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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

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SCIENCE MISSION DIRECTORATE

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WASHINGTON, DC 20546-0001

RESEARCH OPPORTUNITIES IN SPACE AND EARTH SCIENCES – 2007

(ROSES-2007)

NASA RESEARCH ANNOUNCEMENT (NRA)

SOLICITING BASIC AND APPLIED RESEARCH PROPOSALS

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CATALOG OF FEDERAL DOMESTIC ASSISTANCE (CFDA) NUMBER: 00.000

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PROPOSALS DUE

STARTING MAY 1, 2007

THROUGH APRIL 11, 2008

RESEARCH OPPORTUNITIES IN SPACE AND EARTH SCIENCES (ROSES) – 2007

EXECUTIVE SUMMARY

This National Aeronautics and Space Administration (NASA) Research Announcement (NRA), entitled *Research Opportunities in Space and Earth Sciences (ROSES) – 2007*, solicits basic and applied research in support of NASA's Science Mission Directorate (SMD). This NRA covers all aspects of basic and applied supporting research and technology in space and Earth sciences, including, but not limited to: theory, modeling, and analysis of SMD science data; aircraft, stratospheric balloon, and suborbital rocket investigations; development of experiment techniques suitable for future SMD space missions; development of concepts for future SMD space missions; development of advanced technologies relevant to SMD missions; development of techniques for and the laboratory analysis of both extraterrestrial samples returned by spacecraft as well as terrestrial samples that support or otherwise help verify observations from SMD Earth system science missions; determination of atomic and composition parameters needed to analyze space data as well as returned samples from the Earth or space; Earth surface observations and field campaigns that support SMD science missions; development of integrated Earth system models; development of systems for applying Earth science research data to societal needs; and development of applied information systems applicable to SMD objectives and data.

Awards range from under \$100K per year for focused, limited efforts (e.g., data analysis) to more than \$1M per year for extensive activities (e.g., development of science experiment hardware). The funds available for awards in each program element offered in this NRA range from less than one to several million dollars, which allow selection from a few to as many as several dozen proposals depending on the program objectives and the submission of proposals of merit. Awards will be made as grants, cooperative agreements, contracts, and inter- or intra-agency transfers depending on the nature of the proposing organization and/or program requirements. The typical period of performance for an award is three years, although a few programs may specify shorter or longer (maximum of five years) periods. Organizations of every type, domestic and foreign, Government and private, for profit and not-for-profit, may submit proposals without restriction on number or teaming arrangements. Cost sharing is encouraged but not required. Note that it is NASA policy that all investigations involving non-U.S. organizations will be conducted on the basis of no exchange of funds. Any changes or modifications to any of these guidelines will be specified in the descriptions of the relevant programs in the Appendices of this solicitation.

Details of the solicited programs are given in the Appendices of this NRA. Proposal due dates are given in Tables 2 and 3 of this NRA. Interested proposers should monitor <http://nspires.nasaprs.com> or subscribe to the SMD electronic notification system for additional new programs or amendments to this NRA through February 2008, at which time release of a subsequent ROSES NRA is planned.

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RESEARCH OPPORTUNITIES IN SPACE AND EARTH SCIENCES (ROSES) – 2007

SUMMARY OF SOLICITATION

I. FUNDING OPPORTUNITY DESCRIPTION

(a) Strategic Goals of NASA's Research Program

The National Aeronautics and Space Administration's (NASA's) Mission,

To pioneer the future in space exploration, scientific discovery, and aeronautics research,

and the Vision for Space Exploration, whose fundamental goal is

To advance U.S. scientific, security, and economic interests through a robust space exploration program,

allow the science objectives of the NASA Science Mission Directorate to be clearly defined as the orderly pursuit of the agency's strategic goals.

Responsibility for achieving several of NASA's strategic goals and outcomes (see Table 1) belongs to SMD, including those to:

- Study planet Earth from space to advance scientific understanding and meet societal needs;
- Understand the Sun and its effects on Earth and the solar system;
- Advance scientific knowledge of the origin and history of the solar system, the potential for life elsewhere, and the hazards and resources present as humans explore space; and
- Discover the origin, structure, evolution, and destiny of the universe and search for Earth-like planets.

Further valuable, indepth insight into these strategic objectives and supporting research areas may be found in the following documents:

- *The 2006 NASA Strategic Plan*, available at <http://www.nasa.gov/about/budget> (also at http://www.nasa.gov/pdf/142302main_2006_NASA_Strategic_Plan.pdf);
- *The Science Plan for NASA's Science Mission Directorate (2007-2016)* (hereafter the *NASA Science Plan*), available at <http://science.hq.nasa.gov/strategy>; and
- *The Vision for Space Exploration*, available at http://www.nasa.gov/mission_pages/exploration/main.

The NASA strategic goals and research objectives for science from the *NASA Science Plan* are given in Table 1. These NASA research objectives, and their corresponding strategic outcomes, are also used to assess NASA's research progress for compliance with the *Government Performance and Results Act (GPRA)* of 1993. Therefore, proposers to this NASA Research Announcement (NRA) are expected to provide a short

statement in their proposals that demonstrates the relevance of the proposed research to one or more of these NASA strategic goals, science outcomes, and the *NASA Science Plan* (further instructions concerning this requirement are provided in Section IV(e) below).

(b) Research Programs of NASA's Science Mission Directorate

The NASA Science Mission Directorate (SMD) pursues NASA's strategic goals using a wide variety of space flight programs that enable the execution of both remote sensing and *in situ* investigations. These investigations are carried out through flight of space missions in Earth orbit, as well as to or even beyond objects in the Solar System, and also through ground-based research activities that directly support these space missions. This ROSES NASA Research Announcement (NRA) solicits proposals for the latter of these two types of programs, in particular, ground-based Supporting Research and Technology (SR&T) investigations that seek to understand naturally occurring space and Earth phenomena, human-induced changes in the Earth system, and Earth and space science-related technologies and to support the national goals for further robotic and human exploration of the Moon and Mars.

Proposals in response to this NRA should be submitted to the most relevant science program elements described in Appendices A, B, C, D, and E (see also the *Table of Contents* that prefaces this NRA). Table 2 lists these program elements in the order of their calendar deadlines for the submission of proposals, while Table 3 lists them in the order in which they appear in the appendices of this NRA. Questions about each specific program element should be directed to the Program Officer(s) identified in the *Summary of Key Information* subsection that concludes each program element description.

In order to pursue NASA's goals and objectives, SMD research activities are organized into four research programs:

- The *Earth Science Research Program* sponsors research to explore interactions among the major components of the Earth system — continents, oceans, atmosphere, ice, and life — to distinguish natural from human-induced causes of change and to understand and predict the consequences of change. The Earth Science Research Program is managed by the Earth Science Division.
- The *Heliophysics Research Program* sponsors research to understand the Sun as a magnetic variable star and as the controlling agent of the space environment of the Solar System, especially the Earth. The Heliophysics Research Program is managed by the Heliophysics Division.
- The *Planetary Science Research Program* sponsors research to explore the Solar System to study its origins and evolution, including the origins of life within it. The Planetary Science Research Program is managed by the Planetary Science Division.
- The *Astrophysics Research Program* sponsors research to explore the Universe beyond, from the search for planets and life in other solar systems to

the origin, evolution, structure, and destiny of the Universe itself. The Astrophysics Research Program is managed by the Astrophysics Division.

The program elements in Appendices A, B, C, and D describe program elements of these four science research programs, respectively, while Appendix E describes cross-division program elements relevant to two or more of these science research programs. Each of these appendices is prefaced with an *Overview* section that provides an introduction to the research program content that all interested applicants to this NRA are encouraged to read.

The program elements described in these appendices also provide any clarifications or modifications to the general guidelines contained in this *Summary of Solicitation*.

(c) Opportunities for Education and Public Outreach

Effective November 20, 2007, the supplemental education and public outreach (E/PO) proposal opportunities for ROSES investigators described in Section I(c)(iii) are suspended. New text is indicated in bold. Deleted text is indicated by striking through the deleted text.

(i) Overview

SMD is committed to fostering the broad involvement of the Earth and space science research communities in Education and Public Outreach (E/PO) and contributing to NASA's three education goals and outcomes:

- Strengthen NASA and the Nation's future workforce;
- Attract and retain students in science, technology, engineering, and mathematics disciplines (STEM); and
- Engage Americans in NASA's mission.

Progress towards achieving these goals has become an important part of the broad justification for the public support of Earth and space science. A more detailed discussion may be found in the *NASA Education Strategic Coordination Framework* (http://education.nasa.gov/pdf/151156main_NASA_Booklet_final_3.pdf).

SMD sponsors a broad spectrum of educational activities ranging from kindergarten to postgraduate levels via several vehicles of solicitation. A variety of information about recent E/PO activities in Earth and space science can be found at <http://science.hq.nasa.gov/research/epo.htm> and at <http://science.hq.nasa.gov/education>. These sites include the *Explanatory Guide to E/PO Evaluation Criteria* (December 2006), strategic planning and implementation documents, catalog or directory of E/PO resources, list or abstracts of selected E/PO awards, etc.

(ii) E/PO Opportunities

Two ~~Three~~ opportunities to participate in SMD's E/PO programs are included in this NRA. ~~The first is the opportunity to receive supplemental E/PO awards by the Principal Investigators (PIs) of selected investigations (see Section I(c)(iii) below).~~ The **first** ~~second~~ is the opportunity for early-career scientists and engineers in Earth science to participate in the *New Investigator Program in Earth Science* (see Appendix A.21). The

~~second third~~ is the opportunity for early-career scientists and engineers in planetary science to participate in the *Fellowships for Early Career Researchers* (see Appendix C.22).

Other opportunities to participate in SMD's E/PO programs are not included in this NRA, but are posted separately at <http://nspires.nasaprs.com>; these include the NASA Earth and Space Science Fellowship (NESSF) Program for graduate students, E/PO opportunities embedded in SMD missions and programs, and opportunities to provide E/PO support to the scientific and educational enterprise inside and outside of NASA, as well as to develop systematic and sustainable educational efforts.

(iii) Supplemental E/PO Awards for ROSES Investigators

Effective November 20, 2007, the supplemental education and public outreach (E/PO) proposal opportunities for ROSES investigators are suspended.

The opportunity for selected ROSES investigators to submit proposals for supplemental E/PO awards is suspended as of December 31, 2007, pending a global review of the SMD E/PO portfolio, as the Science Mission Directorate moves towards the goal of reducing the proposal writing burden on scientists while increasing their science productivity and efficiency. In the interim, no further proposals are solicited. However, limited selections will be made from those supplemental E/PO proposals submitted by December 31, 2007.

Section I(c)(iii) of the ROSES 2007 Summary of Solicitation is deleted in its entirety and replaced with this amendment.

~~Supplemental E/PO awards are used to encourage engagement and participation by research scientists themselves in education and scientific communication by adding an E/PO component to their "parent" research investigations. The scope of the supplemental E/PO awards include all aspects of higher, elementary/secondary, and informal education and public outreach, except student support at the undergraduate, graduate, and postdoctoral levels which is either already a part of the parent research award or provided in other competitive opportunities (e.g., NESSF, Hubble Fellows, etc.) Efforts promoting participation of underrepresented groups in Earth and space science studies at all levels of education and strengthening such learning in minority serving institutions are encouraged.~~

~~In order to propose an E/PO activity as a supplement to a research proposal submitted in response to this NRA, the proposer must follow these instructions:~~

- ~~• An E/PO proposal may be submitted only by a proposer whose research proposal is selected for funding through this NRA (hereafter called the "parent research award"), as well as those who hold a parent award selected through any previous Science Mission Directorate, Office of Space Science (OSS), or Office of Earth Science (OES) NRA that has at least 15 months remaining in its period of performance at the time of the submission of the E/PO proposal.~~
- ~~• The cost cap for an E/PO proposal by an individual NRA investigator is \$15K per year.~~

- A “Collaborative E/PO Proposal” option is available that allows several SMD-funded researchers to collectively carry out a more ambitious, expansive E/PO program, with a cap of ≤\$50K per year, not to exceed \$125K over the nominal three-year lifetimes of the parent awards. The supplemental E/PO funds are added to a single research award of the consortium of proposing investigators.
- To ease the burden of NASA’s administration of such small supplemental awards, the total period of performance for any E/PO award is limited to that of its parent research award (for institutional and collaborative awards, this limit applies to the research award to which the supplemental E/PO funding is added.)
- A selected investigator has two windows of opportunity to submit an E/PO proposal: (i) no later than 90 days after the date of the letter of selection for the parent award, which anticipates starting the E/PO activity early in the first year of the parent award; or (ii) not less than 90 days in advance of the yearly anniversary date of the parent award, which anticipates starting the E/PO activity at the time of the next yearly funding supplement for the parent award.

Further details and guidance on preparing and submitting a proposal for E/PO funding under this SMD NRA, or any previous OES or OSS NRA, may be found at <http://science.hq.nasa.gov/research/guidelines.html>. Questions and/or comments and suggestions about this SMD E/PO program are welcome and may be directed to:

Ms. Doris Daou
 ROSES E/PO Project Lead
 Science Mission Directorate
 NASA Headquarters
 Washington, DC 20546
 E-mail: HQ-SMD-ROSES-EPO@hq.nasa.gov
 Telephone: 202-358-0422

(d) NASA-Provided High-End Computing (HEC) Resources

SMD provides a specialized computational infrastructure to support its research community. High-performance computing resources are available from two major computing facilities, namely, the Computational and Information Sciences and Technology Office (CISTO) (<http://cisto.gsfc.nasa.gov>) at NASA’s Goddard Space Flight Center (GSFC), and the NASA Advanced Supercomputing (NAS) Division (<http://www.nas.nasa.gov>) at NASA’s Ames Research Center (ARC). Each facility maintains high-end computer platforms with significant capacity for data storage.

The main computing platforms at GSFC are an SGI Altix system with 1152 processors and a Linux Network cluster consisting of 256 dual core processors. These systems will support computational modeling tasks ranging from a single processor to as large as 256 processors. The computing system at ARC consists of twenty, 512-processor SGI Altix systems. Each system is tightly coupled and is configured to support large computational tasks. Tasks requiring at least 64 processors will be given preference in scheduling computing time on this system.

Additional computational resources include user services in code porting and performance tuning, scientific data visualization, and data transfer.

Any need for these specific computing resources for the proposed research must be explicitly described in the proposal, including the computing system and location, rationale and justification of the need, how it supports the investigation, when during the proposed period the resources will be required, and an estimate of processor hours and storage capacity needed. An aggregated computing time per year (number of runs times number of processors per run times number of hours required per run) should also be included.

The box provided on the *Cover Page* for proposals submitted in response to this NRA should also be “checked” to indicate that a request for computing resources is included in the proposal. As they review the intrinsic merit of the proposed investigation, science peer review panels will be asked to consider the realism and reasonableness of the computing request and whether it is an appropriate utilization of a highly constrained resource.

Successful investigations selected for funding will be considered for an allocation of the requested NASA HEC resources needed for their investigation, but the fully requested level cannot be guaranteed. SMD will make every attempt to satisfy the needs in the context of the overall set of requirements, constraints, and science priorities.

After a proposal is selected for funding, the PI shall formally request the computing and/or computational resources from the NASA High-End Computing Program (<http://www.hec.nasa.gov>). The requests will be for one year and nontransferable. PIs may make large requests, greater than 100,000 aggregated computing hours, at any time during the year, but requests will be considered only twice a year (November and April). Small requests of less than 100,000 aggregated computing hours may be allocated throughout the year.

For further information contact either of the following:

Dr. Tsengdar J. Lee
Earth Science Division
Science Mission Directorate
NASA Headquarters
Washington, DC 20546
E-mail: Tsengdar.J.Lee@nasa.gov
Telephone: 202-358-0860

Mr. Joseph H. Bredekamp
Heliophysics Division
Science Mission Directorate
NASA Headquarters
Washington, DC 20546
E-mail: Joe.Bredekamp@nasa.gov
Telephone: 202-358-2348.

(e) NASA Safety Policy

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 the public, astronauts and pilots, the NASA workforce (including employees working under NASA award instruments), and high-value equipment and property.

(f) Availability of Funds for Awards

Prospective proposers to this NRA are advised that funds are not in general available for awards for all of its solicited program elements at the time of its release. The Government's obligation to make awards is contingent upon the availability of sufficient appropriated funds from which payment can be made and the receipt of proposals that NASA determines are acceptable for award under this NRA.

(g) Significant Changes from ROSES-2006

Proposers should be aware of the following significant changes in this NRA from ROSES-2006.

- The *NASA Science Plan* has been published, and proposers must reference the science questions and research objectives in the *NASA Science Plan* to demonstrate relevance to NASA (Section I(a) and Table 1).
- All proposing organizations must register in NSPIRES and all participating organizations must be listed on the *Cover Page*. All participants in the proposal must register in NSPIRES. In the proposal, participants must list the organization through which they are participating in the proposed investigation (Section IV(b)(i)).
- Specific requirements have been set on the creation of PDF files for upload, particularly PDF files created from TeX or LaTeX (Section IV(b)(ii)).
- The requirements for the proposal budget have been expanded and clarified (Section 2.3.10 of the *NASA Guidebook for Proposers*). The additional requirements for budgets placed on ROSES proposals have been clarified (Section IV(b)(iii) of this NRA).
- The full cost budget instructions for NASA Centers have been revised to reflect changes in NASA's implementation of full cost accounting (Section IV(d)).
- A description of the available appeals process has been added (Section V(d)).

In addition to the listed significant changes, this NRA and the *NASA Guidebook for Proposers* incorporate a large number of additional changes including both policy changes and changes to proposal submission requirements. Many sections of both documents have been clarified since the release of ROSES-2006. All proposers are urged to read this NRA and the 2007 edition of the *NASA Guidebook for Proposers* carefully since all proposals must comply with their requirements, constraints, and guidelines.

II. AWARD INFORMATION

(a) Funding and Award Policies

The amount of funds expected to be available for new awards for proposals submitted in response to this NRA is given in the *Summary of Key Information* that concludes each program element description in the appendices. Given the submission of proposals of merit, the number of awards that may be made for each program element is also given in

this location. Any deviation from the usual maximum duration for awards of three years will also be noted (a few program elements may specify only one year for activities of limited scope to as long as five years for extensive, comprehensive studies).

In all cases, NASA's goal is to initiate new awards within 46 days after the selection of proposals is announced for each program element. However, this time period may be longer based on the workload experienced by NASA, the availability of appropriated funds, and any necessary postselection negotiations with the proposing organization(s) needed for the award(s) in question. Regarding this last item, every proposer is especially encouraged to submit full and detailed explanations of the requested budget (see further below and Section 2.3.10 of the *NASA Guidebook for Proposers*¹) to help expedite the processing of the award should their proposal be selected.

Awards made through this NRA will be in the form of grants, cooperative agreements, contracts, and intra- or inter-agency transfers depending on the nature of the submitting organization and/or the specific requirements for awards given in each program element description in the appendices. The type of award to be offered to selected proposers will generally follow the policies in Section D.1 of the *NASA Guidebook for Proposers*, although in a few cases, only one type of award may be offered as specified in the program element description. A NASA awards officer will determine the appropriate award instrument for the selections resulting from this solicitation. Grants and cooperative agreements will be subject to the provisions of the *Grants Handbook*² and Appendix D of the *NASA Guidebook for Proposers*. In the case of any conflict, the *Grants Handbook* takes precedence. Contract awards will be subject to the provisions of the Federal Acquisition Regulations (FAR) and the NASA FAR Supplement (see <http://ec.msfc.nasa.gov/hq/library/v-reg.htm>).

(b) Successor Proposals and Resubmissions

Generally, PIs holding previous awards selected through any of the programs offered through earlier NRAs are welcome to submit "successor" proposals that seek to continue a previously funded line of research (see Section 1.5 of the *NASA Guidebook for Proposers*). However, it is SMD policy that such successor proposals will be considered with neither advantage nor disadvantage along with new proposals that are submitted for that same program. Note that the instructions regarding successor proposals in the *NASA Guidebook for Proposers* have changed from past years. Proposers are strongly encouraged to review them.

Proposals that were submitted but not selected for any previous NASA solicitation may be submitted either in a revised or original form. Such submissions will be subjected to full peer review and considered with neither advantage nor disadvantage along with new proposals that are received by NASA.

¹ The *Guidebook for Proposers Responding to a NASA Research Announcement* (hereafter referred to as the *NASA Guidebook for Proposers*) is at <http://www.hq.nasa.gov/office/procurement/nraguidebook>; see Section IV(a) of this NRA for further information.

² The *NASA Grants and Cooperative Agreement Handbook* (hereafter referred to as the *Grants Handbook*) is at <http://ec.msfc.nasa.gov/hq/grcover.htm>.

III. ELIGIBILITY INFORMATION

(a) Eligibility of Applicants

Participation in this program is open to all categories of U.S. and non-U.S. organizations, including educational institutions, industry, not-for-profit institutions, the Jet Propulsion Laboratory, as well as NASA Centers and other U.S. Government agencies. Historically Black Colleges and Universities (HBCUs), Other Minority Universities (OMUs), small disadvantaged businesses (SDBs), veteran-owned small businesses, service disabled veteran-owned small businesses, HUBZone small businesses, and women-owned small businesses (WOSBs) are encouraged to apply. Participation by non-U.S. organizations in this program is welcome but subject to NASA's policy of no exchange of funds, in which each government supports its own national participants and associated costs (further information on foreign participation is provided in Section 1.6 of the *NASA Guidebook for Proposers*).

(b) Number of Proposals and Teaming Arrangements

There is no restriction on the number of proposals that an organization may submit to this solicitation or on the teaming arrangements for any one proposal, including teaming with employees of NASA's Centers and the Jet Propulsion Laboratory. However, each proposal must be a separate, stand-alone, complete document for evaluation purposes.

(c) Cost Sharing or Matching

If an institution of higher education or other not-for-profit organization wants to receive a grant or cooperative agreement, cost sharing is not required, although NASA can accept cost sharing if it is voluntarily offered (see the *Grants Handbook*, Section B, §1260.123, "Cost Sharing or Matching"). If a commercial organization wants to receive a grant or cooperative agreement, cost sharing is required unless the commercial organization can demonstrate that it does not expect to receive substantial compensating benefits for performance of the work. If this demonstration is made, cost sharing is not required but may be offered voluntarily (see also the *Grants Handbook*, Section D, §1274.204, "Costs and Payments"). See also Section V(a) below.

IV. PROPOSAL AND SUBMISSION INFORMATION

(a) Proposal Instructions and Requirements

All information needed to apply to this solicitation is contained in this ROSES NRA and in the companion document, the *Guidebook for Proposers Responding to a NASA Research Announcement* (hereafter referred to as the *NASA Guidebook for Proposers*), located at <http://www.hq.nasa.gov/office/procurement/nraguidebook>. By reference, the 2007 edition of the *NASA Guidebook for Proposers* is incorporated into this NRA. Proposers are responsible for understanding and complying with its procedures for the successful, timely preparation and submission of their proposals. Proposals that do not conform to its standards may be declared noncompliant and rejected without review.

Questions regarding this NRA or its program elements should be directed to the cognizant Program Officer identified in the *Summary of Key Information* subsection that concludes each program element description. Any clarifications or questions and answers that are published will be posted on the relevant program element's web page.

The introductory material, as well as the appendices, of the *NASA Guidebook for Proposers* provide additional information about the entire NRA process, including NASA policies for the solicitation of proposals, guidelines for writing complete and effective proposals, and NASA's general policies and procedures for the review and selection of proposals and for issuing and managing the awards to the institutions that submitted selected proposals. A group of *Frequently Asked Questions* (FAQs) provides additional miscellaneous information about a variety of the NASA proposal and award processes, policies, and procedures.

Comments and suggestions of any nature about the *NASA Guidebook for Proposers* are encouraged and welcome and may be directed at any time to the point-of-contact identified in Section VII below.

(b) Content and Form of the Proposal Submission

(i) Electronic Proposal Submission

All proposals submitted in response to this ROSES NRA must be submitted in a fully electronic form. No hard copy of the proposal is required or permitted. Electronic proposals must be submitted by one of the officials at the PI's organization who is authorized to make such a submission; electronic submission by the authorized organization representative (AOR) serves for the proposal as the required original signature by an authorized official of the proposing organization.

Proposers may opt to submit proposals in response to this ROSES NRA via either of two different electronic proposal submission systems: either via the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES) (<http://nspires.nasaprs.com>; see Section IV(b)(iv) below) or via Grants.gov (<http://www.grants.gov>; see Section IV(b)(v) below).

Note carefully the following requirements for submission of an electronic proposal, regardless of the intent to submit via NSPIRES or Grants.gov.

- Every organization that intends to submit a proposal to NASA in response to this NRA, including educational institutions, industry, not-for-profit institutions, the Jet Propulsion Laboratory, NASA Centers, and other U.S. Government agencies, must be registered in NSPIRES. This applies equally for proposals submitted via Grants.gov, as well as for proposals submitted via NSPIRES. Every organization that intends to submit a proposal through Grants.gov must also be registered in Grants.gov. Registration for either proposal data system must be performed by an organization's electronic business point-of-contact (EBPOC) in the Central Contractor Registry (CCR).
- Any organization requesting NASA funds through the proposed investigation must be listed on the Proposal Cover Page. NASA will not fund organizations that do not appear on the Proposal Cover Page.

- Each individual team member (e.g., PI, co-investigators, etc.), including all personnel named on the proposal's electronic cover page, must be individually registered in NSPIRES. This applies equally for proposals submitted via Grants.gov, as well as for proposals submitted via NSPIRES.
- Each individual team member (e.g., PI, co-investigators, etc.), including all personnel named on the proposal's electronic cover page, must specify an organizational affiliation. The organizational affiliation specified must be the organization through which the team member is participating in the proposed investigation. If the individual has multiple affiliations, then this organization may be different from the individual's primary employer or preferred mailing address.

Generically, an electronic proposal consists of one or more electronic forms, including an electronic cover page and one or more attachments. The attachments contain all sections of the proposal, including the science/technical/management section, as well as all required and allowed appendices; see Section IV(b)(ii) below for further requirements.

Submission of electronic proposals via either NSPIRES or Grants.gov requires a fundamental change in proposal submission procedure over previous years. In particular, when the PI has completed entry of the data requested in the required electronic forms and attachment of the allowed PDF attachments, including the science/technical/management section, an official at the PI's organization who is authorized to make such a submission, referred to as the authorized organization representative (AOR), must submit the electronic proposal (forms plus attachments). Coordination between the PI and his/her AOR on the final editing and submission of the proposal materials is facilitated through their respective accounts in NSPIRES and/or Grants.gov.

(ii) Proposal Format and Contents

All proposals submitted in response to this NRA must include the appropriate required electronic forms available through either of two proposal submission systems, NSPIRES or Grants.gov.

The science/technical/management section and other required sections of the proposal must be submitted as searchable, unlocked PDF files that are attached to the electronic submission using one of the proposal submission systems. Proposers must comply with any format requirements specified in this NRA and in the *NASA Guidebook for Proposers* (e.g. Section 2.3 of the *NASA Guidebook for Proposers*). Only appendices/attachments that are specifically requested in either this NRA or in the *NASA Guidebook for Proposers* will be permitted; proposals containing unsolicited appendices/attachments may be declared noncompliant. Section 2 of the *NASA Guidebook for Proposers* provides detailed discussions of the content and organization of proposals suitable for all program elements in this NRA, as well as the default page limits of a proposal's constituent parts.

Note that some of the program elements in Appendices A through E of this NRA may specify different page limits for the main body of the proposal; if so, these page limits will be prominently given in the *Summary of Key Information* subsection that concludes each program element description. In the event the information in this NRA is different

from or contradictory to the information in the *NASA Guidebook for Proposers*, the information in this NRA takes precedence.

Important note on creating PDF files for upload: It is essential that all PDF files generated and submitted meet NASA requirements. This will ensure that the submitted files can be ingested by NSPIRES regardless of whether the proposal is submitted via NSPIRES or Grants.gov. At a minimum, it is the responsibility of the proposer to: (1) ensure that all PDF files are unlocked and that edit permission is enabled – this is necessary to allow NSPIRES to concatenate submitted files into a single PDF document; and (2) ensure that all fonts are embedded in the PDF file and that only Type 1 or TrueType fonts are used. In addition, any proposer who creates files using TeX or LaTeX is required to first create a DVI file and then convert the DVI file to Postscript and then to PDF. See http://nspires.nasaprs.com/tutorials/PDF_Guidelines.pdf for more information on creating PDF documents that are compliant with NSPIRES. PDF files that do not meet NASA requirements cannot be ingested by the NSPIRES system; such files may be declared noncompliant and not submitted to peer review for evaluation.

(iii) Additional ROSES Requirement for Budget Format

SMD has adopted a uniform policy concerning the review of proposals submitted in response to this ROSES NRA with regard to the cost evaluation criterion described in Appendix C of the *NASA Guidebook for Proposers*. It is SMD policy to have cost realism and cost reasonableness evaluated according to the match (or mismatch) between proposed objectives and the proposed resources required, including work effort and other proposed costs, and not according to the total cost. The peer review will evaluate the proposed budget and budget justification for cost realism. NASA program personnel will evaluate the proposed budget and budget justification for cost reasonableness, total cost, and comparison of the proposed cost to available funds.

In order to allow this division of review responsibilities, NASA will provide limited but sufficient proposal budget information to the peer review (work effort and personnel, other direct costs including procurements and subawards/subcontracts) while reserving certain proposal budget details for NASA's use (costs of direct labor, indirect costs, total costs).

Therefore, SMD places additional requirements on the submission of proposals in response to this ROSES NRA. Where the requirements in this NRA conflict with requirements and instructions found elsewhere (e.g., in the *NASA Guidebook for Proposers*, NSPIRES instructions, or Grants.gov instructions), the requirements in this NRA have precedence. It is important that all proposers responding to this ROSES NRA follow these additional instructions carefully to enable an appropriate evaluation of their proposals.

In addition to the budget summary information provided in the NSPIRES or Grants.gov Cover Page forms, all proposers are required to include more detailed budgets and budget justifications, including detailed subcontract/subaward budgets, in a format of their own choosing in the *Budget Justification*. For this NRA, this additional budget must be divided into three parts, the "*Budget Justification: Narrative*" and the "*Budget Justification: Details*," both as described in Section 2.3.10 of the *NASA Guidebook for Proposers*, and the "*Total Budget*," a requirement specific to this ROSES NRA.

The *Budget Justification: Narrative* includes the *Table of Proposed Work Effort* and the description of facilities and equipment, as well as the rationale and basis of estimate for all components of cost including procurements, travel, publication costs, and all subawards/subcontracts. The *Table of Proposed Work Effort* must include the names and/or titles of all personnel (including postdoctoral fellows and graduate students) necessary to perform the proposed investigation regardless of whether these individuals require funding from the current proposal. The number of person-months each person is expected to devote to the project must be given for each year. The *Budget Justification: Details* must include the detailed proposed budget including all of the Other Direct Costs and Other Applicable Costs specified in the *NASA Guidebook for Proposers*. For this NRA, the *Budget Justification: Narrative* and the *Budget Justification: Details* should not specify the Total Estimated Cost, the cost of Direct Labor, or any Administrative Costs (e.g., overhead).

The *Total Budget* file must specify the complete set of cost components including all costs discussed in the *Budget Narrative* and *Budget Details*, as well as the Total Estimated Cost, cost of Direct Labor, and Administrative Costs (overhead). The *Total Budget* document will not be provided to the peer review, but will be used by NASA in the evaluation of total cost and comparison of the proposed cost to available funds.

The required *Budget Justification: Narrative* and *Details* section of the proposal may be incorporated into the proposal document as these will be provided to the peer review (for submission via NSPIRES, the *Budget Justification: Narrative* and *Details* must be incorporated into the single proposal PDF file). Regardless of whether the proposal is submitted via NSPIRES or Grants.gov, proposers to ROSES must provide the *Total Budget* in a file called “totalbudget.pdf,” which is uploaded as a separate attachment in either NSPIRES or Grants.gov.

Note that failure to provide sufficient budget justification and data in the *Budget Narrative* (including the *Table of Proposed Work Effort*) and the *Budget Details*, recognizing that the peer review will not have access to the Total Estimated Cost, the cost of Direct Labor, and Administrative Costs (e.g., overhead), will prevent the peer review from appropriately evaluating the cost realism of the proposed effort. A finding by the peer review of “insufficient information to properly evaluate cost realism” will be considered a weakness of the proposal. Inconsistent budget information between these budget descriptions will also be considered a weakness of the proposal.

(iv) Submission of Proposals via NSPIRES, the NASA Proposal Data System

Proposals may be submitted electronically via NASA’s master proposal data base system, the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES). Note that this database system has been changed from that used prior to 2005 for NASA Office of Earth Science and Office of Space Science research proposals. In order to submit a proposal via NSPIRES, this NRA requires that the proposer register key data concerning the intended submission with NSPIRES; NSPIRES is accessed at <http://nspires.nasaprs.com>. Potential applicants are urged to access this site well in advance of the NOI and proposal due dates of interest to familiarize themselves with its structure and enter the requested identifier information.

It is especially important to note that every individual named on the proposal's electronic *Cover Page* form (see below) as a proposing team member in any role, including co-investigators and collaborators, must be individually registered in NSPIRES and that such individuals must perform this registration themselves; no one may register a second party, even the PI of a proposal in which that person is committed to participate. It is also important to note that every named individual must be identified with the organization through which they are participating in the proposal, regardless of their place of permanent employment or preferred mailing address. This data site is secure and all information entered is strictly for NASA's use only.

All proposals submitted via NSPIRES in response to this NRA include a required electronic *Cover Page* form that is accessed at <http://nspires.nasaprs.com>. This form is comprised of several distinct sections: a *Cover Page* that contains the identifier information for the proposing institution and personnel; a *Proposal Summary* that provides an overview of the proposed investigation that is suitable for release through a publicly accessible archive should the proposal be selected; and a *Budget Summary* of the proposed research effort. This *Cover Page* form is available for access and submission starting about 90 days in advance of the proposal due dates given in Tables 2 and 3 of this NRA and remains open until the proposal due date for each program element. Unless specified in the program element description itself, no other forms are required for proposal submission via NSPIRES. See the *NASA Guidebook for Proposers*, Sections 2 and 3, for further details.

Although NSPIRES has the ability to accept many, separate proposal documents, the required elements of any proposal submitted in response to this NRA must be submitted as a single, searchable, unlocked PDF document that contains the complete proposal, including the science/technical/management section and budget justification (but not the *Total Budget*), assembled in the order provided in the *NASA Guidebook for Proposers* (see Section 2.3) and uploaded as a single attachment using the tools in NSPIRES. The proposer is responsible for assembling the complete proposal document for peer review. All required and permitted appendices and attachments (with the exception of the *Total Budget* -- see Section IV(b)(iii) above) must be included in the PDF file(s) and should not be uploaded as separate attachments, unless specified otherwise in the program element description in the Appendices to this NRA. The *Total Budget* must be uploaded as a separate attachment in a file named "totalbudget.pdf." Including any part of the proposal twice creates an additional burden on the peer reviewers. Documents such as team member biographical sketches, letters of commitment, and current and pending support should not be uploaded to NSPIRES as separate files. Any warnings or errors that NSPIRES might generate as part of the element check concerning seemingly missing data should be ignored after verifying that the material is included in the single electronic proposal document.

In addition, it is unnecessary to download the Proposal Cover Page and incorporate it into the Proposal Document. NSPIRES will automatically route the two parts of the proposal (*Cover Page* form, proposal document) to the appropriate peer or NASA reviewers.

Proposers are encouraged to begin their submission process early. Tutorials and other NSPIRES help topics may be accessed through the NSPIRES online help site at <http://nspires.nasaprs.com/external/help.do>. For any questions that cannot be resolved

with the available online help menus, requests for assistance may be directed by E-mail to nspires-help@nasaprs.com or by telephone to (202) 479-9376, Monday through Friday, 8:00 a.m. – 6:00 p.m. Eastern Time.

(v) Submission of Proposals via Grants.gov

In furtherance of the President’s Management Agenda, NASA offers proposers the option to use Grants.gov to prepare and submit proposals in response to this ROSES NRA. Grants.gov allows organizations to electronically find and apply for competitive grant opportunities from all Federal grant-making agencies; it provides a single access point for over 1000 grant programs offered by the 26 Federal grant-making agencies. The U.S. Department of Health and Human Services is the managing partner for Grants.gov.

In order to submit a proposal via Grants.gov, Grants.gov requires that the PI download an application package from Grants.gov. Identifying the appropriate application package requires the funding opportunity number for that program element; the funding opportunity number may be found in the *Summary of Key Information* subsection that concludes each program element description. Proposals submitted via Grants.gov must be submitted by the AOR.

Submitting a proposal via Grants.gov requires the following steps:

- Grant researchers (PIs) do NOT need to register with Grants.gov. However, every individual named in the proposal as a proposing team member in any role, including PI, co-investigators and collaborators, must be registered in NSPIRES (<http://nspires.nasaprs.com>) and that such individuals must perform this registration themselves; no one may register a second party, even the PI of a proposal in which that person is committed to participate. This data site is secure and all information entered is strictly for NASA’s use only.
- Follow Grants.gov instructions provided at the website to download any software tools or applications required to submit via Grants.gov.
- Download the application package from Grants.gov by selecting “Download grant application packages” under “Apply for Grants” at <http://www.grants.gov>. Each program element described in an appendix of ROSES requires a different application package and has a different Funding Opportunity Number; the Funding Opportunity Number may be found in the *Summary of Key Information* at the end of the program element description in each appendix of ROSES. Enter the appropriate Funding Opportunity Number to retrieve the desired application package. All NASA application packages may be found by searching on CFDA Number 00.000.
- Complete the required Grants.gov forms including the SF424 (R&R) Application for Federal Assistance, R&R Other Project Information, R&R Senior/Key Person Profile, and R&R Budget. Every named individual must be identified with the organization through which they are participating in the proposal, regardless of their place of permanent employment or preferred mailing address.
- Complete the required NASA specific forms including NASA Other Project Information, NASA PI and Authorized Representative Supplemental Data Sheet,

and NASA Senior/Key Person Supplemental Data Sheet (this form is only required if there are Senior/Key Persons other than the PI).

- Complete any NASA program-specific form that is required for the specific program element. Program-specific forms may be found by clicking on the hyperlink in the NASA Other Project Information form or by directly accessing <http://nspires.nasaprs.com/grants.gov>. Directions for accessing and submitting program-specific forms, if there are any, are provided in the NASA Other Project Information form.
- Create a proposal in PDF including the science/technical/management section and all other required proposal sections (see Section 2 of the *NASA Guidebook for Proposers*). Upload sections as separate PDFs as prompted by Grants.gov.
- Submit the proposal via the authorized organization representative (AOR); the PI may not submit the application to Grants.gov unless he/she is an AOR.

Potential applicants are urged to access Grants.gov site well in advance of the proposal due date(s) of interest to familiarize themselves with its structure and download the appropriate application packages and tools.

Additional instructions for formatting and submitting proposals via Grants.gov may be found in Sections 2 and 3 of the *NASA Guidebook for Proposers*. Instructions for the use of Grants.gov may be found in the *Grants.gov User Guide* at <http://www.grants.gov/Customersupport>. Instructions for NASA-specific forms and NASA program-specific forms may be found in the application package and at <http://nspires.nasaprs.com/Grants.gov>. For any questions that cannot be resolved with the available online help menus and documentation, requests for assistance may be directed by E-mail to support@grants.gov or by telephone to (800) 518-4726.

(vi) Notice of Intent to Propose

For most of the program elements advertised through this solicitation, a brief Notice of Intent (NOI) to propose is encouraged, but not required, for the submission of proposals to this solicitation. The information contained in an NOI is used to help expedite the proposal review activities and, therefore, is of considerable value to both NASA and the proposer. To be of maximum value, NOIs should be submitted by the PI to NSPIRES (located at <http://nspires.nasaprs.com>) by the dates given in Tables 2 or 3 of this NRA for each program element in Appendices A through E. Note that NOIs may be submitted within NSPIRES directly by the PI; no action by an organization's AOR is required to submit an NOI.

Grants.gov does not provide NOI capability; therefore, NOIs must be submitted via NSPIRES regardless of whether the proposal will be submitted via NSPIRES or Grants.gov. Interested proposers must register with NSPIRES before it can be accessed for use. NSPIRES is open for the submission of NOIs for typically 30 days, starting about 90 days in advance of the due date for the proposals themselves. Since NOIs submitted after these deadlines may still be useful to NASA, late NOIs may be submitted by E-mail as directed in Section 3.1 of the *NASA Guidebook for Proposers*.

(vii) The Two-Step Proposal Process and the Two-Phase Proposal Process

The Two-Step Proposal Process

On occasion, NASA will solicit proposals using a two-step proposal process for which the NOI is an extended synopsis (length not to exceed ~2000 words) of the intended research that is considered a Step-1 proposal. When employed, Step-1 proposals are submitted via NSPIRES (located at <http://nspires.nasaprs.com>) by the NOI/Step-1 due date given in Tables 2 and 3 of this NRA; this site will be open for the submission of Step-1 proposals starting ~30 days in advance of their due date. NASA will review this Step-1 proposal to determine if the anticipated research project exhibits sufficient merit and relevance to warrant submission of a full Step-2 proposal. All submitters of Step-1 proposals will be informed by NASA no later than eight weeks after the Step-1 due date that they are, or are not, encouraged to submit a full Step-2 proposal by the proposal due date established for that program element. Note that a Step-2 proposal may be submitted regardless of whether or not a Step-1 proposal is submitted and whether or not submission of a Step-2 proposal is encouraged by NASA as a result of the Step-1 proposal review.

Grants.gov does not provide Step-1 capability; therefore, Step-1 proposals must be submitted via NSPIRES regardless of whether the Step-2 proposal will be submitted via NSPIRES or Grants.gov. Step-2 proposals are to be submitted in full compliance with the *NASA Guidebook for Proposers* discussed in Section IV(a) above.

This ROSES-2007 NRA contains one program element that is soliciting proposals using a two-step process: Land Cover/Land Use Change (Appendix A.2).

The Two-Phase Proposal Process

On occasion, NASA will solicit proposals using a two-phase proposal process for which Phase-1 is an observing request for an observation to be performed by a NASA space observatory as part of a NASA guest investigator/guest observer program element. Phase-2 is a proposal for funding. An NOI is requested for a Phase-1 observing request by the NOI due date, and the Phase-1 observing request must be submitted by the proposal due date in Tables 2 and 3 of this NRA.

Grants.gov does not provide NOI or Phase-1 observing request capability; therefore, NOIs and Phase-1 observing requests must be submitted via NSPIRES regardless of whether the Phase-2 funding proposal will be submitted via NSPIRES or Grants.gov. The Phase-2 proposal for funding must be submitted via either NSPIRES or Grants.gov by a proposal due date that will be announced when NASA announces the disposition of the Phase-1 observing requests. The process and requirements for the submission of Phase-1 observing requests and Phase-2 proposals may differ for each program element; proposers should read carefully the relevant Appendix to this ROSES NRA.

This ROSES-2007 NRA contains several guest investigator/guest observer program elements using the two-phase proposal process: GALEX Guest Investigator (Appendix D.5), FUSE Guest Investigator (Appendix D.6), Suzaku Guest Observer (Appendix D.8), and GLAST Guest Investigator (Appendix D.9).

(c) Proposal Submission Due Dates and Deadlines

For each program element in Appendices A through E of this NRA, the electronic proposal must be submitted in its entirety by an Authorized Organizational Representative no later than the proposal deadline on the appropriate proposal due date given in Tables 2 or 3 of this NRA. Unless stated otherwise in the relevant appendix to this NRA, the proposal deadline is 11:59 p.m. Eastern Time. All proposals must be submitted electronically using either NSPIRES or Grants.gov (see Sections IV(b)(i–iii) above).

Proposals submitted later than the proposal due date and deadline will be considered late. Proposals that are late will be handled in accordance with NASA’s policy as given in Section (g) of Appendix B of the *NASA Guidebook for Proposers* (see also its Sections 3.2 and F.23). Proposals received after the due date may be rejected without review. If a late proposal is rejected, it is entirely at the discretion of the proposer whether or not to resubmit it in response to a subsequent appropriate solicitation. It is not possible to submit a late proposal electronically via NSPIRES unless the electronic *Cover Page* was initially created prior to the proposal due date. Late proposals may not be submitted via Grants.gov.

(d) Proposal Funding Restrictions

In addition to the funding restrictions and requirements given in the *Guidebook for Proposers* and the *Grants Handbook*, the following restrictions are applicable to this ROSES NRA.

- The estimated funding and number of proposals anticipated to be funded, as shown in the *Summary of Key Information* at the end of each program element, are subject to the availability of appropriated funds, as well as the submission of a sufficient number of proposals of adequate merit.
- The construction of facilities is not an allowed activity for any of the program elements solicited in this NRA unless specifically stated. For further information on the allowability of costs, refer to the cost principles cited in the *Grants Handbook*, Section B, §1260.127, “Allowable Costs.”
- Travel, including foreign travel, is allowed as may be necessary for the meaningful completion of the proposed investigation, as well as for publicizing its results at appropriate professional meetings.
- Profit for commercial organizations is not allowable under grant or cooperative agreement awards but is allowable under contract awards.
- U.S. research award recipients may directly purchase supplies and/or services from non-U.S. sources that do not constitute research, but award funds may not be used to fund research carried out by non-U.S. organizations. However, a foreign national may receive remuneration through a NASA award for the conduct of research while employed either full or part time by a U.S. organization (see Section 1.6 of the *NASA Guidebook for Proposers*).

- The following instructions clarify and supersede the *Guidebook for Proposers*, Section 2.3.10(c)(iv).

Regardless of whether functioning as a team lead or as a team member, personnel from NASA Centers must propose budgets based on full-cost accounting and consistent with the current implementation of simplified full cost accounting for the requested year of performance. Proposal budgets from NASA Centers must include all costs that will be paid out of the resulting award. Costs which will not be paid out of the resulting award, but are paid from a separate NASA budget (e.g. CM&O) and are not based on the success of this specific proposal, should not be included in the proposal budget. For example, CM&O should not be included in the proposal budget while direct civil service labor, travel, and other direct charges (including procurements and contractor labor) to the proposed research task should be included.

- Non-NASA U.S. Government organizations should propose based on full-cost accounting unless no such standards are in effect; in that case such proposers should follow the *Managerial Cost Accounting Standards for the Federal Government* as recommended by the Federal Accounting Standards Advisory Board (for further information, see <http://www.hq.nasa.gov/fullcost>). Proposal budgets must include all costs that will be paid out of the resulting award.

(e) Proposal Requirements for Relevance

Proposals for all NASA sponsored research programs are evaluated on three criteria: intrinsic merit, relevance to NASA's objectives, and cost realism and reasonableness (see Appendix C of the *NASA Guidebook for Proposers*). To enable NASA to properly evaluate the relevance of proposals submitted in response to this solicitation, proposals must contain a statement of the relevance of the proposed work to NASA objectives as stated in the latest version of the *NASA Strategic Plan* and the *NASA Science Plan* (see Section I(a)). This statement need not exceed a quarter page of text and is to be included in the introduction to the science/technical/management section of the proposal. This short statement of relevance to NASA objectives is in addition to the proposal's longer and more detailed discussion addressing the specific goals of a particular research program element.

Note that this NRA references NASA's 2006 strategic goals and objectives (see Section I(a) and Table 1).

V. PROPOSAL REVIEW INFORMATION

(a) Evaluation Criteria

Evaluation by peers of the proposing personnel will be used to assess each proposal's intrinsic scientific and technical merit, its relevance to NASA's stated objectives, and its cost realism. See Appendix C.2 of the *NASA Guidebook for Proposers* for further discussion of these criteria and their relative weights. The evaluation factors include factors evaluated by peer reviewers, as well as factors evaluated by NASA program personnel. Note the following specific points:

- Some of the program elements discussed in Appendices A through E will give specific factors, based on the solicited research objectives, which will be considered when evaluating a proposal’s science and/or technical merits and/or its relevance to program objectives.
- As discussed in Section IV(e) above, relevance will be judged in part by the proposal’s focus on specific strategic and science objectives for SMD, as given in Table 1.
- Cost data for U.S. proposals will be evaluated both by peer review (for cost realism) and by NASA program personnel (for cost reasonableness, total cost, and comparison to available funds) as discussed in Section IV(b)(iii) above. Proposers must follow the budget requirements in Section 2.3.10 of the *NASA Guidebook for Proposers*, as modified in Section IV(b)(iii) of this NRA.
- Cost sharing is not part of the evaluation criteria (see Section III(c) above). However, cost sharing may become a factor at the time of selection when deciding between proposals of otherwise equal scientific and technical merit.

(b) Review and Selection Processes

Review of proposals submitted to this NRA will be consistent with the general policies and provisions given in Sections C.1 through C.4 of Appendix C of the *NASA Guidebook for Proposers*, and selection procedures will be consistent with the provisions of Section C.5 of that document. For some of the program elements solicited in this NRA, the desire to achieve a balance of efforts across the solicited program objectives may play a role in the selections, taking into account not only the new proposals of merit that are suitable for selection but also those that seek an extension of activities initiated through previous but now concluded selections, i.e., “successor” proposals; see Section II(b) above.

Unless otherwise specified, the SMD Division Director responsible for a research program element (or his/her delegate) is its Selecting Official. Unless otherwise specified, the Associate Administrator for the Science Mission Directorate (or his/her delegate) is the Selecting Official for cross-division program elements.

(c) Selection Announcement and Award Dates

Selections are typically announced between 150 days and 220 days after the proposal due date for proposals. Although there are many reasons why selections are not announced earlier, the most common are the uncertainty in the NASA budget at the time selection decisions could be made and the time required to conduct an appropriate peer review and selection process. NASA does not usually announce new selections until the funds needed for those awards are approved through the Federal budget process. Therefore, a delay in the budget process for NASA usually results in a delay of the selection date. After 150 days past the proposal due date for which a proposal was submitted, proposers may contact the responsible Program Officer listed at the conclusion of that program element description in the appendices for the status of the selection activity.

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

(d) Processes for Appeals

(i) Ombudsman Program

The NASA Procurement Ombudsman Program is available under this NRA as a procedure for addressing concerns and disagreements. The clause at NASA FAR Supplement (NFS) 1852.215-84 (“Ombudsman”) is incorporated into this NRA. The cognizant ombudsman is

Director, Contract Management Division
Office of Procurement
NASA Headquarters
Washington, DC 20546
Telephone: 202-358-0445.

(ii) Protests

Only prospective offerors seeking contract awards under this NRA have the right to file a protest, either at the Government Accountability Office (GAO) or with the Agency, as defined in FAR 33.101. The provisions at FAR 52.233-2 (“Service of Protest”) and NFS 1852.233-70 (“Protests to NASA”) are incorporated into this NRA. Under both of these provisions, the designated official for receipt of protests to the Agency and copies of protests filed with the GAO is

Assistant Administrator for Procurement
Office of Procurement
NASA Headquarters
Washington, DC 20546.

VI. AWARD ADMINISTRATION INFORMATION

(a) Notice of Award

Notification of both the selected, as well as the nonselected proposers, will be consistent with the policy given in Section C.5.3 of the *NASA Guidebook for Proposers*. For selected proposers, the offeror’s business office will be contacted by a NASA Awards Officer, who is the only official authorized to obligate the Government. Any costs incurred by the offeror in anticipation of an award will be subject to the policies and regulations of the *Grants Handbook* (see Section B, §1260.125(e), “Revision of Budget and Program Plans”).

(b) Administrative and National Policy Requirements

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

(c) Award Reporting Requirements

The reporting requirements for awards made through this NRA will be consistent with Exhibit G of the *Grants Handbook*. Any additional requirements will be specified in the program element description.

VII. POINTS OF CONTACT FOR FURTHER INFORMATION

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

Dr. Paul Hertz
Chief Scientist
Science Mission Directorate
National Aeronautics and Space Administration
Washington, DC 20546
Telephone: (202) 358-0986
E-mail: paul.hertz@nasa.gov

Note: Proposals must not be submitted to this address. Proposals must be submitted electronically as described in Section IV above.

Specific questions about a given program element in this NRA should be directed to the Program Officer(s) listed in the *Summary of Key Information* subsection that concludes each program element description.

Inquiries about accessing or using the NASA proposal data base located at <http://nspires.nasaprs.com> should be directed by an E-mail that includes a telephone number to nspires-help@nasaprs.com or by calling (202) 479-9376. This help center is staffed Monday through Friday, 8:00 a.m. – 6:00 p.m. Eastern Time.

Inquiries about accessing or using Grants.gov located at <http://www.grants.gov> should be directed by an E-mail to support@grants.gov or by calling (800) 518-4726. This customer support contact center is staffed Monday through Friday, 7:00 a.m. – 9:00 p.m. Eastern Time.

VIII. ANCILLARY INFORMATION

(a) Announcement of Updates/Amendments to Solicitation

Because this NRA is released far in advance of many of the deadlines given in Tables 2 and 3, additional programmatic information for any of its programs may develop before their proposal due dates. If so, such information will be added as a formal amendment to this NRA as posted at its homepage at <http://nspires.nasaprs.com> (select “Solicitations” then “Open Solicitations” then “NNH07ZDA001N”) no later than 30 days before the proposal due date, or, if this is not possible, the proposal due date will be extended to allow 30 days for proposal submission from the date of the amendment. Although NASA SMD will also send an electronic notification of any such amendments to all subscribers of its electronic notification system (see Section VIII(c) below), it is the responsibility of the prospective proposer to check this NRA’s homepage for updates concerning the program(s) of interest.

Any clarifications or questions and answers that are published will be posted on the relevant program element's web page at <http://nspires.nasaprs.com> (select "Solicitations" then "Open Solicitations" then "NNH07ZDA001N" then "List of Program Elements" then the relevant program element). All such clarifications will be posted no later than 30 days before the proposal due date.

(b) Electronic Submission of Proposal Information

On-time electronic submission over the Internet is required for every proposal. While every effort is made to ensure the reliability and accessibility of the electronic proposal submission systems (NSPIRES and Grants.gov) and to maintain help centers via E-mail and telephone, difficulty may arise at any point on the Internet, including the user's own equipment. Therefore, prospective proposers are urged to familiarize themselves with the submission system(s) and to submit the required proposal materials well in advance of the deadline of the program of interest. Difficulty in registering with or using a proposal submission system is not, in and of itself, a sufficient reason for NASA to consider a proposal that is submitted after the proposal due date (see Section IV(c) above).

(c) Electronic Notification of SMD Research Solicitations

SMD maintains an electronic notification system to alert interested researchers of its research program announcements. Subscription to this service is free to all registered users of the NASA proposal data base system at <http://nspires.nasaprs.com>. To add or change a subscription to the electronic notification system, users should login to the data base system and select "Account Management" then "E-mail Subscriptions." Owing to the increasingly multidisciplinary nature of SMD programs, this E-mail service will notify all subscribers of (i) all NASA SMD research program solicitations regardless of their type or science objectives; (ii) amendments to all SMD solicitations that have been released for which the proposal due dates have not passed; and (iii) special information that SMD wishes to communicate to those interested in proposing to its sponsored research programs. Altogether, a subscriber may receive 50–75 notifications per year. SMD maintains this subscription list in confidence and does not attempt to discern the identity of its subscribers. Regardless of whether or not this service is used, all SMD research announcements may be accessed at <http://nspires.nasaprs.com> (select "Solicitations" then "Open Solicitations") as soon as they are posted (typically by ~9:00 a.m. Eastern Time on their release date).

NRAs issued by SMD are synopsized on Grants.gov (<http://www.grants.gov>) at the time they are released. This ROSES-2007 NRA will be synopsized upon its release. Amendments to this NRA that create new proposal opportunities will also be synopsized at the time of their release.

(d) Archives of Past Selections

For more information about the types of research supported by the program elements solicited in previous editions of this NRA and other predecessor NRAs, the titles of investigations selected through previous solicitations (issued after January 1, 2005) are available at <http://nspires.nasaprs.com> (select "Solicitations", then "Past Solicitations").

(e) Meeting Geospatial Standards

NASA pioneered the development of metadata and the accessibility and interoperability of space and Earth science data. When grants result in the development of data that NASA both identifies as geospatial and intends to distribute, then NASA awards will require that documentation (metadata) meets Federal Geographic Data Committee standards. NASA will assure that this documentation is electronically accessible to the Clearinghouse network (<http://www.fgdc.gov/dataandservices/>) and discoverable through Geospatial One Stop (<http://www.GeoData.gov>).

IX. CONCLUDING STATEMENT

Through this ROSES NRA, NASA encourages the participation of the space and Earth science communities in its Science Mission Directorate research and technology programs. These programs, while quite diverse in objectives and types, in fact form the foundation of both the basic and applied research that allows NASA's space and Earth science programs to be properly planned and carried through to the successful interpretation of data and its application to the needs of end users. Comments about this NRA are welcome and may be directed to the point of contact for general questions and comments identified in Section VII above.

Michael H. Freilich
Director
Earth Science Division

Richard Fisher
Director
Heliophysics Division

James L. Green
Director (Acting)
Planetary Science Division

Richard Howard
Director (Acting)
Astrophysics Division

Mary L. Cleave
Associate Administrator
Science Mission Directorate

TABLE 1. NASA STRATEGIC GOALS AND RESEARCH OBJECTIVES

TABLE 1A. NASA'S STRATEGIC GOALS³

- Strategic Goal 1: Fly the Shuttle as safely as possible until its retirement, not later than 2010.
- Strategic Goal 2: Complete the International Space Station in a manner consistent with NASA's International Partner commitments and the needs of human exploration.
- Strategic Goal 3: Develop a balanced overall program of science, exploration, and aeronautics consistent with the redirection of the human spaceflight program to focus on exploration.
- Strategic Sub-goal 3A Study Earth from space to advance scientific understanding and meet societal needs.
- Strategic Sub-goal 3B Understand the Sun and its effects on Earth and the solar system.
- Strategic Sub-goal 3C Advance scientific knowledge of the origin and history of the solar system, the potential for life elsewhere, and the hazards and resources present as humans explore space.
- Strategic Sub-goal 3D Discover the origin, structure, evolution, and destiny of the universe, and search for Earth-like planets.
- Strategic Sub-goal 3E Advance knowledge in the fundamental disciplines of aeronautics, and develop technologies for safer aircraft and higher capacity airspace systems.
- Strategic Sub-goal 3F Understand the effects of the space environment on human performance, and test new technologies and countermeasures for long-duration human space exploration.
- Strategic Goal 4: Bring a new Crew Exploration Vehicle into service as soon as possible after Shuttle retirement.
- Strategic Goal 5: Encourage the pursuit of appropriate partnerships with the emerging commercial space sector.
- Strategic Goal 6: Establish a lunar return program having the maximum possible utility for later missions to Mars and other destinations.

³ From *The 2006 NASA Strategic Plan*; see Section I(a) for reference

TABLE 1B. NASA'S SCIENCE QUESTIONS AND RESEARCH OBJECTIVES⁴

Strategic Sub-goal 3A: Study planet Earth from space to advance scientific understanding and meet societal needs.

NASA's Science Questions

- How is the global Earth system changing?
- What are the primary causes of change in the Earth system?
- How does the Earth system respond to natural and human-induced changes?
- What are the consequences for human civilization?
- How will the Earth system change in the future?

NASA's Research Objectives

- 3A.1 Understand and improve predictive capability for changes in the ozone layer, climate forcing, and air quality associated with changes in atmospheric composition.
- 3A.2 Enable improved predictive capability for weather and extreme weather events.
- 3A.3 Quantify global land cover change and terrestrial and marine productivity, and improve carbon cycle and ecosystem models.
- 3A.4 Quantify the key reservoirs and fluxes in the global water cycle and improve models of water cycle change and fresh water availability.
- 3A.5 Understand the role of oceans, atmosphere, and ice in the climate system and improve predictive capability for its future evolution.
- 3A.6 Characterize and understand Earth surface changes and variability of Earth's gravitational and magnetic fields.
- 3A.7 Expand and accelerate the realization of societal benefits from Earth system science.

⁴ From *The Science Plan for NASA's Science Mission Directorate (2007-2016)*; see Section I(a) for reference

Strategic Sub-goal 3B: Understand the Sun and its effects on Earth and the solar system.

NASA's Science Questions

- How and why does the Sun vary?
- How do planetary systems respond?
- What are the impacts on humanity?

NASA's Research Objectives

- 3B.1 Understand the fundamental physical processes of the space environment from the Sun to Earth, to other planets, and beyond to the interstellar medium
- 3B.2 Understand how human society, technological systems, and the habitability of planets are affected by solar variability and planetary magnetic fields
- 3B.3 Develop the capability to predict the extreme and dynamic conditions in space in order to maximize the safety and productivity of human and robotic explorers.

Strategic Sub-goal 3C: Advance scientific knowledge of the origin and history of the solar system, the potential for life elsewhere, and the hazards and resources present as humans explore space.

NASA's Science Questions

- How did the Sun's family of planets and minor bodies originate?
- How did the solar system evolve to its current diverse state?
- What are the characteristics of the solar system that lead to the origin of life?
- How did life begin and evolve on Earth and has it evolved elsewhere in the solar system?
- What are the hazards and resources in the solar system environment that will affect the extension of human presence in space?

NASA's Research Objectives

- 3C.1 Learn how the Sun's family of planets and minor bodies originated and evolved.
- 3C.2 Understand the processes that determine the history and future of habitability in the solar system, including the origin and evolution of Earth's biosphere and the character and extent of prebiotic chemistry on Mars and other worlds.
- 3C.3 Identify and investigate past or present habitable environments on Mars and other worlds, and determine if there is or ever has been life elsewhere in the solar system.
- 3C.4 Explore the space environment to discover potential hazards to humans and to search for resources that would enable human presence.

Strategic Sub-goal 3D: Discover the origin, structure, evolution, and destiny of the universe, and search for Earth-like planets.

NASA's Science Questions

- What are the origin, evolution, and fate of the universe?
- How do planets, stars, galaxies, and cosmic structure come into being?
- When and how did the elements of life and the universe arise?
- Is there life elsewhere?

NASA's Research Objectives

- 3D.1 Understand the origin and destiny of the universe, phenomena near black holes, and the nature of gravity.
- 3D.2 Understand how the first stars and galaxies formed, and how they changed over time into the objects recognized in the present universe.
- 3D.3 Understand how individual stars form and how those processes ultimately affect the formation of planetary systems.
- 3D.4 Progress in creating a census of extra-solar planets and measuring their properties.

TABLE 2: SOLICITED RESEARCH PROGRAMS (IN ORDER OF PROPOSAL DUE DATES)

TABLE3: SOLICITED RESEARCH PROGRAMS (IN ORDER OF APPENDICES A–E)

Tables 2 and 3 are posted as separate documents at <http://nspires.nasaprs.com/> (select “Solicitations” then “Open Solicitations” then “NNH07ZDA001N”).