

## E.7 EXPLORER PROGRAM U.S. PARTICIPATING INVESTIGATORS

### 1. Scope of Program

#### 1.1 Introduction

This ROSES program element for Explorer Program U.S. Participating Investigator (Explorer USPI) is released in conjunction with the Stand Alone Mission of Opportunity Notice (SALMON) Announcement of Opportunity (AO) Program Element Amendment (PEA) H7: Explorer 2011 Science Missions of Opportunity. The purpose is to solicit potential Explorer Program Mission of Opportunity (MO) investigations in which investigators participate as a Co-I for an instrument, experiment, or technology demonstration that is being built and flown by a sponsor agency other than NASA (see Section 5.3 of the SALMON AO).

NASA has released, simultaneously with this ROSES element and SALMON AO PEA H7, a solicitation for Explorer (EX) Missions through the Explorer 2011 AO (NNH11ZDA002O). The Explorer 2011 AO and the SALMON AO PEA H7 are available for download at <http://nspires.nasaprs.com/>.

Proposals submitted in response to this solicitation must comply with the requirements in this ROSES-2010 NRA and in this Explorer USPI program element appendix. Proposals submitted in response to this solicitation are not required to comply with the requirements in the SALMON AO.

Proposals submitted in response to the EX 2011 AO and SALMON AO PEA H7 solicitations will be reviewed at the same time by the same science review panels as proposals submitted in response to this ROSES program element for Explorer U.S. Participating Scientists.

A single selection meeting will select proposals, and all Explorer selections will be funded from the same Explorer future mission budget; there is no separate budget for Explorer Missions of Opportunity or Explorer USPIs.

#### 1.2 Background

Two of NASA's strategic goals are to (a) "Understand the Sun and its interactions with Earth and the solar system" and (b) "Discover how the universe works, explore how the universe began and developed into its present form, and search for life elsewhere." Further information on NASA's strategic goals may be found in NASA Policy Directive (NPD) 1001.0, *The 2006 NASA Strategic Plan*, available through the Program Library (Appendix D).

The NASA Science Mission Directorate (SMD) addresses these strategic goals by conducting programs of heliophysics and astrophysics science designed to answer the following science research objectives:

For heliophysics research, the strategic objectives are to

- Understand the fundamental physical processes of the space environment from the Sun to Earth, to other planets, and beyond to the interstellar medium;
- Understand how human society, technological systems, and the habitability of planets are affected by solar variability interacting with planetary magnetic fields and atmospheres; and,
- Maximize the safety and productivity of human and robotic explorers by enabling the capability to predict the extreme and dynamic conditions in space.

For astrophysics research, the strategic objectives are to

- Understand the origin and destiny of the universe, and the nature of black holes, dark energy, dark matter, and gravity;
- Understand the many phenomena and processes associated with galaxy, stellar, and planetary system formation and evolution from the earliest epochs to today; and,
- Generate a census of extra-solar planets and measure their properties.

Further information on the goals and objectives of NASA's heliophysics and astrophysics programs may be found in the *2010 Science Plan for NASA's Science Mission Directorate* and the *2009 Heliophysics Roadmap*, available through the Program Library.

It should be noted that while the National Research Council has recently released the 2010 Astronomy and Astrophysics Decadal Survey report, *New Worlds, New Horizons in Astronomy and Astrophysics* ([http://www.nap.edu/catalog.php?record\\_id=12951](http://www.nap.edu/catalog.php?record_id=12951)), NASA has not fully absorbed this report into its program planning. For the purposes of this solicitation, investigations proposing to address the goals and objectives of astrophysics programs will be reviewed only in the context of the *2010 Science Plan for NASA's Science Mission Directorate*.

### 1.3 Science and Program Objectives

NASA solicits proposals for Explorer USPI investigations that address any heliophysics or astrophysics objective as outlined in Section 1.2 of this program element. Investigations that address NASA goals in other areas, such as Earth science or planetary science, are not solicited in this program element.

## 2. Programmatic Considerations

### 2.1 Proposal Opportunity Period and Schedule

The schedule that applies to this Explorer USPI program element is given in Section 3.

A Preproposal Conference will be held in Washington, D.C., in accordance with the schedule in Section 3 of this program element. Further information, including logistics, will be available at the Explorer Acquisition Homepage (<http://explorers.larc.nasa.gov/EX/>) prior to the Preproposal Conference.

## 2.2 Proposal Requirements and Constraints

### 2.2.1 Type of Investigation

A proposed investigation as a U.S. Participating Investigator on a non-NASA space mission may be as a Co-I for an instrument, experiment, or technology demonstration that is being built and flown by a sponsor agency other than NASA. The Co-I role can include, but is not limited to, instrument design, modeling and simulation of the instrument's operation and measurement performance, calibration of the instrument, scientific analysis and/or research of the data returned, and/or development of innovative data analysis techniques. A U.S. Participating Investigator may also serve as a member of a non-NASA space mission science or engineering team and participate in science team activities such as mission planning, mission operations, data processing, data analysis, and data archiving. Regardless of the nature of the U.S. Participating Investigator role, an investigation proposed under this category must be for a science or technology investigation and must include some meaningful data analysis component, archiving of the complete data set, and the publication of science results in the peer reviewed literature. All aspects of the investigation through publication must be within the proposed cost.

Investigations requiring the provision of flight hardware are not solicited through this USPI solicitation. Investigations requiring the provision of flight hardware may be proposed as a Partner Mission of Opportunity (PMO) proposal through the "Explorer 2011 Science Missions of Opportunity" program element described in Appendix H7 of the SALMON AO.

A proposed investigation as a USPI on a non-NASA mission or instrument may take any form that clearly and demonstrably enhances the scientific output of the mission, benefits the U.S. scientific community, and enables U.S. astrophysics and heliophysics science community access to a highly valued scientific data set.

The proposed investigations can vary in duration, to include just the prime science mission phase, or to begin at the post confirmation development phase (e.g., for calibration analysis) through the prime mission operational phase, depending on the science requirements of the investigation. All investigations shall include adequate time for data analysis and archiving following the conclusion of the prime mission phase.

This program element solicits new investigations only. Proposals whose intent or purpose is to extend or directly supplement existing investigations already funded for approved space flight missions or other NASA-supported research programs are not appropriate for this program element. Investigators who are members of the science teams of ongoing missions and who propose to use data from those missions must clearly demonstrate that the proposed research is distinct from their existing efforts.

### 2.2.2 Cost Constraints

For individual investigators, the cost for selected proposals is expected to be on the order of \$125K per selected investigation per year through the prime science mission phase, plus one year for additional data analysis and archiving for the baseline scientific investigation. For a team of

investigators, the cost is expected to be on the order of \$125K per investigator per year, up to a maximum combined team total of on the order of \$1M per year, through the prime science mission phase plus one year for additional data analysis and archiving.

Proposals must include archiving data such as raw data, reduced data (Level 2), instrument calibration data, observation geometry ancillary data, and derived products at an appropriate data archive.

NASA reserves the right to make no selection if there are no proposals of appropriate merit.

### 2.2.3 Duration of Award

Proposals should be for the entire duration of the proposed investigation. This may be no more than through the prime science mission, plus one year for additional data archiving for the baseline scientific investigation. The budget justification in the body of the proposal should cover this entire period. Awards will be for a maximum of five years.

**[The following paragraph is added through Amendment 24 on December 3, 2010.]**

**If the proposed investigation is for more than five years, then a continuation proposal may be submitted for a new award covering a period of up to five additional years. The progress and accomplishments of the initial five years of the investigation will be reviewed as part of the decision making process for the continuation award. The budget for only the first five years of the investigation should be entered into the NSPIRES or Grants.gov electronic budget forms.**

### 2.2.4 Technical Requirements and Constraints

In addition to the requirements given in ROSES, all proposed investigations must also demonstrate: (1) their formal relationship with the sponsoring agency's mission (e.g., selected participant, invited participant, or proposed participant); (2) the status of the mission within the sponsoring agency (i.e., Preliminary Study (Pre-Phase A); Concept Study and Technology Development (Phase A); Preliminary Design and Technology Completion (Phase B); Final Design and Fabrication (Phase C); System Assembly, Integration and Test, and Launch (Phase D); Operations and Sustainment (Phase E)), including the level of commitment that the sponsoring agency has made to complete development; (3) a description of the type and the characteristics of the data from this investigation, as well as any ancillary science data, that will be archived as part of this investigation, and a description of the arrangements and resources included in the proposal to ensure the timely delivery of the necessary data in the required format; and (4) a detailed explanation of how the astrophysics and/or heliophysics science community benefits from this participation.

### 2.3 Proposal Evaluation Factors

Proposers are reminded that the evaluation criteria for this solicitation are given in the *NASA Guidebook for Proposers* (see below for reference). These criteria are intrinsic merit, relevance

to NASA's strategic goals and objectives, and cost realism and reasonableness. In addition to the factors given in the *NASA Guidebook for Proposers*, the evaluation criterion "intrinsic merit" specifically includes the following factors:

### 2.3.1 Scientific Merit of the Proposed Investigation

The information provided in a proposal will be used to assess the intrinsic scientific merit of the proposed investigation. The factors for scientific merit include the following:

- Factor A-1. Compelling nature and scientific priority of the proposed investigation's science goals and objectives. This factor includes the clarity of the goals and objectives; how well the goals and objectives reflect program, Agency, and National priorities; the potential scientific impact of the investigation on program, Agency, and National science objectives; and the potential for fundamental progress, as well as filling gaps in our knowledge relative to the current state of the art.
- Factor A-2. Programmatic value of the proposed investigation. This factor includes the unique value of the investigation to make scientific progress in the context of other ongoing and planned missions; the relationship to the other elements of NASA's science programs; how well the investigation may synergistically support ongoing or planned missions by NASA and other agencies; and the necessity for a space mission to realize the goals and objectives.
- Factor A-3. Likelihood of scientific success. This factor includes how well the anticipated measurements support the goals and objectives; the adequacy of the anticipated data to complete the investigation and meet the goals and objectives; and the appropriateness of the mission requirements for guiding development and ensuring scientific success.

This evaluation will result in narrative text, including specific major and minor strengths and weaknesses, as well as an appropriate adjectival rating for the scientific merit of the investigation.

### 2.3.2 Scientific Implementation Merit and Feasibility of the Investigation

The information provided in a proposal will be used to assess merit of the plan for completing the proposed investigation, including the scientific implementation merit, feasibility, resiliency, and probability of scientific success of the proposed investigation. The factors for scientific implementation merit and feasibility include the following:

- Factor B-1. Merit of the instruments and mission design for addressing the science goals and objectives. This factor includes the degree to which the proposed mission will address the goals and objectives; the appropriateness of the selected instruments and mission design for addressing the goals and objectives; the degree to which the proposed instruments and mission can provide the necessary data; and the sufficiency of the data gathered to complete the scientific investigation.
- Factor B-3. Merit of the data analysis, data availability, and data archiving plan. This factor includes the merit of plans for data analysis and data archiving to meet the goals

and objectives; to result in the publication of science discoveries in the professional literature; and to preserve data and analysis of value to the science community. Considerations in this factor include assessment of planning and budget adequacy and evidence of plans for well-documented, high-level data products and software usable to the entire science community; assessment of adequate resources for physical interpretation of data; reporting scientific results in refereed journals; and assessment of the proposed plan for the timely release of the data to the public domain for enlarging its science impact.

- Factor B-5. Probability of science team success. This factor will be evaluated by assessing the experience, expertise, and organizational structure of the science team. The role of each Co-Investigator will be evaluated for necessary contributions to the proposed investigation; the inclusion of Co-Is who do not have a well defined and appropriate role may be cause for downgrading of the proposal.

This evaluation will result in narrative text, including specific major and minor strengths and weaknesses, as well as an appropriate adjectival rating for the scientific implementation merit and feasibility of the scientific investigation.

#### 2.4 Award Management

Awards will likely be executed directly from NASA Headquarters, although NASA reserves the right to implement them through a NASA Center in order to facilitate coordination with related flight projects that the Center may be carrying out.

### 3. Summary of Key Information

Expected program budget for first year of new awards	See Section 2.4 and 5.3* of SALMON AO PEA H7
Number of new awards pending adequate proposals of merit	See Section 2.4 and 5.3* of SALMON AO PEA H7
Maximum duration of awards	Through the end of the Prime Mission plus one year for data analysis and archiving, for a maximum of five years.
Due date for Notice of Intent to propose (NOI)	December 9, 2010
Due date for proposals	February 16, 2011
Planning date for start of investigation	9 months after proposal due date.
Page limit for the central Science-Technical-Management section of proposal	15 pp; see also Chapter 2 of the <i>NASA Guidebook for Proposers</i>

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\* SALMON Announcement of Opportunity NNH08ZDA0090 Program Element Appendix (PEA) H7 is available through NSPIRES: <http://nspires.nasaprs.com/>.

Relevance	This program is relevant to the heliophysics and astrophysics strategic goals and subgoals in NASA's <i>Strategic Plan</i> ; see Table 1 and the references therein. Proposals that are relevant to this program are, by definition, relevant to NASA.
General information and overview of this solicitation	See the <i>ROSES Summary of Solicitation</i> .
Detailed instructions for the preparation and submission of proposals	See the <i>NASA Guidebook for Proposers</i> at <a href="http://www.hq.nasa.gov/office/procurement/nraguidebook/">http://www.hq.nasa.gov/office/procurement/nraguidebook/</a> .
Submission medium	Electronic proposal submission is required; no hard copy is required or permitted. See Section IV of the <i>ROSES Summary of Solicitation</i> and Chapter 3 of the <i>NASA Guidebook for Proposers</i> .
Web site for submission of proposal via NSPIRES	<a href="http://nspires.nasaprs.com/">http://nspires.nasaprs.com/</a> (help desk available at <a href="mailto:nspires-help@nasaprs.com">nspires-help@nasaprs.com</a> or (202) 479-9376)
Web site for submission of proposal via Grants.gov	<a href="http://grants.gov/">http://grants.gov/</a> (help desk available at <a href="mailto:support@grants.gov">support@grants.gov</a> or (800) 518-4726)
Funding opportunity number for downloading an application package from Grants.gov	NNH10ZDA001N-EXUSPI
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