



**National Aeronautics and
Space Administration**

July 14, 2004

NN-H-04-Z-YO-007-N

RESEARCH ANNOUNCEMENT

Earth Science Outreach Investigator Awards

**Notice of Intent Due August 16, 2004
Proposals Due October 14, 2004**

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

EARTH SCIENCE OUTREACH INVESTIGATOR AWARDS

NASA RESEARCH ANNOUNCEMENT (NRA)

NN-H-04-Z-YO-007-N

**CATALOG OF FEDERAL DOMESTIC ASSISTANCE (CFDA) NUMBER:
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ISSUED: JULY 14, 2004

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Outreach Investigator Awards

I FUNDING OPPORTUNITY DESCRIPTION

a) Purpose of this NASA Research Announcement

This NASA Research Announcement (NRA) solicits proposals to support innovative and effective outreach strategies, products or services to assist the NASA Earth Science Enterprise to engage the public in shaping and sharing the experience of exploration and discovery. Results will be contract awards that will require deliverables and will be subject to the Federal Acquisition Regulations (FAR) and the NASA FAR Supplement (NFS). The Rights in Data General clause (FAR 52.222-14), and possibly other FAR Rights in Data clauses, will be included.

Selected activities must be keenly aware of, and exhibit the capacity to communicate, the following Earth Science Enterprise message:

What NASA Does

We use our vantage from space to understand and protect our home planet.

Why NASA Does Earth Science

- Planet Earth is a complex, dynamic system with many unknown processes. The Earth system, like the human body, comprises diverse components that interact in complex ways, requiring unique capabilities for characterizing, understanding, and predicting change. NASA's view of the whole planet from space enabled us to pioneer the field of Earth system science.
- Earth is the only planet in our solar system known to be capable of sustaining life. NASA's research of the Earth system tells us why.
- Over the past 50 years, world population has doubled, while grain yields have tripled and economic output has grown sevenfold. Earth system science contributes to understanding whether and how the Earth can sustain this growth in the future.
- Over a third of the US economy--\$3 trillion annually—is influenced by climate, weather, and natural hazards. NASA creates technology and knowledge for our partners and the public use to enhance economic security and environmental stewardship.
- The leaders and citizens who will meet challenges of tomorrow are in school today. Earth system science is strengthening science, technology, engineering and mathematics education nationwide.
- In an increasingly interconnected world, human activities cause global change, and global changes affect us all. NASA's Earth Science Enterprise conducts research and technology development to answer the question "How is the Earth system changing, and what are the consequences for life on Earth?"

How NASA Does Earth Science (e.g. What does NASA uniquely contribute?)

Our mission: *To understand and protect our home planet by using our view from space to study the Earth system and improve prediction of changes in the Earth system.*

- We give the world innovative and powerful means to observe Earth as a system.

- We conduct and sponsor research to answer fundamental science questions about the changes we see in climate, weather and natural hazards on planet Earth.
- We extend the use of new technology and knowledge about the Earth system to serve society through partnerships with other Federal agencies, industries, and other nations.
- We deliver sound science to help decision-makers make knowledgeable decisions.
- We provide knowledge of how and why life is sustained on Earth to help scientists explore the universe and search for life elsewhere.
- We inspire the next generation of Earth explorers by providing opportunities for learners of all ages to investigate the Earth system using unique NASA resources.

b) Programmatic Ties to NASA's Earth Science Enterprise Objectives

The NASA's 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 number one mission, "To understand and protect our home planet" is broken down into goals and objectives. Goal number one reads, "To understand Earth's system and apply Earth system science to improve the prediction of climate, weather, and natural hazards." The objectives to accomplish this goal are as follows: 1) understand how Earth is changing, better predict change, and understand consequences for life on Earth; 2) Expand and accelerate the realization of economic and societal benefits from Earth science, information and technology; 3) Understand the origins and societal impacts of variability in the Sun-Earth connection; 4) Catalog and understand potential hazards to Earth from space.

For additional information on NASA's goals and objectives please refer to the NASA 2002 Strategic Plan, <http://www.nasa.gov/>. The NASA Earth Science Enterprise Strategy 2003 can be found at the Destination Earth website, <http://www.earth.nasa.gov>. Detailed information, including the Earth Science Research and Applications documents, Earth Science Enterprise can be found at <http://www.earth.nasa.gov//visions>. (Destination Earth website). Detailed information on the Research theme of the Earth Science Enterprise can be found at <http://www.earth.nasa.gov/> under the heading *Science of the Earth Systems*. Detailed information on the Earth Science Missions and Advanced Technology can be found under those headings on the Destination Earth website and the Earth Science Enterprise Education Program has information and pertinent documents under the heading, *Teaching Earth Science*. Detailed information on the Earth Science Applications theme can be accessed at <http://www.earth.nasa.gov/> under the *Science for Society* hotlink.

In 1958, Congress passed the Space Act mandating NASA to broadly disseminate the knowledge it generates. Further, NASA's mission is to use the agency's research results and observing capabilities "to inspire the next generation of explorers." NASA seeks to "engage the public in shaping and sharing the experience of exploration and discovery." Additionally, the E-Government Act of 2003 encourages and empowers Federal agencies to use advanced technology as an integral component of Outreach strategy, in order to make government research more "citizen-centric." Finally, the Earth Science Enterprise has an obligation to inform the public of the return on the federal investment in NASA.

The ESE Outreach and Communications Plan (available at NASA Office of Earth Science, Washington D.C. and on-line at <http://www.earth.nasa.gov/visions>) outlines a framework to inform broader audiences not only of *what* we NASA ESE is accomplishing and learning, but also *why* we are doing so and *how* it is relevant to society. NASA's Earth Science Enterprise provides overall leadership and guidance for outreach activities and a coordinated network of ESE staff, Enterprise-affiliated field centers and their staff, and partner institutions and their staff, that contribute to NASA in implementing our plan.

Earth Science Enterprise Contributions to NASA Goals and Objectives can be found in Appendix I of this document.

c) As Only NASA Can

NASA's unique contributions to Earth Science Enterprise include:

- Creating the ability to study the Earth as an integrated physical and biological system. The Agency is pioneering new remote sensing capabilities from a variety of vantage points in space exploration of the Earth. Global-scale changes require a global perspective, and local and regional changes can only be fully understood in their global context.
- Addressing fundamental scientific questions with an "end-to-end" systems approach that integrates Earth observations, interdisciplinary research, and Earth system modeling, and provides comprehensive results to Earth science questions that can be used to inform policy and economic decisions.
- Advancing remote sensing technology and computational modeling for scientific purposes, and facilitating the transition of mature observations and technologies to partner agencies that provide essential decision support services using Earth science information.
- Forging domestic and international partnerships to explore the complex Earth system. NASA has the program management and system engineering expertise to help lead complex, multi-partner research endeavors as well as make unique contributions to those led by other nations and organizations. In these ways and more, we conduct Earth system observation, research, and knowledge transfer— as only NASA can.

d) Program Description

Effective outreach and communications of ESE program elements transcends beyond the traditional approach of reporting mission launches and exciting images from an Earth observation spacecraft. The NASA Earth Science Outreach and Communications Plan provides guidance for approaches that are far more descriptive and interactive than the practice of distributing fountain pens, lapel pins, posters, and non-targeted brochures. Effective ESE outreach must:

- Enable a common understanding of the enterprise mission and purpose through a common message (refer to section 1.1) for the approximately 14,000 personnel associated with the Earth Science Enterprise (NASA civil servants (3000), contractors (8000), partners (3000));
- Continuously update the global community on evolving Enterprise plans and dynamic results;
- Make decision-makers and opinion-shapers cognizant of the value, types, and sources of ESE information and space exploration results;
- Empower our internal and external communications intermediaries;
- Provide a coherent framework for the ESE Outreach network to work in;
- Implement efficient use of existing resources and electronic technologies;
- Promote Earth Science literacy in the public;
- Convey the value of ESE education programs for the "next generation of explorers" ; and
- Communicate the effectiveness of products and activities resulting from NASA research and development of aerospace science and technology for Earth System Science.

External stakeholders that understand the Enterprise's contributions are likely to appreciate how the U.S. space agency positively affects their daily lives. Furthermore, the plan seeks to operate within the new NASA paradigms that (1) all investments contribute to a single set of Agency goals and (2) all activities convey One NASA and "As Only NASA Can."

Outreach Goal

In keeping with NASA and Federal strategic goals, the Earth Science Enterprise's Outreach goal is to provide current and accurate information for access by policymakers and opinion-shapers, the public at large and the users of Earth science data that enable contributions to protect and understand Earth.

Outreach Objectives

- To communicate our progress, the value and relevance of our results, and our future plans to decision makers and opinion shapers;
- To increase public awareness of NASA's key role in Earth science and engage them in our missions, discoveries, and applications of our research and development results; and
- To improve the capacity of other communicators of Earth science to deliver engaging NASA content.

Approach

The ESE Outreach and Communications Plan 2003 shifts the paradigm for outreach to a strategically targeted approach leveraging a coordinated network of people, organizations, and resources. ESE outreach and communications products or services should:

- Map easily and intuitively to Federal, Program, Agency, and Enterprise strategies;
- Clearly identify target audiences with common messages tailored to each group;
- Open and maintain pathways of communication with key decision-makers and opinion-shapers;
- Guide the development of information products that accurately and clearly communicate the NASA's Earth science results;
- Engage our science and applications community;
- Leverage resources by creating partnerships with appropriate groups and organizations;
- Provide Earth observation opportunities for the general public by building a communications network where sustained and engaging activities are provided; and
- Measures and evaluates all activities.

Proposers to this solicitation of ESE outreach and communications should use these criteria as benchmarks for proposed networks, products, and services.

Target Audiences

The Outreach audiences can be grouped into three broad categories: Public Communication, Stakeholder Communication, and Peer Communication. Though not identical, the Enterprise's terms are consistent with the *President's Management Agenda's* definitions of target audiences as "government to citizen," "government to government," and "government to business." Target groups are defined as follows:

- **Public Communication**

Public Communication is defined as communicating with the public (science attentive, informed, and general). This component is highly synergistic with "informal education" as addressed by the NASA Education Enterprise but specifically targets the "broader public community." Examples include press releases, NASA and ESE web pages, media coverage of ESE activities, science museum exhibits, and community events. ESE's Education Program Strategy and the Education Enterprise maintain responsibilities for informal education, but many ESE outreach activities will serve informal education audiences. The ESE Education Strategy, *Inspire the Next Generation of Earth Explorers*, and the Education Enterprise Strategy, *See Learning in a Whole New Light*, document the ESE and Agency education goals.

The public has access to numerous conduits of information including newspapers, magazines, television, radio, and various reports. As officially noted by Congress in the E-Government Act, recent studies indicate that a growing number of people rely on the Internet for information acquisition, particularly for Earth science-related issues. As Earth science information often addresses topics of interest and relevance beyond the NASA internal community, ESE outreach should effectively leverage (where possible),

all available media platforms to communicate with the public. As such, our plan requires a strong relationship with NASA's Office of Public Affairs and Office of Legislative Affairs.

- **Stakeholder Communication**

Stakeholder Communication is defined as communicating with decision-makers and opinion-shapers and establishing resources and systematic processes to enable efficient and effective access to NASA's Earth Science results and to facilitate inputs to the direction for future Earth science programs. State, local, and federal policymakers (and some internal Agency decision-makers) are included in this "community of decision-making".

A key component of this plan is to reach strategic stakeholders - those who are asked to make decisions or inform decision-makers enabled by NASA research results in Earth Science. The stakeholder community, including policymakers and opinion-shapers at all levels, are often very active consumers of science information. As the scope of NASA's Earth science and policy agendas expand, the challenge increases to provide decision makers and others with up-to-the minute scientific and technical information that could affect critical policy issues. This group represents the interest of the broader public. Key sources of policy information include major science literature (e.g., Nature and Science magazines) and the Internet. We need to maximize the dissemination of information through these venues and other effective mechanisms.

- **Peer Communication**

Peer Communication is defined as communicating with internal and external intermediary groups that work to create products or services for the stakeholders and/or public. Examples include other Federal agencies, interagency and international committees, NASA internal institutions, university researchers, the private sector, media and non-governmental organizations (e.g., law offices, businesses, civic groups). This group can be effectively referred to as a "community of practice".

Our Outreach plan involves sharing Earth science results with key audiences that are themselves "intermediary" users or members of the community-of-practice associated with Earth science information. This group includes international partners, federal agencies, non-Enterprise NASA institutions, media, associations, or private-sector companies that utilize NASA's Earth science information. These groups are important conduits for Earth science information and it is our responsibility to ensure that ESE's message is current and consistent. In the broader context of this "community of practice," we are an integral part of domestic programs in Climate Change Science and Technology Programs, IWGEO, CRSP IWG, OceanUS, Geospatial One Stop, US Weather Research Program, and Earthscope. NASA is also a key participant in international groups including the Global Climate Observing System (GCOS), Global Terrestrial Observing System (GTOS), Global Ocean Observing System (GOOS), Integrated Global Observing Strategy (IGOS), and Committee on Earth Observation

Satellites (CEOS). NASA supports a number of United Nations programs including the World Meteorological Organization (WMO) and World Summit on Sustainable Development (WSSD). As such, our Outreach efforts must be consistent with and scalable to these efforts.

Among the target audiences above, this NRA focuses on communication to the public, with stakeholder and peer communications as secondary and tertiary priorities, respectively.

Rationale for This NRA

The Earth Science Enterprise has over eighty sensors on eighteen Earth observation satellites delivering over three terabytes of data per day, and there is value in communicating the information to our target audiences. For this reason, effective and target outreach and communications strategies, products and services are required.

Within the science community, resources and opportunities are required to enable scientists to engage in the communication of their research and discoveries to non-scientists. In addition, most expertise on communicating with broad audiences lies outside the science community, and NASA can help foster those linkages.

Investment in Outreach is driven by several considerations.

- Prioritization of target audiences (e.g., decision-makers and opinion shapers);
- Mapping of target audiences to communication pathways and products;
- Measures of cost vs. reach/impact for communication products (includes "scalability" of product or activity);
- Leveraging of formal and informal education resources in product development;
- Requirements to obtain essential, non-government resources for ESE Outreach efforts;
- Ensuring ease of access to ESE data;
- Empowerment of the public and local decision makers through citizen centered information sharing of NASA research results; and
- Promotion of innovation through competition.

Historically, it has been difficult to define measures of success for Outreach activities. Proposed strategies, products, and services should strive to meet the following metrics to be considered as candidate ESE outreach agents:

Message: Consistency with current Agency and Enterprise strategies and messages.

Target Audience: Clearly identifies a target audience(s) with appropriate message(s) for the intended group.

Scalability: How effectively can the activity, service or product be scaled: (1) to different and wide range of target audiences, (2) to diverse subject matter, or (3) to foreseen and unanticipated needs.

- Sustainability: Initiatives will be evaluated for duration of impact to the intended target audience as well as financial sustainability beyond ESE investment.
- Evaluation: Implements an evaluation plan to effectively measure success in terms of number of target audience(s) reached, effectiveness, cost/benefit, sustainability, and scalability.
- Partnerships: Effectively leverages existing resources and partnerships.

Safety

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 workforce (including employees working under NASA award instruments), and (4) high-value equipment and property. Individuals or organizations wishing to submit a proposal for this research request should plan to implement safety measures for all research performed, such that safety is ensured according to this specification

II. AWARD INFORMATION

The number of awards anticipated is approximately 10-15, depending on the size of the individual awards. Awards will be made for a period of one year, with two 1-year options. Proposers are not required to propose options but may elect to include one or two option periods. Funding at a level of approximately \$1 million per year is expected to be available for this solicitation. It is anticipated that the average NASA Outreach Investigator Award will be funded in the range of \$50,000 to \$150,000 per year.

Proposers are encouraged to leverage NASA funding with resources (either monetary or in-kind) from other sources.

Prior to production of any deliverable items, elected contractors will be required to conduct a review and obtain approval from NASA.

III. ELIGIBILITY INFORMATION

Participation in the program is open to all categories of domestic and foreign organizations, including educational institutions, industry, non-profit institutions, NASA centers, and other U.S. agencies. Collaborations with partners from institutions other than the submitting institution, including international collaborations, are strongly encouraged. Access to unique equipment, facilities, and/or geographical locations, and the opportunity to collaborate with outstanding foreign researchers and educators may provide substantial benefits to the proposed activity.

IV. PROPOSAL AND SUBMISSION INFORMATION

Specific Guidelines in Preparing Responses to This NRA

Twenty (20) copies of the proposal should be submitted. One copy must bear original signatures. Original signatures are to be placed on an official cover page, which is generated electronically and printed through SYS-EFUS; an example of the required cover page is located in Appendix B. Notice of Intent is requested within two (2) weeks after release of this Research Announcement. Proposals should not exceed 15 pages of single-spaced standard font of size 12, exclusive of title, abstract, references, vitae, budget information and certificates. Vitae should not exceed 3 pages per investigator, including publications. A work plan, which describes the specific tasks for each year of the proposal, should be included as part of the text. Proposals should be self-contained and should not refer to other material, such as websites on the Internet. If color figures are included, they should be included in all copies provided. Attached preprints and reprints of publications and reports will be ignored in the review process. To facilitate recycling, proposals should be prepared without binders or plastic covers. Appendices C and D contain a cover sheet, required certifications and budget summary form which must be submitted with the original signature version of all proposals.

Note that NASA investigators should prepare their budgets to include full cost accounting. The reference for the NASA Full Cost Initiative can be found at <http://www.hq.nasa.gov/fullcost>.

Proposals will be subjected to both mail and panel reviews.

Further details to assist proposers in preparing their submissions can be found in the Guidebook for Proposers Responding to a NASA Research Announcement, which includes NASA Headquarters policy on submitting a Notice of Intent (NOI) and accessing SYS-EYFUS. The website may be found at: <http://www.hq.nasa.gov/office/procurement/nraguidebook>.

Prospective proposers are advised that the *Cover Page* requires that all applicants must provide the Dun and Bradstreet (D&B) Data Universal Numbering System (DUNS) number for their employing organization. This requirement applies to successor awards as well as to prospective new awards. The DUNS number is a unique nine-character identification number provided by the commercial company Dun and 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/>. Requesting a DUNS number takes ~10 minutes by telephone or ~14 days through the Web site; both are free of charge. Organizations will use the same DUNS number with every proposal submitted for a Federal grant or cooperative agreement so that this registration need only be done one time. Note that the DUNS number is site-specific.

The *Cover Page* also requires a Commercial And Government Entity (CAGE) code that the applicant's organization obtains by registering in the Central Contractor Registration (CCR) database. This requirement centralizes information about grant recipients and provides 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* that is

also located at the same site. The process for obtaining a CAGE code is incorporated into the CCR registration.

V. PROPOSAL REVIEW INFORMATION

The Earth Science Outreach Investigator awards will be selected through the Enterprise competitive announcements process. A peer review committee assembled by the Headquarters' Outreach management team will evaluate the proposals.

a. Evaluation Criteria

The general criteria for proposal selection identified in Appendix A Section (i), **Evaluation Factors**, apply to this announcement with the following clarifications. The principal elements (of approximately equal weight) for proposal evaluation are the proposal's relevance to NASA ESE outreach objectives, its intrinsic merit, and its cost and management approach:

i. Relevance to ESE Outreach Objectives

- a. Degree to which effort meets goals and objectives as outlined by the Outreach and Communications Plan.

ii. Intrinsic Merit

- a. Have a clear intellectual linkage to at least one of the six focus areas of ESE research (see *Earth Science Enterprise Strategy* <http://www.earth.nasa.gov/visions>) : climate variability & change; atmospheric composition; carbon cycle, ecosystems & biogeochemistry; water & energy cycle; weather; and Earth surface & interior and make extensive use ESE data sets and other ESE resources.
- b. Quality of project design; evidence of a genuine, good idea and thoroughness in implementation
- c. Engagement of underrepresented groups in science and technology
- d. Scalability, sustainability beyond NASA investment, partnerships, and "multiplier" effect
- e. The innovation shown in applying or developing advanced technology to minimize barriers to data access, promote interoperability, or manage knowledge.
- f. Overall standing among similar proposals and/or evaluation against the state-of-the-art or acknowledged "best practices"

iii. Cost and Management

- a. Value of the outreach and communications effort proposed for the NASA contribution, including consideration of leveraged non-NASA resources.
- b. Effort includes consideration of the realism and reasonableness of the proposed budget and the comparison in relation to impact.
- c. Proposal is clearly organized, consistent with the requested budget, have clear lines of management responsibilities, and demonstrate a high probability for successful implementation.

- d. The qualifications, capabilities, and experience of the proposed team leader and members, or key personnel critical in achieving the proposed objectives

b. Review and Selection Process

Proposals will be evaluated by a combined mail and panel review. Contribution of resources and in-kind contributions as well as leveraging existing programs, products and resources is encouraged. Awards will be made based on the availability of funds and the needs of the strategic program, as a whole. NASA reserves the right to make judgments during final project selection based on programmatic factors, including the overall balance of viable proposals across Earth system science outreach program.

c. Selection Announcement and Award Dates

NASA's stated goal is to announce selections within 150 days of the proposal due date. However, NASA Earth Science Enterprise does not usually announce new selections until the funds needed for awards are approved through the Federal budget process. Therefore, a delay in this process for NASA usually results in a delay of the selection date(s). After 150 days past the Proposal Due Date for which a proposal was submitted, proposers may contact the responsible Program Officer identified under heading.

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*

VI. AWARD ADMINISTRATION INFORMATION

The Earth Science Enterprise seeks proposals to support innovative and effective outreach strategies beyond the realm of basic activities. This solicitation for NASA Earth Science Outreach Investigator Awards provides the mechanism to solicit internal and external NASA community support for the ESE Outreach and Communications Plan. A subset of innovative, scalable (i.e. broad in impact, audience, or scope) successful Outreach projects may be identified as candidates for supplemental or matching funds, pending budget availability. Selected proposals will be solicited and evaluated by the ESE Outreach Management team and the Associate Administrator on an annual basis.

VII. POINTS OF CONTACT FOR FURTHER INFORMATION

Identifier: **NN-H-04-Z-YO-007-N**

Submit Notice of Intent To:

Conventional Mail:

NASA Peer Review Services, Code Y
Outreach Investigator Awards Proposals
500 E Street, SW, Suite 200
Washington, D.C. 20024-2760
Fax: 202-479-0511

Electronically:

Enter the requested information through SYS-EFUS

Web site located at <http://proposals.hq.nasa.gov/>

Submit Proposals To: NASA Peer Review Services, Code Y
Outreach Investigator Awards Proposals
500 E Street, SW, Suite 200
Washington, D.C., 20024-2760
(For overnight delivery purposes only, the recipient telephone number is 202-479-9030).

Number of Copies Requested: 20

Selecting Official: Ronald J. Birk

Obtain Additional Information: Keya Chatterjee
Outreach Program Manager
Code YO
NASA Headquarters
300 E Street, SW
Washington, D.C. 20546

TEL: (202) 358 4746

FAX: (202) 358 2770

EMAIL: keya.chatterjee@nasa.gov

Please use identifier number **NN-H-04-Z-YO-007-N** when making an inquiry regarding this Announcement. Your interest and cooperation in participating in this effort are appreciated.

ORIGINAL SIGNED BY

Dr. Ghassem Asrar
Associate Administrator
Office of Earth Science

Date: _____

VIII. ANCILLARY INFORMATION

Commercially Available Data Sets

NASA's Earth Science Enterprise 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 they meet the scientific requirements and are cost-effective. When responding to a NASA Research Announcement, the proposer should identify the commercial data sources intended for use and the associated cost.

APPENDIX A.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) Quality of Products Delivered. Describe the management approach and quality controls that will be used to ensure excellence of products delivered."

(10) 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.

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

(12) 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. (Omitted; see page 10)

(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.

APPENDIX A.2

Additional Instructions for Responding to NRA on Earth Science Outreach

(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.bxa.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 B

Required Proposal Cover Page

Two steps are required to submit a cover page. The first step is to complete the proposal cover page (see SAMPLE Appendix B) **electronically** to the SYS-EYFUS Website located at <http://proposals.hq.nasa.gov/>. If the proposer has submitted an electronic Notice of Intent (Appendix E) to SYS-EYFUS, the same user UserID and password can be used to complete the electronic proposal cover page. 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 proposal cover page in response to this research opportunity announcement. Be sure to click on "Edit Personal Information" if any of your correspondence information in SYS-EYFUS is not current.

The second step is to print a **hard copy** of the electronic cover page that must be signed by the Principal Investigator and an official of the investigator's organization who is authorized to commit the organization. This authorizing signature also certifies that the proposing institution has read and is in compliance with the required certifications printed in full, therefore, these certifications do not need to be submitted separately. This page will not be counted against the page limit of the proposal.

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:

- f) Click the hyperlink for **new user** that will take you to the Personal Information Search Page.
- g) Enter your first and last name. SYS-EYFUS will **search** for your record information in the SYS-EYFUS database.
- h) Confirm your personal information by **choosing** the record displayed.
- i) 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 website and follow the instructions for **New Proposal Cover Page**.

Proposers without access to the web or who experience difficulty in using this site may contact the Help Desk at proposals@hq.nasa.gov (or call 202-479-9376) for assistance. After you have submitted your notice of intent or proposal cover page electronically, if you are unsure if it has been successfully submitted, **do not re-submit**. Please call the Help Desk. They will be able to promptly tell you if your submission has been received. Please note that submission of the electronic cover page does not satisfy the deadline for proposal submission.



Proposal Cover Page

Proposal Number: _____

Date: ___/___/___

Name of Submitting Institution: _____

Congressional District: _____

Proposal Title: _____

Name of Submitting Institution: _____

Congressional District: _____

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: _____

Co-Investigator:

Name	Telephone	Email	Institution	Address

Budget:

Year	Budget
1	
2	
3	
Total	

APPENDIX C

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. GOVERNMENT WIDE 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 D

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	XXXXXXX	XXXXXXXXX	_____

***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 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:

- j) Click the hyperlink for **new user** which will take you to the Personal Information Search Page.
- k) Enter your first and last name. SYS-EYFUS will **search** for your record information in the SYS-EYFUS database.
- l) Confirm your personal information by **choosing** the record displayed.
- m) 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

NASA Outreach and Communications Plan Overview

The first elements of NASA's Vision and Mission are "to improve life here" and "to understand and protect our home planet", respectively. The Earth Science Enterprise (ESE) works toward the goal of advancing our capability to understand how and why the Earth is changing, and what are the consequences for life. Our unique ability to improve on knowledge of the Earth system and its predictability potentially benefits every inhabitant of Earth.

The plan presents the new approach to organizing and managing the network of agents committed to effectively communicate a unified Enterprise message that is consistent with Agency and national objectives. The plan is available in the Office of Earth Science at NASA Headquarters. The document is a pioneering statement of the Enterprise and Agency commitment to inform broader audiences not only of *what* we are accomplishing and learning (the results), but also *why* we are doing so and how it is relevant to them.

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

In 1958, Congress passed the Space Act mandating NASA to broadly disseminate the knowledge it generates. Further, NASA's mission is to use the agency's research results and observing capabilities "to inspire the next generation of explorers." NASA seeks to "engage the public in shaping and sharing the experience of exploration and discovery." Table 1 provides an overview of NASA's strategic goals and objectives for communicating our message to the broader target audiences. The E-Government Act of 2003 encourages and empowers Federal agencies to use advanced technology as an integral component of Outreach strategy, in order to make government research more "citizen-centric." Finally, we have an obligation to inform the public of the return it receives from its investment in NASA.

NASA's Earth Science Enterprise provides overall leadership and guidance for the strategy and a coordinated network of ESE staff, Enterprise-affiliated field centers and their staff, and partner institutions and their staff that contribute to NASA in implementing our plan. The plan is aligned with the strategic objectives and goals of Table 1 and leverages the unique scientific and educational contributions provided by the Earth Science Enterprise.

Table 1. NASA Public Outreach Strategic Goals (as derived from the NASA Strategic Plan)

NASA Strategic Goals and Objectives
Goal 7. -- Engage the public in shaping and sharing the experience of exploration and discovery
Objective 7.1 --Improve the capacity of science centers, museums, and other institutions, through the development of partnerships, to translate and deliver engaging NASA content.
Objective 7.2 --Improve science Literacy by engaging the public in NASA missions and discoveries, and their benefits, through such avenues as public programming, community outreach, mass media, and the Internet.
Objective 7.3 --Increase public awareness and understanding of how research and innovations in aerospace technology affect and improve the quality of life.

Outreach Plan in Conjunction with Earth Science Enterprise Programs

The Earth Science Enterprise is organizing its research program within the context of 6 focus areas:

1. Climate variability and change
2. Atmospheric composition
3. Carbon cycle and ecosystem
4. Water and energy cycle
5. Weather
6. Earth surface and interior

Research/Science

Suggested activities include:

- Sharing research efforts and knowledge directly with policymakers with targeted publications (e.g. Congressional lithographs and 1-page brief sheets, etc.);
- Sharing research efforts and knowledge with the broader university, private sector, and societal communities through relevant publications, press releases, and documents;
- Cross-correlating public engagement contact databases with keywords, tracking conference talks, and asking scientists for names of people, organizations, or laboratories that they would like to have informed of their work;
- Routinely updating the Outreach network by sending emails and/or Web page links with contact information of NASA funded scientists;

- Sponsoring a targeted set of meetings for ESE science community to interact, advise, and plan headquarters staff on future direction, mission development and strategy;
- Maximize exposure of ESE science activities through more frequent (3-4 per year) Science Updates and more media/public-friendly ESE meetings (e.g. EOS Working Group Meeting or its successor should have a significant media and public interest component);
- Investigators submitting "popular summaries" to Center ESE managers when submitting any refereed journal paper;
- Providing annual summaries of Outreach activities, linkages to the three target group areas (e.g., what groups, numbers impacted, outcomes), and synopses of any products/services eligible for Outreach Product review process;
- Understanding institutional and/or NASA procedures (see below) for submitting potential work for press release or non-science community dissemination; and
- Maximizing the use of sub-orbital and field campaign activities as effective and engaging Outreach opportunities.

National Applications

The National Applications program within the Enterprise has identified 12 areas of priority:

- Agricultural Efficiency
- Air Quality
- Aviation
- Carbon Management
- Coastal Management
- Ecological Forecasting
- Disaster Management
- Energy Management
- Homeland Security
- Invasive Species Management
- Public Health
- Water Management

Outreach for the National Applications will engage all target audiences and will also focus on the stakeholder, public, and peer groups. Typical activities in support of the applications plan include the following:

- Establish routine ESE Applications briefings for federal, state, local, and tribal policy makers;
- Support the development of capabilities to enable the science community and media community to better understand the strategies and impacts of the Earth Science applications programs (e.g. workshops, guidebooks, etc.);
- Query operational partner and decision-maker communities to understand what requirements from emerging data system architectures are needed for effective utilization and communication of ESE data;
- Develop enabling infrastructures like (1) an interface that merges browse datasets with GIS overlay and data ordering capability, (2) a graduated suite of software tools for data analysis,

and (3) extensible indexed digital repositories of images, animations, and data visualizations for public use (e.g. [visibilearth.nasa.gov](http://visibileearth.nasa.gov));

- Develop targeted resources (e.g., posters, storyboards, documents);
- Create collaborative materials with other agencies;
- Provide annual summaries of Outreach activities, linkages to the three target group areas (e.g., what groups, numbers impacted, outcomes), and synopses of any products/services eligible for Outreach Product review process;
- Advance the capabilities of target applications communities with crosscutting solutions, program planning, and new tools like Geo-Spatial One Stop or Earth Knowledge Gateway (EKG);
- Continue to nurture the DEVELOP program as an Outreach mechanism;
- Work with partners to understand and nurture their Outreach efforts; and
- Publish two NASA ESE special issues/year in publications like Earth Observation Magazine.

Space Missions

Missions have traditionally played a unique role in the Outreach strategy because these efforts typically merge technology, science, engineering, and applications. Missions should:

- Work closely with outreach specialists to develop a coordinated and targeted plan and budget for products and services and to ensure consistency with the Outreach and Communications Plan in the pre-launch timeframe, and one that transitions smoothly and seamlessly into the post-launch timeframe.
- Target Outreach products and services, rather than over-utilize "novelty" Outreach mechanisms (e.g., fountain pens, lapel pins, stickers, buttons, etc.).

Cross-Cutting and Enabling

In support of the Outreach plan, cross-cutting activities endeavor to conduct the following Outreach activities that benefit all three targeted audience categories, and in a manner that highlights and strengthens the relationship between science and technology.

- Develop and publish general materials to increase awareness of ESTO, DAACS, their purpose, their goals, and their vision;
- Develop and publish materials that serve to educate general and target audiences about emerging technologies and their strategic linkage to science themes;
- Organize and host conferences, technology workshops and consortia for the Earth Science Enterprise, government institutions, academia and industry; and
- Participate in and support Enterprise technology-related Outreach efforts to foster a unified message and identity.

Coordination with Public Affairs

The NASA Public Affairs Office is a critical partner. This asset is an important doorway through which to communicate science, applications, and technologies knowledge to the public. Public

Affairs is responsible for issuing press releases, coordinating media events, and various activities. As a component of the Outreach strategy, we will work with Public Affairs to:

- Define reasonable targets of success in communicating with the public;
- Establish a clear and consistent process for sharing Earth science, applications, and technology results to the appropriate outlets (e.g. an end-to-end process from science to press release);
- Establish guidelines for the use of visualizations, fonts, etc. in outreach products that may have broader use;
- Increase the benefits of launches and special events (e.g., launches, field campaigns, etc.) by targeting specific groups or individuals to be invited;
- Create VIP packets and other readily available informational packets that can be easily modified for the particular audience; and
- Participate in regular meetings at NASA headquarters and field centers;

Coordination with Education Programs

There is a natural and inherent link between education and outreach. While both of these elements have unique program plans, education and outreach are mutually supportive towards achievement of Agency goals, objectives and outcomes. Education is concerned with what is being delivered, how it is being delivered and the specific learning that takes place. Outreach is concerned with informing targeted audiences not only what the Agency is accomplishing and learning, but also why we are doing so and how it is relevant to them. Outreach audiences are grouped into three broad categories: Stakeholder Communication, Public Communication, and Peer Communication. At the Agency level, Goal 7, *Engage the public in shaping and sharing the experience of exploration and discovery*, has education and outreach components. Table 2 illustrates Earth Science Education and Earth Science Outreach contributions to the Agency goal.

Table 2. Earth Science Education and Earth Science Outreach Contributions to Agency Goal 7.

NASA Strategic Goals and Objectives	Earth Science Education	Earth Science Outreach
Goal 7. -- Engage the public in shaping and sharing the experience of exploration and discovery		
Objective 7.1 --Improve the capacity of science centers, museums, and other institutions, through the development of partnerships, to translate and deliver engaging NASA content.	✓	
Objective 7.2 --Improve science Literacy by engaging the public in NASA missions and discoveries, and their benefits, through such avenues as public programming, community outreach, mass media, and the Internet.	✓	✓
Objective 7.3 --Increase public awareness and understanding of how research and innovations in aerospace technology affect and improve the quality of life.		✓

The Earth Science Enterprise Outreach plan will exist in parallel with the ESE Education Program, *Inspire the Next Generation of Earth Explorers*. The ESE Education program has established a set of guidelines for formal and informal education activities. These activities are beyond the scope of the NASA Earth Science Enterprise Outreach and Communication Plan. However, the Enterprise's Outreach team will:

- Participate in cross-cutting activities;
- Share products, where appropriate;
- Combine events, where appropriate;
- Utilize the digital library efforts such as the Digital Library for Earth System Education in partnership;
- Review Fellowship research for possible Outreach opportunities;
- Share multimedia resources;
- Share knowledge gained from education conferences and earth science related conferences regarding successful and popular informational material;
- Share some of Informal Education activities based on discussions and appropriate actions (such as museums, science centers, nature centers, community events); and
- Share metrics to evaluate effectiveness.

Coordination with Legislative Affairs

Stakeholders are a key target audience identified in this plan. The Enterprise will leverage the expertise and procedures of the Legislative Affairs Office to communicate key information to Congressional policymakers and staff. The Legislative Affairs Office liaison is considered to be a key partner in the ESE Outreach and Communications paradigm.

Conferences

Conferences and meetings are important forums for sharing information and interacting with target audiences, particularly peer and stakeholder groups. The Outreach Plan promotes a new paradigm for presenting the ESE at conferences and meetings. To maximize the effectiveness of conferences and meetings, the plan seeks to:

- Implement and maintain an on-line events management system within the Outreach Management System;
- Identify and target key meetings at which we might reach a maximum number or strategic set of target audience groups;
- Implement a process in which Outreach network agents inform Outreach Managers of plans and budget requirements for exhibiting conferences or workshops prior to any expenditures or agreements;
- Establish guidelines and training resources for ESE agents for proper protocol in representing the Enterprise and Agency at booths and conference activities;
- List all planned attendance and level of participation to events;
- Examine cost/benefit of having a booth by attendance, audience, locations, etc. Present plans and reasons for those plans during the Outreach weekly teleconference;
- Coordinate ONE NASA ESE booth when deemed appropriate; and
- Collect business cards from booth attendees that interacted with the staff and follow-up with a call or email to see how beneficial their visit was and to see if they are using the informational material.

Outreach Network Communications

Internal communication within the Outreach network is vital. Several mechanisms will be utilized to achieve an effective level of network "inreach." Weekly teleconference meetings with the network will be used to provide a routine synopsis of ongoing and future Outreach activities. Additionally, the ESE Outreach Management System portal and database will be created and maintained. The database will be a component of a broader portal developed to provide "inreach" and cross-coordination for the Outreach and communications network. In addition to the database, the Portal would access relevant images, visualizations, presentations, and guidelines needed for a robust Outreach and communications strategy. Visible Earth (<http://visibleearth.nasa.gov>) is an Enterprise-level site where many of NASA's "for public release" Earth images, animations and data visualizations are being archived. The Portal's database will also interface with partnering agencies, interested parties, requests with follow up actions, and search query capability based on keywords. The procedure for database and list management is to create, maintain, and use a contacts database for intermediary (peer), stakeholder, and informal education contact information. Keywords will be assigned to each contact to determine related topics of interest. This can also be used for mailings and workshop invitations, and notification of funding opportunities. The Portal will also serve as a gateway and scheduler for regular and sustained communication within the network. Finally, the Portal would also provide a dynamic and robust mechanism for generating the Education and Outreach Annual Report. The Annual Report will be a powerful resource for Enterprise management, staff, and Outreach agents to utilize for promotion and assessment of Outreach activities.

Cross-Enterprise Collaborations

The Enterprise currently partners with all other NASA Enterprises in Outreach-supporting endeavors. At the agency level, the most comprehensive collaboration is on the NASA Portal Editorial Board. Other notable examples include co-hosting of resources with the Office of Aerospace Technology (OAT), collaborative XML research efforts with the Office of Biological and Physical Research (OBPR), re-use of the Office of Space Science (OSS) Education/Public Outreach system and shared use of Congressional Database with all other Enterprises.

Coordination with External Affairs

The Enterprise's Outreach network will work to support current and future linkages to international programs and partnerships like the Committee on Earth Observation Satellites (CEOS) and the International Working Group on Earth Observations (IWGEO). Additionally, efforts will be determined on a case-by-case basis depending on direction from the Administrator's office or Associate Administrator's office. These efforts will be coordinated with the NASA External Affairs Office.

Rationale

NASA is viewed as one of the preeminent organizations devoted to exploration in the country today. That reputation has been achieved as a result of 45 years of unprecedented success. The One NASA effort is no different than any continuous improvement effort within industry today where we continually strive to improve upon our past by looking toward the future. Further, the One NASA initiative is in keeping with the President's Management Agenda, the goal of which is to make the Government more efficient and effective.

Background

In the Apollo era, NASA had one unifying goal so large and relevant that it was embraced by the public and resulted in the placement of a man on the moon. The innovation that was at the heart of the Apollo era still burns within the NASA of today. However, the world has changed such that society is perhaps more interested in the value we add to life on Earth, even while we explore the outer bounds of the universe. Our current vision and mission statement accurately reflect that shift in public sentiment by encompassing a broader range of objectives. With that shift in culture, and a broader mission and vision, comes the challenge of ever strengthening a workforce that is absolutely committed to excellence under a mission and vision that requires us to address multiple objectives. The intent of One NASA is to build on the capabilities that are unique and "value added" from each Center, for the good of the whole, while working under that common shared vision. NASA is addressing the needs of today while building the capability that will allow us to pursue any destination tomorrow. One NASA is about our team "building the future...together."

Simply Stated

The concept of One NASA simply means that we will operate as one team that applies our many unique capabilities to the pursuit of a shared vision and in keeping with our clearly defined mission statement. One NASA specifically addresses our challenge of doing the things "as only NASA can." NASA is pursuing those challenges that are outside the realm of possibility within the commercial sector. The One NASA initiative will enable NASA to better fulfill that mission and vision by 1) fostering more collaboration across the Agency, and 2) promoting more efficient systems and processes throughout the Agency. One NASA then consists of ten Centers and a Headquarters function working together under a shared vision that clearly defines the roles of and interrelationship between the different Enterprises as we pursue those significant challenges. One NASA enables the Agency to accomplish those things that no one organizational element can possibly achieve on their own.

APPENDIX G
Outreach Product Authorization Form

	National Aeronautics and Space Administration	<h1>NASA Earth Science Outreach Products Authorization</h1>	
Use this form to approve all NASA/ESE Outreach Products			
<input type="checkbox"/> Concept Approval		<input type="checkbox"/> Final Product Approval	
Title	Author(s)/Originator(s)		
Date Assigned	Date Due		
Originating NASA Organization (Include organization code)	Performing organization (if different)		
Contract/Grant/Interagency/Project Number(s)/SWR Number	Document File Name	Document File Date	
Check: <input type="checkbox"/> Conference Material <input type="checkbox"/> Periodical <input type="checkbox"/> Video <input type="checkbox"/> Poster <input type="checkbox"/> Handout/Flyer/Brochure <input type="checkbox"/> Booklet	Intended Audience: <input type="checkbox"/> Public <input type="checkbox"/> Government <input type="checkbox"/> Academia <input type="checkbox"/> Industry/Scientific <input type="checkbox"/> Other		
Review Dates: Draft 1 _____ Draft 2 _____ Draft 3 _____ Final _____	Additional Information/Comments:		
<h2>Final Approval</h2>			
_____ ESE Senior Management		_____ ESE Senior Policy Analyst	
_____ ESE Outreach Manager		_____ ESE Science Communications Manager	
_____ NASA Public Affairs Representative, (where relevant)			

APPENDIX H

Guidelines for video and printed material for Earth Science Enterprise (not NASA Educational material):

- All printed materials should bear the NASA logo and the name "Earth Science Enterprise" and the Enterprise's web address.
 - Specific cases of regional or political reasons for using Center names will be evaluated and approved on a case-by-case basis
- All ESE materials will employ, at a minimum, the NASA tag-line "to understand and protect our home planet" but preferably, the entire mission statement.
- Acronyms and agency jargon will be eliminated or severely limited in any written communication intended for external distribution. If acronyms exist, the first case will be defined. Agency jargon will be translated into common English usage.
- An efficient and effective use of resources should be considered when planning to develop new materials for Outreach or participating in events.
 - Sharing of printing and publishing costs being incurred, if any, should be considered if material will be used for cross-cutting purposes.
 - An awareness of existing plans for events or plans for creating new products and material within NASA should be researched prior to commitment of funds.
 - Posters, brochures, lithographs, and CDs should be science-oriented first, and address specific missions in this context. See Outreach Review Process.
- The Office of Earth Science at Headquarters must approve concepts and scripts for all video productions prior to production. Concepts include identification of target audiences and distribution plans. Video products (e.g. scripts, storyboards, and finished production) should follow the Outreach product review process previously outlined in section B.
- Pins, and other premium tokens should not be developed until the subject programs and projects have been officially named.
- All websites should prominently include a link to earth.nasa.gov

APPENDIX I

Earth Science Enterprise Contributions to NASA Goals and Objectives

NASA Goal	NASA Objective	NASA Budget Theme	Earth Science Enterprise Contribution
1. Understand the Earth system and apply Earth system science to improve the prediction of climate, weather, and natural hazards	1.1: Understand how Earth is changing; better predict change and understand the consequences for life on Earth	Earth System Science	This is core of the Enterprise mission; while the Enterprise pursues other initiatives, they stem from our primary research on the interaction of land, atmosphere, oceans, ice, and life on the planet.
	1.2: Expand and accelerate the realization of economic and societal benefits from Earth science, information, and technology	Earth Science Applications	As a Federal agency whose research bears directly on areas of substantial societal concern, the Enterprise is obligated and privileged to make its research findings available to those providing essential public services.
	1.3: Understand the origins and societal impact of variability in the Sun-Earth connection	Earth System Science	Study the effects of solar variability on the Earth, in conjunction with Sun-Earth initiatives facilitated by the Space Science Enterprise
2. Enable a safer, more secure, efficient, and environmentally friendly air transportation system	2.1: Decrease the aircraft fatal accident rate	Earth Science Applications	Support the Aerospace Technology Enterprise (AT) through advanced weather prediction, the detection of volcanic activity, and measurement of topography in remote areas.
	2.2: Protect local and global environmental quality by reducing aircraft noise and emissions		Work with the AT to study the atmospheric effects of aviation and improve the compatibility of aviation with the environment.
3. Create a more secure world and improve the quality of life	3.2: Improve the Nation's economic strength and quality of life by facilitating the innovative use of NASA technology	Earth Science Applications	Contribute to public safety and national security by improving climate, weather and natural hazard forecasting and providing measurements of land cover, topography, oceans, and atmospheric properties.
5. Explore the solar system and the universe beyond	5.1: Learn how the solar system originated and evolved to its current diverse state	Earth System Science	As the only known planet with life, Earth serves as a paradigm for studying other planets and their moons and searching for life-compatible conditions.
6. Inspire and motivate students to pursue careers in science, technology, engineering and mathematics	6.1–6.4: Increase the number of students and teachers involved in NASA-related education opportunities	Earth Science Applications	Enable and extend the use of Earth system science content to enrich STEM and geography education.
7. Engage the public in shaping and sharing the experience of exploration and discovery	7.1: Improve public understanding and appreciation of science and technology	Earth Science Applications	Collaborate with science centers, museums and other informal learning institutions to incorporate Earth system science concepts and materials.