

C.5 SUN-EARTH CONNECTION GUEST INVESTIGATORS

1. Scope of Program

A multiple-year Sun-Earth Connection (SEC) Guest Investigators Program (GIP) is offered for investigations that draw extensively upon the data sets from the SEC space flight missions. This program is intended to maximize the return from currently operating missions by providing support for research of breadth and complexity beyond those typically being carried out by the presently funded investigations. This objective helps fulfill the recommendation of the 2001 and 2003 SEC Senior Review panels whose reports (<http://spacescience.nasa.gov/admin/divisions/ss/index.htm>), stated that

2001: "...the key to meeting SEC goals of understanding the Sun-Earth and Sun-Heliosphere systems is the integration of data from multiple missions during scientific analysis. ... Most extended [mission]-phase scientific analysis should be funded competitively through a substantial GI program to which mission investigators have full access."

2003: "The panel... believes that the SEC Guest Investigator (GI) program should be strengthened ...a GI program with a Cluster focus should be increased by \$1M per year in FY05-07, [and]...a RHESSI Guest Investigator Program established."

This year the Guest Investigator Program consists of four elements described in Section 2 below:

- A) Geospace Missions;
- B) Solar and Heliospheric Missions;
- C) Cluster-specific Theory, Modeling, and Data Analysis Tools; and
- D) RHESSI-specific research program.

The first two (A and B) represent the traditional elements of the GIP. Corresponding investigations should be designed to use data from multiple spacecraft, as well as other related sources and to carry out the associated interpretative data analysis, theory, and modeling. While global system problems utilizing as much of the flight mission data as appropriate are of special interest, problems of all scales within the SEC realm may be addressed by the solicited investigations.

Investigations proposed for the Cluster-specific and RHESSI-specific (C and D) elements should respond to the items listed in Sections 2.C and 2.D below.

Efforts focused on those particular aspects of the Sun-Earth system that directly affect life and society are not appropriate for the SEC GIP, but may be appropriate for the Living With a Star Targeted Research and Technology, Program Element C.7 in this NRA.

The Guest Investigator Program emphasizes the use of data from NASA's SEC missions, including those missions with which NASA has an international partnership. The use of collaborative data from space sensors or ground observations funded by other U.S. government organizations may be important and necessary for the proposed research. Under that circumstance, the use of collaborative data is appropriate if it is clearly demonstrated that the proposed research will rely primarily upon data from NASA's SEC missions.

Specific information on the SEC missions, key personnel, and data sets is found via the Office of Space Science home page (<http://spacescience.nasa.gov/missions>). Prospective guest investigators are strongly encouraged to demonstrate that the proposed effort can be accomplished using available or collectable data. This may entail contacting the PI team or teams who are familiar with the data in an early stage of their proposal preparation in order to achieve early clarification. The following two questions should be clearly addressed in the proposal:

- 1) If new observations are required, are the proposed observations feasible using data from currently operating missions, and, if so, can they be carried out with a reasonable amount of effort and time?
- 2) What procedures will the prospective guest investigator follow for obtaining mission data necessary to conduct the proposed investigation?

2. Information on Specific Space Flight Mission Data Sets

This section describes specific terms and conditions relating to proposed SEC GIP investigations on the use of data from individual missions.

A. Geospace Missions

Incorporated into this SEC GIP is correlative scientific research, that is, research that involves data analysis, theory, and simulations, that utilizes the data from the ACE, Cluster, FAST, Geotail, IMAGE, IMP-8, Polar, SAMPEX, SNOE, TIMED, and Wind missions, as well as other suitable space sensors, ground-based observations, and theory investigations.

Note on access to Cluster data: Data equivalent to the Prime Parameter Database from Cluster for 2001 is now available for all experiments. In addition, the public active Cluster archive is scheduled to begin operation in 2004. Should use of non-public data be required for research projects selected under this opportunity, reasonable requests for access to such data will be arranged by the instrument PIs, the NASA Cluster Project Scientist, and the selected investigators.

Questions concerning the geospace missions may be addressed to the Program Officer:

Dr. William Peterson
Sun-Earth Connection Division
Code SS
Office of Space Science
NASA Headquarters
Washington DC 20546-0001
Telephone: (202) 358-0080
FAX (202) 358-3987
E-mail: William.K.Peterson@nasa.gov

B. Solar and Heliospheric Missions

The missions contributing to our knowledge of the Sun and the heliosphere include ACE, IMP-8, RHESSI, SOHO, TRACE, Ulysses, Voyager, Wind, and Yohkoh. Proposals are invited as part of the SEC GIP requiring new observations, analysis of existing data, theoretical analysis that seeks to explain observations, and/or ancillary ground-based observations that augment mission data. Proposals combining data from these solar and heliospheric missions with other data from active and past missions are especially pertinent and welcome. While Yohkoh operations have ceased, proposals are invited for Yohkoh scientific research that utilizes its decade-long database, which is entirely open. See http://umbra.nascom.nasa.gov/yohkoh_archive.html.

Note that the Instrument PIs on SOHO and the mission PIs for TRACE and RHESSI may not receive funding from, nor propose as a PI to, this Guest Investigator Program.

Questions concerning the Solar and Heliospheric Physics missions may be addressed to the Program Officer:

Dr. William Wagner
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C. Cluster-Specific Program for Modeling, Theory, and Enhanced Data Analysis Tools

The 2003 Senior Review of SEC operating satellites recommended that \$1M/year for the Fiscal Years 2005–2007 be allocated for a competitive Cluster-specific program to support modeling, theory, and the development of enhanced data analysis tools with the goal of addressing Cluster-specific science questions and enhancing the scientific return of the Cluster mission.

The four Cluster spacecraft are designed to use their variable separation to determine the structure of discontinuities in geospace. Cluster can provide multipoint data from which physical quantities, such as the electric current density and density gradients can be derived. The instrumentation on the Cluster spacecraft is appropriate for studying the structure of the bow shock, magnetopause, and dayside polar cusp. Magnetic reconnection throughout the magnetosphere, the flow of energy from the solar wind into the magnetosphere, and a variety of plasma sheet and auroral processes are also strong foci of research using data from Cluster.

Upon selection, the investigators will organize a Cluster Theory Modeling and Data research team to coordinate their efforts and facilitate collaborations among members of the team and Cluster experimenters. Therefore, proposers should indicate how they plan to contribute to such a team. The team is expected to initiate collaborative studies to further a global understanding of the structure and dynamics of processes in the magnetosphere and to help achieve the scientific objectives of the Cluster mission as summarized above.

This solicitation is for grants of up to three years and is not expected to be repeated. Proposals for theory, modeling, and data analysis tools are specifically requested for this portion of the program. Proposals focused on the analysis of Cluster data should be addressed to section 2.A (above) of this GIP.

See the “note on access to Cluster Data” in Section 2.A above.

It is envisioned that these proposals will be for larger efforts than those typically proposed for the GIP. The \$1M per year is expected to support from three to seven awards. The distribution of awards between theory, modeling, and enhanced data analysis tools will be determined by the intrinsic scientific merit of the proposals.

The proposals should assume that the Cluster Theory Modeling and Data team will meet at least once per year for a workshop lasting several days. Interim contacts via national and international meetings and teleconferences are also anticipated. After selection of proposals, the NASA Project Scientist (see below) will request that one of the selected PIs take on additional responsibility in helping to lead the collaborative research team.

Questions concerning this solicitation may be directed to the NASA Project Scientist

Dr. Melvyn L. Goldstein
Code 692
NASA Goddard Space Flight Center
Greenbelt, MD 20771

Telephone: (301) 286-7828
Facsimile: (301) 286-1433
E-mail: Melvyn.L.Goldstein@nasa.gov

D. RHESSI-Specific Research

Acting on the recommendation of the 2003 SEC Senior Review, a special one-time research program has been established to support investigations concentrating on the use of the RHESSI database. *“RHESSI has a unique role and tremendous potential for understanding flares. It provides information on the (penultimate) source of many phenomena in the SEC system.”* The purpose of this part of the GIP is to analyze the quantitative, spectral, spatial, and temporal information contained in this rich data set. Investigators are expected to take full advantage of the RHESSI database, software tools and workshops(see <http://hessi.ssl.berkeley.edu/> for more information).

The proposed investigations should be consistent with one of the SEC strategic goals. Note: Researchers wishing to investigate RHESSI data from astronomical sources such as Gamma-ray bursts, are encouraged to propose to the Astrophysics Data Analysis Program, A.2.

Approximately \$500K per year will be available for the investigations sought by this section of the GIP, which is expected to support between four to eight proposals. The proposed investigations may be for up to three years.

Questions concerning the RHESSI-specific research may be addressed to the Program Officer:

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3. Programmatic Information

Proposals whose intent or purpose is to extend or directly supplement existing investigations already funded for approved space flight missions or other SEC research programs are not appropriate for this SEC GIP. 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 research proposed is distinct from their existing efforts. A PI (note the exception in section 2.B above) or a Co-I on a qualifying SEC mission may also propose as a PI or Co-I to this SEC GIP. However, such SEC mission personnel must include in their proposal a description of their mission responsibilities, which are not to duplicate the research proposed for the SEC GIP.

In addition to the funds set aside for the Cluster-specific and RHESSI-specific research elements, approximately \$6.0M will be available for general geospace, solar and heliospheric investigations sought by this solicitation in Sections 2.A and 2.B above. The proposed investigations may be for up to three years. Historically, awards have averaged a funding level of about \$80K per year.

IMPORTANT INFORMATION

The *Summary of Solicitation* of this NRA points out that NASA Headquarters now uses a single, unified set of instructions, entitled *NASA Guidebook for Proposers Responding to NASA Research Announcements*, that provides detailed guidance for the preparation and submission of proposals to most of its NRAs. The current edition, *Guidebook for Proposers– 2004*, is incorporated into this Office of Space Science solicitation and is accessible by linking through the menu item “Helpful References” at the Web site <http://research.hq.nasa.gov> or it may be directly accessed at <http://www.hq.nasa.gov/office/procurement/nraguidebook/>. Proposers to this Program Element are urged to familiarize themselves with this document, in particular its Chapters 1, 2, and 3, before preparing a proposal. This NRA’s *Summary of Solicitation* also contains the schedule and instructions for the electronic submission of both a *Notice of Intent* (NOI) to propose, as well as a proposal’s *Cover Page/Proposal Summary/Budget Summary* for the proposal, and the mailing address for the submission of proposals.
