and the basis for that assessment for the critical technology developments of the activity. The first TRL assessment is to be provided with the first monthly report. An updated TRL assessment must be provided at the interim review and at the annual review. The final report should indicate the PI's assessment for time required to get from the IIP completion state to TRL 6, if not already there.

Format: Bimonthly reports shall be submitted in Microsoft Word or PowerPoint compatible formats.

Due date: Bimonthly technical reports shall be submitted by the 10th of the month or the close of business of the first workday following the 10th if the 10th is on a weekend or a federal holiday. A

teleconference or brief meeting may be conducted each month with the PI to review and discuss the monthly report.

Monthly financial reports (Required for contract awards only):

The following shall be included in the monthly financial reports:

- Summarize planned vs. actuals: The monthly financial report shall show the planned versus actual obligations and costs for the preceding month and explain any deviations from the plan. Include work that has been completed and cost incurred from the project (should be traceable to the schedule).
- Summarize procurements: The PI shall report the status of major procurements that have been incurred to date.

Format: Monthly financial reports may be submitted in Microsoft Excel compatible formats.

Due date: The financial report shall be submitted with the monthly technical report by the 10th of the month or the close of business of the first workday following the 10th if the 10th is on a weekend or a federal holiday.

If a fixed price contract is awarded, no financial reporting is required.

Interim review:

A presentation format review of the work accomplished and results leading up to this milestone review shall be held at each phase mid-point. The review shall:

- describe the primary findings, technology development results, technical status, status of construction of breadboards, and/or construction of an engineering model, and results of tests and/or demonstrations.
- provide a demonstration, if appropriate, to show technical results and status.
- describe the work planned for the remainder of the phase and critical issues that need to be resolved to successfully complete the remaining planned work.
- summarize the financial and schedule status of the project including any schedule slippage/acceleration.
- provide an update of the TRL assessment and the quad chart.

The review will be conducted at the PI's facility or a mutually agreed to location with the length of the presentation tailored as appropriate depending on the amount of work to be discussed. In addition to hard copy handouts at the review, the interim review package shall also be submitted in Microsoft Word or PowerPoint compatible formats.

Due date: Interim reviews shall be scheduled at a time mutually agreeable to the IIP program manager and the PI, but not after 60 percent of the duration of a phase.

Annual review:

The annual review will be a presentation format similar to the interim review. All interim content described above shall be covered. The planned work discussion should focus on the upcoming phase and any critical issues related to continuation. The PI should also recommend whether the work should be continued based on results to date and provide a strong rationale for the recommendation. **Exercise of any subsequent option phase(s) of contracts and continued funding of annual increments of grants and cooperative agreements will be decided based upon the results of the annual review(s).** For the *final* annual review, the focus should be on plans and issues related to fabricating a flight instrument.

The review will be conducted at the PI's facility or a mutually agreed to location with the length of the presentation tailored as appropriate depending on the amount of work to be discussed. The annual review for the final phase should be comprehensive and should include a discussion of the planned content of the written report. In addition to hard copy handouts at the review, the annual review package shall also be submitted in Microsoft Word or PowerPoint compatible formats.

Due date: Annual reviews shall be scheduled at a time mutually agreeable to the IIP program manager and the PI, however, in order to allow sufficient time for processing option phase continuation documentation, the annual review shall normally be conducted at least 30 days prior to the end of the phase.

Final report:

The final written report shall include the following:

- results of requirements analysis, instrument design, breadboards and/or an engineering model design and performance analyses.
- an update the TRL assessment and an estimate of the time required to reach TRL level 6 (using reasonable assumptions on funding levels).
- a final quad chart. This chart shall consist of three sections as follows:

First Quadrant: Include a visual, graphic, or other pertinent information of the proposed instrument or science investigation

Second Quadrant: "Description and Objectives" – provide a short summary of the instrument design and measurement approach. In general, this quadrant should be identical to the second quadrant of the original Quad chart, except where changes in objectives occurred as a result of the selection process

Third Quadrant: "Accomplishments" This section, which should include an area approximately equal to the first two quadrants, shall identify the major accomplishments of the IIP, including the success in meeting the original objectives and a summary of the key tests which were completed. Any significant change in approach or objective(s) should also be clearly indicated. This section shall also identify the final TRL level achieved.

- an instrument or measurement design concept or actual design and an instrument development plan leading to an operational instrument in 18 months including a concept for data product generation.
- an estimation of cost and schedule to develop a flight quality instrument, and documentation of technology dependencies.

The final report shall be submitted in Microsoft Word compatible format and paper copy by the end of the scheduled period of performance.

Distribution of Reports and Presentation Packages:

All electronic reports and presentation packages described in the preceding section shall be submitted to the program manager using the ESTO award administration e-books available at <http://esto.reisys.com/>. In order to protect any proprietary information, access to this system is restricted via usernames and passwords. Only the PI and the program manager will have access to the reports and presentations. A username and password will be provided to the PI to gain access to the system prior to the due date for the first monthly report.

Annual Conference:

If held, the awardee is encouraged to participate in an annual technology conference sponsored by the program office. This conference is an opportunity for NASA planners, managers, technologists and scientists to review the research and development tasks funded by the Science Mission Directorate. It is also an opportunity for researchers from NASA, academia and industry to meet with their peers and to better understand NASA's Earth systems research requirements. Invitational travel orders may be provided to those non-civil servant awardees selected to participate. If selected for participation in the conference, the awardee should be prepared to make a presentation, provide a paper, or create a poster providing a description of the project, the objectives, approach, technical status, and schedule information.

CURRENT AND PENDING RESEARCH SUPPORT FROM ALL OTHER SOURCES

All proposals must include this information. This list should include all current and pending research support from the following sources:

1. Any proposal for which the PI of this proposal is also the Principal Investigator.
2. Any proposal, regardless of the PI, which accounts for more than 20% of the time of the Principal Investigator of this proposal and other personnel essential to this proposal.

Please provide this information in the following format:

I. Principal Investigator

A. Current Fiscal Year Support

1. Source of Support and Principal Investigator
2. Award Amount and Period of Performance
3. Person-Months and Level of Effort
4. Project Title and Short Abstract (50 words or less)

B. Pending Proposals (Excluding this proposal but including other proposals).

1. Source of Support and Principal Investigator
2. Award Amount and Period of Performance
3. Person-Months and Level of Effort
4. Project Title and Short Abstract (50 words or less)

For both current and pending support provide information on:

II. Co-Investigators

As outlined above, provide information on all Current and Pending Support. Disclosure of current and pending research support is not required for collaborators.

III. Other agencies to which this proposal, or parts thereof, has been submitted.

Appendix B

1. INSTRUCTIONS FOR RESPONDING TO NASA RESEARCH ANNOUNCEMENTS (1852.235-72, OCTOBER 2002)

(a) **General.**

(1) Proposals received in response to a NASA Research Announcement (NRA) will be used only for evaluation purposes. NASA does not allow a proposal, the contents of which are not available without restriction from another source, or any unique ideas submitted in response to an NRA to be used as the basis of a solicitation or in negotiation with other organizations, nor is a pre-award synopsis published for individual proposals.

(2) A solicited proposal that results in a NASA award becomes part of the record of that transaction and may be available to the public on specific request; however, information or material that NASA and the awardee mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law, including the Freedom of Information Act.

(3) NRAs contain programmatic information and certain requirements that apply only to proposals prepared in response to that particular announcement. These instructions contain the general proposal preparation information that applies to responses to all NRAs.

(4) A contract, grant, cooperative agreement, or other agreement may be used to accomplish an effort funded in response to an NRA. The NASA contracting officer will determine the appropriate award instrument. Contracts resulting from NRAs are subject to the Federal Acquisition Regulation and the NASA FAR Supplement. Any resultant grants or cooperative agreements will be awarded and administered in accordance with the NASA Grant and Cooperative Agreement Handbook (NPG 5800.1).

(5) NASA does not have mandatory forms or formats for responses to NRAs; however, it is requested that proposals conform to the guidelines in these instructions. NASA may accept proposals without discussion; hence, proposals should initially be as complete as possible and be submitted on the proposers' most favorable terms.

(6) To be considered for award, a submission must, at a minimum, present a specific project within the areas delineated by the NRA; contain sufficient technical and cost information to permit a meaningful evaluation; be signed by an official authorized to legally bind the submitting organization; not merely offer to perform standard services or to just provide computer facilities or services; and not significantly duplicate a more specific current or pending NASA solicitation.

(b) **NRA-Specific Items.** Several proposal submission items appear in the NRA itself: the unique NRA identifier; when to submit proposals; where to send proposals; number of copies required; and sources for more information. Items included in these instructions may be supplemented by the NRA.

(c) The following information is needed to permit consideration in an objective manner. NRAs will generally specify topics for which additional information or greater detail is desirable. Each proposal copy shall contain all submitted material, including a copy of the transmittal letter if it contains substantive information.

(1) **Transmittal Letter or Prefatory Material.**

(i) The legal name and address of the organization and specific division or campus identification if part of a larger organization;

- (ii) A brief, scientifically valid project title intelligible to a scientifically literate reader and suitable for use in the public press;
- (iii) Type of organization: e.g., profit, nonprofit, educational, small business, minority, women-owned, etc.;
- (iv) Name and telephone number of the principal investigator and business personnel who may be contacted during evaluation or negotiation;
- (v) Identification of other organizations that are currently evaluating a proposal for the same efforts;
- (vi) Identification of the NRA, by number and title, to which the proposal is responding;
- (vii) Dollar amount requested, desired starting date, and duration of project;
- (viii) Date of submission; and
- (ix) Signature of a responsible official or authorized representative of the organization, or any other person authorized to legally bind the organization (unless the signature appears on the proposal itself).

(2) **Restriction on Use and Disclosure of Proposal Information.** Information contained in proposals is used for evaluation purposes only. Offerors or quoters should, in order to maximize protection of trade secrets or other information that is confidential or privileged, place the following notice on the title page of the proposal and specify the information subject to the notice by inserting an appropriate identification in the notice. In any event, information contained in proposals 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.

Notice

Restriction on Use and Disclosure of Proposal Information

The information (data) contained in [insert page numbers or other identification] of this proposal 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 other than for evaluation purposes; provided, however, that in the event a contract (or other agreement) is awarded on the basis of this proposal the Government shall have the right to use and disclose this information (data) to the extent provided in the contract (or other agreement). This restriction does not limit the Government's right to use or disclose this information (data) if obtained from another source without restriction.

(3) **Abstract.** Include a concise (200-300 word if not otherwise specified in the NRA) abstract describing the objective and the method of approach.

(4) Project Description.

(i) The main body of the proposal shall be a detailed statement of the work to be undertaken and should include objectives and expected significance; relation to the present state of knowledge; and relation to previous work done on the project and to related work in progress elsewhere. The statement should outline the plan of work, including the broad design of experiments to be undertaken and a description of experimental methods and procedures. The project description should address the evaluation factors in these instructions and any specific factors in the NRA. Any substantial collaboration with individuals not referred to in the budget or use of consultants should be described. Subcontracting significant portions of a research project is discouraged.

(ii) When it is expected that the effort will require more than one year, the proposal should cover the complete project to the extent that it can be reasonably anticipated. Principal emphasis should be on the first year of work, and the description should distinguish clearly between the first year's work and work planned for subsequent years.

(5) **Management Approach.** For large or complex efforts involving interactions among numerous individuals or other organizations, plans for distribution of responsibilities and arrangements for ensuring a coordinated effort should be described.

(6) **Personnel.** The principal investigator is responsible for supervision of the work and participates in the conduct of the research regardless of whether or not compensated under the award. A short biographical sketch of the principal investigator, a list of principal publications and any exceptional qualifications should be included. Omit social security number and other personal items, which do not merit consideration in evaluation of the proposal. Give similar biographical information on other senior professional personnel who will be directly associated with the project. Give the names and titles of any other scientists and technical personnel associated substantially with the project in an advisory capacity. Universities should list the approximate number of students or other assistants, together with information as to their level of academic attainment. Any special industry-university cooperative arrangements should be described.

(7) **Facilities and Equipment.**

(i) Describe available facilities and major items of equipment especially adapted or suited to the proposed project, and any additional major equipment that will be required. Identify any Government-owned facilities, industrial plant equipment, or special tooling that are proposed for use. Include evidence of its availability and the cognizant Government points of contact.

(ii) Before requesting a major item of capital equipment, the proposer should determine if sharing or loan of equipment already within the organization is a feasible alternative. Where such arrangements cannot be made, the proposal should so state. The need for items that typically can be used for research and non-research purposes should be explained.

(8) **Proposed Costs (U.S. Proposals Only).**

(i) Proposals should contain cost and technical parts in one volume: do not use separate "confidential" salary pages. As applicable, include separate cost estimates for salaries and wages; fringe benefits; equipment; expendable materials and supplies; services; domestic and foreign travel; ADP expenses; publication or page charges; consultants; subcontracts; other miscellaneous identifiable direct costs; and indirect costs. List salaries and wages in appropriate organizational categories (e.g., principal investigator, other scientific and engineering professionals, graduate students, research assistants, and technicians and other non-professional personnel). Estimate all staffing data in terms of staff-months or fractions of full-time.

(ii) **Explanatory notes should accompany the cost proposal to provide identification and estimated cost of major capital equipment items to be acquired; purpose and estimated number and lengths of trips planned; basis for indirect cost computation (including date of most recent negotiation and cognizant agency); and clarification of other items in the cost**

proposal that are not self-evident. List estimated expenses as yearly requirements by major work phases.

(iii) Allowable costs are governed by [FAR Part 31](#) and the [NASA FAR Supplement Part 1831](#) (and OMB Circulars A-21 for educational institutions and A-122 for nonprofit organizations). All proposals involving NASA employees as either PI or as a CO-I must be shown in full cost in accordance with Agency full cost accounting standards (www.hq.nasa.gov/fullcost).

(iv) Use of NASA funds--NASA funding may not be used for foreign research efforts at any level, whether as a collaborator or a subcontract (also see paragraph I). The direct purchase of supplies and/or services, which do not constitute research, from non-U.S. sources by U.S. award recipients is permitted. Additionally, in accordance with the National Space Transportation Policy, use of a non-U.S. manufactured launch vehicle is permitted only on a no-exchange-of-funds basis.

(9) **Security.** Proposals should not contain security-classified material. If the research requires access to or may generate security-classified information, the submitter will be required to comply with Government security regulations.

(10) **Current Support.** For other current projects being conducted by the principal investigator, provide title of project, sponsoring agency, and ending date.

(11) Special Matters.

(i) Include any required statements of environmental impact of the research, human subject or animal care provisions, conflict of interest, or on such other topics as may be required by the nature of the effort and current statutes, executive orders, or other current Government-wide guidelines. Of particular interest are proposed use of radioactive or hazardous materials or lasers.

(ii) Identify and discuss risk factors and issues throughout the proposal where they are relevant, and your approach to managing these risks.

(iii) Proposers should include a brief description of the organization, its facilities, and previous work experience in the field of the proposal. Identify the cognizant Government audit agency, inspection agency, and administrative contracting officer, when applicable.

(d) Renewal Proposals.

(1) Renewal proposals for existing awards will be considered in the same manner as proposals for new endeavors. A renewal proposal should not repeat all of the information that was in the original proposal. The renewal proposal should refer to its predecessor, update the parts that are no longer current, and indicate what elements of the research are expected to be covered during the period for which support is desired. A description of any significant findings since the most recent progress report should be included. The renewal proposal should treat, in reasonable detail, the plans for the next period, contain a cost estimate, and otherwise adhere to these instructions.

(2) NASA may renew an effort either through amendment of an existing contract or by a new award.

(e) **Length and Page Format.** Unless otherwise specified in the NRA, effort should be made to keep proposals as brief as possible, concentrating on substantive material. **Proposals are not to exceed 20 pages**, including references and figures (cover pages, certifications, budget sheets, and attachments are not included in this page limit). Necessary detailed information, such as

reprints, should be included as attachments. A complete set of attachments is necessary for each copy of the proposal. As proposals are not returned, avoid use of "one-of-a-kind" attachments.

(f) Joint Proposals.

(1) Where multiple organizations are involved, the proposal may be submitted by only one of them. It should clearly describe the role to be played by the other organizations and indicate the legal and managerial arrangements contemplated. In other instances, simultaneous submission of related proposals from each organization might be appropriate, in which case parallel awards would be made.

(2) Where a project of a cooperative nature with NASA is contemplated, describe the contributions expected from any participating NASA investigator and agency facilities or equipment, which may be required. The proposal must be confined only to that which the proposing organization can commit itself. "Joint" proposals, which specify the internal arrangements NASA will actually make, are not acceptable as a means of establishing an agency commitment.

(g) Late Proposals. Proposals or proposal modifications received after the latest date specified for receipt may be considered if a significant reduction in cost to the Government is probable or if there are significant technical advantages, as compared with proposals previously received.

(h) Withdrawal. Proposals may be withdrawn by the proposer at any time before award. Offerors are requested to notify NASA if the proposal is funded by another organization or of other changed circumstances, which dictate termination of evaluation.

(i) Evaluation Factors.

(1) Unless otherwise specified in the NRA, the principal elements (of approximately equal weight) considered in evaluating a proposal are its relevance to NASA's objectives, intrinsic merit, and cost.

(2) Evaluation of a proposal's relevance to NASA's objectives includes the consideration of the potential contribution of the effort to NASA's mission.

(3) Evaluation of its intrinsic merit includes the consideration of the following factors of equal importance:

(i) Overall scientific or technical merit of the proposal or unique and innovative methods, approaches, or concepts demonstrated by the proposal.

(ii) Offeror's capabilities, related experience, facilities, techniques, or unique combinations of these, which are integral factors for achieving the proposal objectives.

(iii) The qualifications, capabilities, and experience of the proposed principal investigator, team leader, or key personnel critical in achieving the proposal objectives.

(iv) Overall standing among similar proposals and/or evaluation against the state-of-the-art.

(4) Evaluation of the cost of a proposed effort may include the realism and reasonableness of the proposed cost and available funds. Cost is of substantially less weight than the other factors combined.

(j) Evaluation Techniques. Selection decisions will be made following peer and/or scientific review of the proposals. Several evaluation techniques are regularly used within NASA. In all

cases proposals are subject to scientific review by discipline specialists in the area of the proposal. Some proposals are reviewed entirely in-house, others are evaluated by a combination of in-house and selected external reviewers, while yet others are subject to the full external peer review technique (with due regard for conflict-of-interest and protection of proposal information), such as by mail or through assembled panels. The final decisions are made by a NASA selecting official. A proposal, which is scientifically and programmatically meritorious, but not selected for award during its initial review, may be included in subsequent reviews unless the proposer requests otherwise.

(k) Selection for Award.

(1) When a proposal is not selected for award, the proposer will be notified. NASA will explain generally why the proposal was not selected. Proposers desiring additional information may contact the selecting official who will arrange a debriefing.

(2) When a proposal is selected for award, negotiation and award will be handled by the procurement office in the funding installation. The proposal is used as the basis for negotiation. The contracting officer may request certain business data and may forward a model award instrument and other information pertinent to negotiation.

(l) Additional Guidelines Applicable to Foreign Proposals and Proposals Including Foreign Participation.

(1) NASA welcomes proposals from outside the U.S. However, foreign entities are generally not eligible for funding from NASA. Therefore, unless otherwise noted in the NRA, proposals from foreign entities should not include a cost plan unless the proposal involves collaboration with a U.S. institution, in which case a cost plan for only the participation of the U.S. entity must be included. Proposals from foreign entities and proposals from U.S. entities that include foreign participation must be endorsed by the respective government agency or funding/sponsoring institution in the country from which the foreign entity 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.

(2) All foreign proposals must be typewritten in English and comply with all other submission requirements stated in the NRA. All foreign 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. Those received after the closing date will be treated in accordance with paragraph (g) of this provision. Sponsoring foreign government agencies or funding institutions may, in exceptional situations, forward a proposal without endorsement if endorsement is not possible before the announced closing date. In such cases, the NASA sponsoring office should be advised when a decision on endorsement can be expected.

(3) Successful and unsuccessful foreign entities will be contacted directly by the NASA sponsoring office. Copies of these letters will be sent to the foreign sponsor. Should a foreign proposal or a U.S. proposal with foreign participation be selected, NASA's Office of External Relations will arrange with the foreign sponsor for the proposed participation on a no-exchange-of-funds basis, in which NASA and the non-U.S. sponsoring agency or funding institution will each bear the cost of discharging their respective responsibilities.

(4) Depending on the nature and extent of the proposed cooperation, these arrangements may entail:

- (i) An exchange of letters between NASA and the foreign sponsor; or
- (ii) A formal Agency-to-Agency Memorandum of Understanding (MOU).

(m) **Cancellation of NRA.** NASA reserves the right to make no awards under this NRA and to cancel this NRA. NASA assumes no liability for canceling the NRA or for anyone's failure to receive actual notice of cancellation.

2. ADDITIONAL INSTRUCTIONS

(a) Export Control Guidelines Applicable to Proposals Including Foreign Participation.

Proposals including foreign participation must include a section discussing compliance with U.S. export laws and regulations, e.g., 22 CFR Parts 120-130 and 15 CFR Parts 730-774, as applicable to the circumstances surrounding the particular foreign participation. The discussion must describe in detail the proposed foreign participation and is to include, but not limited to, whether or not the foreign participation may require the prospective proposer to obtain the prior approval of the Department of State or the Department of Commerce via a technical assistance agreement or an export license, or whether a license exemption/exception may apply. If prior approvals via licenses are necessary, discuss whether the license has been applied for or if not, the projected timing of the application and any implications for the schedule. Information regarding U.S. export regulations is available at <http://www.pmdtc.org> and <http://www.bis.doc.gov/>. Proposers are advised that under U.S. law and regulations, spacecraft and their specifically designed, modified, or configured systems, components, and parts are generally considered "Defense Articles" on the United States Munitions List and subject to the provisions of the International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120-130.

(b) Data Policy

NASA's policy is to work cooperatively with other U.S. government agencies and our international partners in the development of a comprehensive capability to observe and understand the Earth. In addition, both National and NASA policy require NASA to support private-sector investment in commercial space activities by committing the U.S. government to purchase commercially available goods and services. NASA will not develop a mission that in any significant way competes with or duplicates commercially available goods or services from U.S. industry.

APPENDIX C

INSTRUCTIONS FOR PROPOSAL SUBMISSION, INCLUDING REQUIRED PROPOSAL COVER PAGES

Proposal submission is comprised of two parts: Internet submission and postal submission. The Internet submission requires that the cover sheet, abstract, and Full Cost Accounting (FCA) budget be submitted via the SYS-EYFUS website (<http://proposals.hq.nasa.gov/>). A printed signed original of the entire proposal, 20 copies, and a magnetic or optical disk containing an electronic copy of the proposal must also be submitted via the postal service or equivalent means.

The first step in the submission process is to enter the Proposal Cover Sheet information via the SYS-EYFUS website. The resultant Cover Sheet and associated certifications must be printed and signed by the Principal Investigator (PI) and an official by title of the investigator's organization that is authorized to commit the organization. This authorizing signature also certifies that the proposing institution is in full compliance with the required certifications. These pages will not be counted against the page limit of the proposal.

This Appendix summarizes proposal submission requirements and instructions for SYS-EYFUS and postal submission.

I. SYS-EYFUS Submission

A. Access the SYS-EYFUS website at <http://proposals.hq.nasa.gov/>

B. If you obtained a UserID and password in the process of submitting a proposal for a previous research opportunity announcement, the same UserID and password can be used to complete the electronic proposal cover page in response to this research opportunity announcement. Be sure to click on "Edit Personal Information" if any of your contact information in the SYS-EYFUS is not current.

If you do not have a SYS-EYFUS UserID or password, you may obtain one electronically by performing the following steps:

1. Select the hyperlink for new user, which will take you to the Personal Information Search Page.
2. Enter your first and last name. SYS-EYFUS will search for your record information in the SYS-EYFUS database to verify that you do not currently have a valid UserID.
3. Enter your personal information as required in the registration form.
4. Select "submit", and a UserID and password will be e-mailed to you.

REGISTER EARLY. Information submitted to the SYS-EYFUS website is validated before being officially added to the database. *New users should allow two weeks for this validation to occur.*

Note: all Co-Investigators (Co-Is) must obtain a UserID and password in order to be added to the Cover Page.

C. Using your UserID and Password, login to the SYS-EYFUS website.

D. The following items must be submitted via the SYS-EYFUS website. Follow the instructions provided on the SYS-EYFUS website for submission, taking note of additional instructions provided below:

1. Proposal Cover Sheet

- a) Enter all cover sheet information, including the specific topic addressed by the proposal, into the form and select the <Submit> button. *Note: Each proposal may address only one topic. **CLICK THE <SUBMIT> BUTTON ONLY ONCE.***
- b) Print the resultant Cover Sheet to be signed and submitted with the official postal submission of the proposal.

NOTE: SUBMISSION OF THE ELECTRONIC COVER PAGE DOES NOT SATISFY THE DEADLINE FOR PROPOSAL SUBMISSION.

2. Abstract

3. Full Cost Accounting budget

Proposers who experience difficulty in using this site may contact the Help Desk at proposals@hq.nasa.gov (or call (202) 479-9376) for assistance. If you are unsure if your information has been successfully submitted, please call the Help Desk. Do NOT re-submit. The Help Desk will be able to promptly tell you if your submission has been received.

II. Postal Submission

A. Components of Postal Submission. The postal submission includes one (1) complete original signed proposal, 20 copies, and one (1) magnetic or optical disk (Macintosh or IBM PC compatible) containing the following *separate* files:

1. Technical Proposal, including the items listed in Appendix A, Paragraph II (J);
2. Budget Information, including costs with and without FCA (if required);
3. Optional Supporting Cost Information;
4. Optional One-Page Resumes; and
5. Optional Letters of Endorsement.

The original proposal must include a *signed cover page* and required certifications obtained from the SYS-EYFUS system. Acceptable formats for the technical proposal and optional resumes and letters of endorsement include PDF (preferred), Microsoft Word, and WordPerfect. The format(s) chosen shall be indicated on the disk label. Acceptable formats for budget and optional cost information include PDF (preferred),

Microsoft Excel, Microsoft Word, and WordPerfect. Other forms of submission such as facsimile or e-mail attachments are not acceptable.

- B. Packaging Requirements for Paper Copies of Proposal. Do not use bindings or special covers. Staple the pages of the proposal in the upper left-hand corner only. Secure packaging is mandatory. NASA cannot process proposals damaged in transit. All items for any proposal must be sent in the same envelope. If more than one proposal is being submitted, each proposal must be in its own envelope, but all proposals may be sent in the same package. Do not send duplicate packages of any proposal as "insurance" that at least one will be received.
- C. Where to Send Proposals. All proposals that are mailed through the U.S. Postal Service first class, registered, or certified mail; proposals sent by Express Mail or commercial delivery services; or hand-carried proposals must be delivered to the following address between 8:00 a.m. and 5:00 p.m. Eastern time:

IIP NRA
NASA Peer Review Services, SMD
500 E Street, SW, Suite 200
Washington, DC 20024-2760

Note: Proposals submitted to any address other than the one specified will not be accepted.

The telephone number 202-479-9030 may be used when required for reference by delivery services.

- D. Deadline for Proposal Receipt. All proposal submissions (Internet and postal) must be received no later than the date and time specified in the solicitation. Any proposal or portion of a proposal received after that specified date and time will not be considered.**



APPENDIX D Proposal Cover Page

Proposal Number: _____

Date: ___/___/___

Name of Submitting Institution: _____

Congressional District: _____

Proposal Title: _____

Name of Submitting Institution: _____

Congressional District: _____

7. Certification of Compliance with Applicable Executive Orders and US Code

By submitting the proposal identified in this *Cover Sheet/Proposal Summary* in response to this Research Announcement, the Authorizing Official of the proposing institution (or the individual proposer if there is no proposing institution) as identified below:

- certifies that the statements made in this proposal are true and complete to the best of his/her knowledge;
- agrees to accept the obligations to comply with NASA award terms and conditions if an award is made as a result of this proposal; and
- confirms compliance with all provisions, rules, and stipulations set forth in the two Certifications contained in this NRA [namely, (i) *Assurance of Compliance with the NASA Regulations Pursuant to Nondiscrimination in Federally Assisted Programs*, and (ii) *Certifications, Disclosures, And Assurances Regarding Lobbying and Debarment & Suspension*].

Willful provision of false information in this proposal and/or its supporting documents, or in reports required under an ensuing award, is a criminal offense (U.S. Code, Title 18, Section 1001).

NASA PROCEDURE FOR HANDLING PROPOSALS

This proposal shall be used and disclosed for evaluation purposes only, and a copy of this Government notice shall be applied to any reproduction or abstract thereof. Any authorized restrictive notices that the submitter places on this proposal shall also be strictly complied with. Disclosure of this proposal for any reason outside the Government evaluation purposes shall be made only to the extent authorized by the Government.

Principal Investigator Name:	Authorized Institutional Official Name:
Organization:	Organization:
Department:	Department:
Mailing Address:	Mailing Address:
City, State Zip:	City, State Zip:
Telephone Number:	Telephone Number:
Fax Number:	Fax Number:
Email Address:	Email Address:
Principal Investigator Signature: _____	Authorized Institutional Official Signature: _____
Date: _____	Date: _____

Sample

Co-Investigator:

Name	Telephone	Email	Institution	Address

Budget:

A. Year	Budget
1	
2	
3	
B. Total	

Assurance of Compliance with the NASA Regulations Pursuant to Nondiscrimination in Federally Assisted Programs

The (*Institution, corporation, firm, or other organization on whose behalf this assurance is signed, hereinafter called "Applicant "*) hereby agrees that it will comply with Title VI of the Civil Rights Act of 1964 (P.L. 88-352), Title IX of the Education Amendments of 1972 (20 U.S.C. 1680 et seq.), Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and the Age Discrimination Act of 1975 (42 U.S.C. 16101 et seq.), and all requirements imposed by or pursuant to the Regulation of the National Aeronautics and Space Administration (14 CFR Part 1250) (hereinafter called "NASA") issued pursuant to these laws, to the end that in accordance with these laws and regulations, no person in the United States shall, on the basis of race, color, national origin, sex, handicapped condition, or age be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Applicant receives federal financial assistance from NASA; and hereby give assurance that it will immediately take any measure necessary to effectuate this agreement.

If any real property or structure thereon is provided or improved with the aid of federal financial assistance extended to the Applicant by NASA, this assurance shall obligate the Applicant, or in the case of any transfer of such property, any transferee, for the period during which the real property or structure is used for a purpose for which the federal financial assistance is extended or for another purpose involving the provision of similar services or benefits. If any personal property is so provided, this assurance shall obligate the Applicant for the period during which it retains ownership or possession of the property. In all other cases, this assurance shall obligate the Applicant for the period during which the federal financial assistance is extended to it by NASA.

This assurance is given in consideration of and for the purpose of obtaining any and all federal grants, loans, contracts, property, discounts, or other federal financial assistance extended after the date hereof to the Applicant by NASA, including installment payments after such date on account of applications for federal financial assistance which were approved before such date. The Applicant recognizes and agrees that such federal financial assistance will be extended in reliance on the representations and agreements made in this assurance, and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Applicant, its successors, transferees, and assignees, and the person or persons whose signatures appear on the Proposal Cover Sheet above are authorized to sign on behalf of the Applicant.

CERTIFICATIONS, DISCLOSURES, AND ASSURANCES REGARDING LOBBYING AND DEBARMENT & SUSPENSION

1. LOBBYING

As required by Section 1352, Title 31 of the U.S. Code, and implemented at 14 CFR Part 1271, as defined at 14 CFR Subparts 1271.110 and 1260.117, with each submission that initiates agency consideration of such applicant for award of a Federal contract, grant, or cooperative agreement exceeding \$ 100,000, the applicant must **certify** 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 an 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 continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than 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 the Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit a 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.

2. GOVERNMENTWIDE DEBARMENT AND SUSPENSION

As required by Executive Order 12549, and implemented at 14 CFR 1260.510, for prospective participants in primary covered transactions, as defined at 14 CFR Subparts 1265.510 and 1260.117—

(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 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 a 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.

Appendix E

Notice of Intent to Propose

In order to plan for a timely and efficient peer review process, *Notices of Intent* (NOI's) to propose are strongly encouraged by the date given in this NRA. The submission of a NOI is not a commitment to submit a proposal, nor is information contained therein considered binding on the submitter. NOI's are to be submitted electronically by entering the requested information through SYS-EYFUS Web site located at <http://proposals.hq.nasa.gov/>.

User identifications (IDs) and passwords are required by NASA security policies in order to access the SYS-EYFUS Web site.

If the proposer obtained a User ID and password in the process of submitting a proposal for a previous research opportunity announcement, the same user UserID and password can be used to complete the electronic Notice of Intent to Propose in response to this research opportunity announcement.

If you do not have a SYS-EYFUS UserID or password, you may obtain one electronically by going to <http://proposals.hq.nasa.gov> and performing the following steps:

- Click the hyperlink for **new user** which will take you to the Personal Information Search Page.
- Enter your first and last name. SYS-EYFUS will **search** for your record information in the SYS-EYFUS database.
- Confirm your personal information by **choosing** the record displayed.
- Select **continue**, and a User ID and password will be e-mailed to you.

Once you receive your User ID and Password, **login** to the SYS-EYFUS Web site and follow the instructions for **New Notice of Intent**.

At a minimum, the following information will be requested:

- NRA number, alpha-numeric identifier, (Note: this may be included on the Web site template);
- the Principal Investigator's name, mailing address, phone number, and E-mail address;
- the name(s) of any Co-Investigator(s) and institution(s) known by the NOI due date;
- a descriptive title of the intended investigation; and,
- a brief description of the investigation to be proposed.

A separate NOI must be submitted for each intended proposal.

APPENDIX F
BUDGET SUMMARY

For period from _____ to _____

- Provide a complete Budget Summary for year one and separate estimated for each subsequent year.
- Enter the proposed estimated costs in Column A (Columns B & C for NASA use only).
- Provide as attachments detailed computations of all estimates in each cost category with narratives as required to fully explain each proposed cost. See *Instructions For Budget Summary* on following page for details.

	A	<u>NASA USE ONLY</u>	
		B	C
1. <u>Direct Labor</u> (salaries, wages, and fringe benefits)	_____	_____	_____
2. <u>Other Direct Costs:</u>			
a. Subcontracts	_____	_____	_____
b. Consultants	_____	_____	_____
c. Equipment	_____	_____	_____
d. Supplies	_____	_____	_____
e. Travel	_____	_____	_____
f. Other	_____	_____	_____
3. <u>Indirect Costs*</u>	_____	_____	_____
4. <u>Other Applicable Costs</u>	_____	_____	_____
5. <u>SUBTOTAL--Estimated Costs</u>	_____	_____	_____
6. <u>Less Proposed Cost Sharing</u> (if any)	_____	_____	_____
7. <u>Carryover Funds</u> (if any)			
a. Anticipated amount : _____			
b. Amount used to reduce budget	_____	_____	_____
8. <u>Total Estimated Costs</u>	_____	_____	XXXXXXXX
9. APPROVED BUDGET	XXXXXX	XXXXXXXX	_____

***Facilities and Administrative Costs.**

INSTRUCTIONS FOR BUDGET SUMMARY

1. Direct Labor (salaries, wages, and fringe benefits): Attachments should list the number and titles of personnel, amounts of time to be devoted to the grant, and rates of pay.
2. Other Direct Costs:
 - a. Subcontracts: Attachments should describe the work to be subcontracted, estimated amount, recipient (if known), and the reason for subcontracting.
 - b. Consultants: Identify consultants to be used, why they are necessary, the time they will spend on the project, and rates of pay (not to exceed the equivalent of the daily rate for Level IV of the Executive Schedule, exclusive of expenses and indirect costs).
 - c. Equipment: List separately. Explain the need for items costing more than \$5,000. Describe basis for estimated cost. General purpose equipment is not allowable as a direct cost unless specifically approved by the NASA Grant Officer. Any equipment purchase requested to be made as a direct charge under this award must include the equipment description, how it will be used in the conduct of the basic research proposed and why it cannot be purchased with indirect funds.
 - d. Supplies: Provide general categories of needed supplies, the method of acquisition, and the estimated cost.
 - e. Travel: Describe the purpose of the proposed travel in relation to the grant and provide the basis of estimate, including information on destination and number of travelers where known.
 - f. Other: Enter the total of direct costs not covered by 2a through 2e. Attach an itemized list explaining the need for each item and the basis for the estimate.
3. Indirect Costs*: Identify F&A cost rate(s) and base(s) as approved by the cognizant Federal agency, including the effective period of the rate. Provide the name, address, and telephone number of the Federal agency official having cognizance. If unapproved rates are used, explain why, and include the computational basis for the indirect expense pool and corresponding allocation base for each rate.
4. Other Applicable Costs: Enter total explaining the need for each item.
5. Subtotal-Estimated Costs: Enter the sum of items 1 through 4.
6. Less Proposed Cost Sharing (if any): Enter any amount proposed. If cost sharing is based on specific cost items, identify each item and amount in an attachment.
7. Carryover Funds (if any): Enter the dollar amount of any funds expected to be available for carryover from the prior budget period Identify how the funds will be used if they are not used to reduce the budget. NASA officials will decide whether to use all or part of the anticipated carryover to reduce the budget (not applicable to 2nd-year and subsequent-year budgets submitted for award of a multiple year award).
8. Total Estimated Costs: Enter the total after subtracting items 6 and 7b from item 5.

* Facilities and Administrative (F&A) Costs

APPENDIX G
DEFINITION OF TECHNOLOGY READINESS LEVELS

TRL 1 Basic principles observed and reported

TRL 2 Technology concept and/or application formulated

TRL 3 Analytical and experimental critical function and/or characteristic proof-of-concept

TRL 4 Component and/or breadboard validation in laboratory environment

TRL 5 Component and/or breadboard validation in relevant environment

TRL 6 System/subsystem model or prototype demonstration in a relevant environment (ground or space)

TRL 7 System prototype demonstration in a space environment

TRL 8 Actual system completed and "flight qualified" through test and demonstration (ground or space)

TRL 9 Actual system "flight proven" through successful mission operations

APPENDIX H
LIST OF ACRONYMS USED IN THIS RESEARCH ANNOUNCEMENT

AO	Announcement of Opportunity
ACT	Advanced Component Technology
EOS	Earth Observing System
ESE	Earth Science Enterprise
ESTO	Earth Science Technology Office
FAR	Federal Acquisition Regulation
FY	Fiscal Year
GEO	Geostationary Earth Orbit
GSFC	Goddard Space Flight Center
IIP	Instrument Incubator Program
LEO	Low Earth Orbit
NASA	National Aeronautics and Space Administration
NFS	NASA FAR Supplement
NRA	NASA Research Announcement
OES	Office of Earth Science
OMB	Office of Management and Budget
PI	Principal Investigator
SMD	Science Mission Directorate
SNR	Signal to Noise Ratio
TRL	Technology Readiness Level
UAV	Uninhabited Aerial Vehicle
URL	Uniform Resource Locator
WWW	World Wide Web