B.4 HELIOPHYSICS GUEST INVESTIGATORS - OPEN

NOTICE: Proposals to this program will continue to be taken by a two-step process, in which the Notice of Intent is replaced by a required Step-1 proposal submitted by an Authorized Organizational Representative (AOR). Only proposers who submit a Step-1 proposal are eligible to submit a Step-2 (full) proposal. Step-1 proposals will be checked for compliance but will not be reviewed. See Section 3 for details. Step-2 proposals will be limited to ten (10) pages. Investigations focused on Magnetospheric Multiscale (MMS) data are not permitted; these investigations should be submitted under B.8 Special MMS Guest Investigators.

Check for NASA spacecraft mission data compliance as specified in the overview B.1.

1. Scope of Program

The Heliophysics Guest Investigator (H-GI) "Open" program is intended to maximize the scientific return from operating Heliophysics missions by providing support for research that is beyond the scope of work of the mission science teams. It also allows scientists who are not associated with a mission team to participate in the mission science. In ROSES-2016, this primary H-GI element is offered as a single "open" program element, although there are plans to include a Magnetospheric Multiscale Guest Investigators (MMS-GI) call in program element B.8, later in ROSES-2016 by Amendment.

1.1 Overview

The H-GI Open program is for investigations whose primary emphasis is the analysis of data from currently operating missions of the Heliophysics System Observatory (HSO). It provides support for analysis of observations from both extended missions and from missions in their prime phase (Phase E). Proposals should either (1) address the goals of the mission(s) on whose data the investigation is focused, or (2) for investigations that go beyond the mission goals, proposals must address one or more of the four high-level science goals from the most recent Heliophysics Decadal survey (*Solar and Space Physics: A Science for a Technological Society* www.nap.edu/catalog.php?record_id=13060):

1. Determine the origins of the Sun's activity and predict the variations in the space environment;
2. Determine the dynamics and coupling of Earth's magnetosphere, ionosphere, and atmosphere and their response to solar and terrestrial inputs;
3. Determine the interaction of the Sun with the solar system and the interstellar medium;
4. Discover and characterize fundamental processes that occur both within the heliosphere and throughout the universe.

In support of any H-GI proposal, investigations may employ theory, models, and data from other sources, as needed, to interpret and analyze NASA's HSO data, but only as a secondary emphasis. However, in any such instance, the proposal must clearly demonstrate that the theory, models, and/or data in question are necessary for interpretation of the HSO data and are not

themselves the primary object of the investigation. Development of new models and theories is not solicited.

The list of operating HSO missions is found at:
http://science.nasa.gov/heliophysics/missions/operating/

Proposers should be aware that for many of these missions, the mission science teams and others have already accomplished a substantial amount of research. Proposals must demonstrate that the proposed research will extend the frontier of existing knowledge in a fundamental and important manner.

Additionally, prospective investigators must demonstrate that the proposed effort can be accomplished using data that will be available during the period of the award. Most Heliophysics data may be found in one or more of the NASA active archives and Virtual Observatories (VOs).

Archive		URL
Solar Data Analysis Center	SDAC	http://umbra.nascom.nasa.gov
Space Physics Data Facility	SPDF	http://spdf.gsfc.nasa.gov
Virtual Solar Observatory	VSO	http://sdac.virtualsolar.org/
Heliophysics Data Portal	formerly VSPO	http://vspo.gsfc.nasa.gov/websearch/dispatcher
Virtual Magnetospheric Observatory	VMO	http://vmo.nasa.gov
Virtual Heliospheric Observatory	VHO	http://vho.nasa.gov
Virtual Radiation Belt Observatory	ViRBO	http://virbo.org
Virtual Ionosphere Thermosphere Mesosphere Observatory	VITMO	http://vitmo.jhuapl.edu
Virtual Wave Observatory	VWO	http://vwo.gsfc.nasa.gov

1.2 Organizing Science Areas

The Heliophysics Guest Investigator program has established four subdisciplines and 13 science areas for the purpose of organizing the evaluation and peer review. The four subdisciplines of Heliophysics are Solar, Heliosphere, Magnetosphere, and Ionosphere-Thermosphere-Mesosphere (ITM). Each PI will have to choose one of the four as the focus of their investigation. Note: Do not choose Heliosphere meaning Heliophysics; they are not synonymous. This wastes time and resources to redirect; such misdirected proposals may be returned without review.

The 13 science areas are listed below. Some of these science areas fit within more than one broad category. Each proposal must choose one of the four broad categories and one of the 13 science areas:

1. Solar Interior
2. Solar Transient Events
3. Solar Atmosphere

4. Particle Acceleration, Transport, Modulation in the Heliosphere
5. Heliospheric Plasma Processes, Turbulence, Waves, Composition
6. Interplanetary Coronal Mass Ejections/Magnetic Clouds
7. Outer Heliosphere and the Interstellar Boundary
8. Solar Wind – Magnetosphere Coupling
9. Inner Magnetosphere
10. Magnetosphere – Ionosphere Coupling/Magnetotail
11. Ionosphere – Atmosphere Coupling
12. Neutral Atmosphere
13. Solar Output – Ionosphere/Atmosphere Coupling

System science proposals that touch on more than one of these science areas are encouraged, but for the purpose of organizing the review, investigators must choose the one area that is most relevant. Proposals addressing the magnetospheres or the ionospheres of other planets are permitted, but must not duplicate proposals sent to other programs.

2. Submission and Evaluation Guidelines

2.1 General Considerations

Each Principal Investigator (PI) is allowed to submit one and only one Step-1 proposal to this program element. In that proposal, the Principal Investigator must invest a substantial portion of their time, of the order of 10-20%, to the investigation. Co-investigators (Co-Is) must each have a specific and defined task in the project, and the task must be essential to completion of the project. Use of collaborators is discouraged. Proposals may be declared noncompliant based on either the Step-1 or Step-2 proposal if they are outside the scope of the H-GI program (see Section 2.2 below) or if they fail to meet submission guidelines specified below (Section 3).

2.2 Limitations and Scope

Proposals outside the scope of H-GI may be declared noncompliant based on either the Step-1 or Step-2 proposal. These include the following:

- Proposals that do not focus on analysis of data from currently-operating HSO missions;
- Proposals for the same or essentially the same work submitted concurrently to other program elements in Appendix B or E, as specified in B.1 Section 1;
- Work for which the proposing organization (or investigators) are already funded by NASA. Where projects might appear to overlap, proposals must show that the proposed effort does not duplicate other awards, including awards as part of operating space flight missions;
- Proposals for model, tool, or theory development (see Section 1.1);
- The routine, long-term gathering of observational data;
- Investigations with the main purpose of supporting ground-based infrastructure or facilities;
- Proposals focused on the use of Magnetospheric Multiscale (MMS) data. MMS data may be used as a secondary resource, but must not be a primary object of the investigation.

A PI or a Co-I on a qualifying Heliophysics mission may also propose as a PI or Co-I to the H-GI program. However, such Heliophysics mission personnel must include in their proposal a

description of their mission duties and clearly distinguish the proposed new activity from their existing responsibilities for mission operations and data analysis.

3. Two-Step Submission Guidelines

To streamline the proposal process (submission, evaluation, and administration), this program uses a two-step proposal submission process. The overall description of a two-step process can be found in Section IV. (b) vii of the ROSES *Summary of Solicitation*.

A Step-1 proposal is required and must be submitted electronically by the Step-1 due date (see below and Tables 2 and 3 in the *ROSES Summary of Solicitation*). The Step-1 proposal must be submitted by the organization's Authorized Organizational Representative (AOR). No budget or other elements are required. Only proposers who submit a Step-1 proposal are eligible to submit a Step-2 proposal. Step-1 proposals will be checked for compliance, but they will not be evaluated. The Step-1 proposal title, science goals, and investigators (Principal Investigator, Co-Investigators, Collaborators, Consultants, and Other Professionals) cannot be changed between the Step-1 and Step-2 proposals. The expected format and evaluation criteria are described below. Submission of the Step-1 proposal does not obligate the offerors to submit a Step-2 (full) proposal later.

3.1 Step-1 Proposal Content

Proposers should refer to the "Instructions for Submitting a Step-1 Proposal" under "Other Documents" on the NSPIRES page for this program. The Step-1 proposal is restricted to the 4000 character Proposal Summary text box on the NSPIRES web interface cover pages. References and any other supporting material are not required, but, if included, must fit within the limit. The Step-1 proposal must include the following information:

- The science goals and objectives to be addressed by the proposal;
- A listing of the mission data to be used in the investigation;
- A listing of the data analysis methodology and any models or simulations to be used;
- A brief statement of the relevance of the problem to the goals of the mission(s) on whose data the investigation is focused, or for investigations that go beyond the mission goals, the relevance to one or more of the four Decadal Survey goals.

The NSPIRES system for proposal submission requires that Step-1 proposals include a summary (i.e., abstract) describing the proposed work as outlined above. The proposal summary is entered directly into a text field in NSPIRES. No PDF attachment is required or permitted for Step-1 proposal submission. All information will be entered within the 4000 character Proposal Summary text box on the NSPIRES web interface cover pages. Proposers will be notified by E-mail when they are able to submit their Step-2 proposals.

3.2 Step-2 Proposals

A Step-2 (full) proposal must be submitted electronically by the Step-2 due date (see below and Tables 2 and 3 in the *ROSES Summary of Solicitation*). The Step-2 proposal must be submitted via NSPIRES or Grants.gov by the organization's Authorized Organizational Representative (AOR). A budget and other specified information is required. The Step-2 proposal title, science

goals, and investigators (Principal Investigator, Co-Investigators, Collaborators, Consultants, and Other Professionals) must be the same as those in the Step-1 proposal.

Proposers must have submitted a Step-1 proposal to be eligible to submit a Step-2 proposal. Proposers that received a noncompliant letter are not eligible to submit a Step-2 proposal.

Proposers are strongly encouraged to provide names and contact information of five experts qualified to review their proposal. These experts must not be from the institutions of the PI or Co-Is. This information can be supplied via the SARA web page at http://science.nasa.gov/researchers/suggested-reviewers/.

Proposers are expected to provide mail-in reviews for one to three proposals in this competition. Much of the science expertise lies in the PI/Co-I community, because increasingly, nearly the entire Heliophysics community proposes. In order to maintain a high caliber review process, it is important to get the additional mail-in reviews to cover all proposals fairly.

3.3 Step-2 Proposal Format

The process for preparation and submission of the Step-2 (full) proposals is the same for any other ROSES proposal. Guidelines for content and formatting full proposals are specified in Table 1 of ROSES and the *NASA Guidebook for Proposers* and the *ROSES Summary of Solicitation*.

Proposals are restricted to ten (10) pages for the Scientific/Technical/Management section and must include the following sections with the preferred order:

- The science objectives and perceived impact of the proposed work to the state of knowledge in the field; references to existing work in the field should be limited to that which is needed to justify the value of the science proposed;
- The data and methodology to be employed in conducting the proposed research; the proposal must demonstrate (1) that the data are appropriate to address the science objectives and (2) that the methodology is both appropriate and feasible to make substantial progress on the science objectives;
- The relevance of the proposed work to the goals of the mission(s) on whose data the investigation is focused; or if the proposed work goes beyond the goals of the mission(s), then relevance to one or more of the four high-level science goals from the most recent Heliophysics Decadal survey listed in Section 1.1 must be demonstrated;
- A general plan of work, the management structure for the proposal personnel, and a description of the expected contribution to the proposed effort by the PI and each person as identified in the proposal whether or not they derive support from the proposed budget. Postdoctorals and students do not need to be named.

Historically, proposals that address a single well-focused science objective with a limited set of specific science questions have been more successful at constructing methodologies that are demonstrably feasible and appropriate, as compared with those that propose to address a large number of science questions or that are directed at an overly-broad science topic.

3.4 Step-2 Evaluation Criteria

Step-2 proposals that are not compliant with format requirements may be rejected without review. See Section IV (b) ii of the *ROSES Summary of Solicitation* and the *NASA Guidebook for Proposers* for details. Proposals that have changed the scientific scope from that of their Step-1 proposal may be declared noncompliant.

Compliant proposals will be evaluated according to the criteria specified in Section C.2 of the *NASA Guidebook for Proposers*. These criteria are intrinsic scientific and technical merit, relevance, and cost realism/reasonableness.

The evaluation of scientific and technical merit will include the following:

- Compelling nature and scientific priority of the proposed investigation's science goals and objectives, including the importance of the problem within the broad field of Heliophysics, the unique value of the investigation to make scientific progress in the context of current understanding in the field, and the importance of carrying out the investigation now.
- Appropriateness and feasibility of the methodology, including the appropriateness of the selected data, models, and analysis for completing the investigation and the feasibility of the methodology for ensuring scientific success.

Based on these two science and technical factors, the evaluation will consider the overall potential science impact and probable success of the investigation.

Relevance to and priority within the H-GI program will be assessed based on criteria discussed in Section 1. Each proposal must demonstrate that the investigation is relevant and of high priority.

Cost realism/reasonableness includes assessing the amount of work to be accomplished versus the amount of time proposed. Open-ended proposals or those with a large number of science questions to be addressed typically do not fare well in this evaluation. Only necessary Co-Investigators and Collaborators should be included, and their specific tasks and roles in the investigation must be clearly laid out in the proposal work plan.

4. Available Funds

It is expected that there will be approximately $2.5M available in Fiscal Year (FY) 2017 to support new Heliophysics GI investigations selected through this solicitation. Annual funding is expected in the range ~$125-150K per investigation per year.

5. Award Types

As begun in 2013, the H-GI program will primarily award funds through three vehicles: (1) grants, (2) interagency transfers, and (3) awards to NASA Centers. The H-GI program will not award contracts. An institution that has received a contract previously can receive funds as a grant by not charging a fee.

6. Summary of Key Information

Expected annual program budget for first year of new awards	~$2.5M; See Section 4
Number of new awards pending adequate proposals of merit	~18
Maximum duration of awards	3 years; shorter-term proposals are encouraged.
Due date for proposals	See Tables 2 and 3 in the *ROSES Summary of Solicitation*.
Page limit for the central Science-Technical-Management section of proposals	10 pp; see also Chapter 2 of the *NASA Guidebook for Proposers*
Planning date for start of investigation	8 months after proposal due date.
Relevance	This program is relevant to the Heliophysics questions and goals in the NASA Science Plan. Proposals that are relevant to this program are, by definition, relevant to NASA.
General information and overview of this solicitation	See the *ROSES Summary of Solicitation*.
Detailed instructions for the preparation and submission of proposals	See the *NASA Guidebook for Proposers* at http://www.hq.nasa.gov/office/procurement/nraguidebook/.
Submission medium	Electronic proposal submission is required; no hard copy is required or permitted. See also Section IV in the *ROSES Summary of Solicitation* and Chapter 3 of the *NASA Guidebook for Proposers*.
Web site for submission of proposal via NSPIRES	http://nspires.nasaprs.com/ (help desk available at nspires-help@nasaprs.com or (202) 479-9376)
Web site for submission of proposals via Grants.gov	http://grants.gov (help desk available at support@grants.gov or (800) 518-4726)
Funding opportunity number for downloading an application package from Grants.gov	NNH16ZDA001N-HGIO
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