A.4.8 Sun-Earth Connection Guest Investigator Program

1. Scope of Program

Proposers interested in submitting in response to this program element should also read Section A.4.0 of this Appendix for an overview of The Sun-Earth Connection (SEC) science theme the NASA Office of Space Science.

A multiple year Sun-Earth Connection (SEC) Guest Investigator Program (GIP) is offered for investigations that extensively utilize the operating SEC missions' data sets. Guidelines for these interdisciplinary objectives are taken from the SEC Senior Review that took place in mid 1997; see the World Wide Web site at URL <http://www.hq.nasa.gov/office/oss/strategy/SEC_review/finalsun.htm>. Note that the Solar Maximum objectives specified by the SEC Senior Review are included as recommended, which include solving the more complex and different problems associated with solar cycle maximum conditions than those addressed to date during solar cycle minimum. Therefore, broad expertise beyond that included in the present Solar Minimum mission teams is needed to interpret data from multiple spacecraft and other correlative sources, and to carry out the essential interpretative data analysis, theory, and modeling.

The objectives of this SEC GIP are: 1) to understand the solar interior and the solar atmosphere, including the evolution of mass and energy ejected from the solar atmosphere; 2) to understand the propagation of disturbances in the three-dimensional as well as the distant heliosphere; and 3) to investigate the flow of mass, energy and momentum throughout the near space environment of the Earth. With the integration of observations and analysis, and of simulations and theory, investigators can proceed from the present static understanding of the Sun-Earth system to the realistic dynamics of the connection process; knowledge that is especially needed for the complex problems of the upcoming solar maximum period. Nevertheless, all problems of all scales within the SEC realm are to be addressed by the solicited investigations, not exclusively global, multiple spacecraft efforts. Guest Investigator Programs are intended to maximize the return from currently operating missions by providing support for research of breadth and complexity beyond that of presently funded, often individually mission oriented, investigations.

This SEC GIP is intended to analyze data from the following missions:

- Magnetospheric Physics: Polar, Wind, Geotail, FAST, Equator-S and ACE/RTSW;
- Heliospheric Physics: Ulysses, Voyager, SAMPEX, and IMP-8; and
- Solar Physics: SOHO, TRACE and Yohkoh.

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These analyses may also incorporate associated ground-based data and simulation, theory, and modeling activities.

2. Information on Specific SEC Mission Data Sets

This section describes a number of ongoing programs within the SEC mission fleet and their accommodation within this broader SEC GIP. Future and new missions typically have specific data rules and realities not shared by established and archived data sets (e.g. ACE); these missions will similarly be included in the SEC GIP as they mature. While the overall scope and objectives of the SEC GIP are described above, the following information is provided for specific data sets and programs.

A. Magnetospheric Missions

Incorporated into this SEC GIP is the presently funded ISTP GIP for correlative scientific research--data analysis, theory, and simulations--that heavily utilize the data base of Polar, Wind, Geotail, and the associated ground-based and theory investigations; additional data bases are those of FAST, Equator-S, and ACE Real Time Solar Wind (RTSW) (see also Section A.4.7 of this Appendix for the ACE GIP) data. Proposals combining data from these with other SEC mission data sets are especially pertinent. The selections for this opportunity must strongly focus upon research goals of SEC, especially toward the Solar Maximum era; the use of the multiple mission data base to address problems is encouraged. Relatively new mission data analysis will be chiefly limited to "quick-look" products accessible on the World Wide Web (or other, appropriate and openly available data); missions in extended phase are generally providing higher resolution and reduced data. Information on the various missions, personnel and data sets is found at the following Web sites:

- Polar, Wind, Geotail: <http://www-istp.gsfc.nasa.gov/>;
- FAST: <http://sprg.ssl.berkeley.edu/fast/>;
- Equator-S: <http://www.mpe-garching.mpg.de/www_plas/EQS/eq-s-home.html>;
- ACE RTSW: <http://www.sel.noaa.gov/sec.html>; and
- Associated ground-based, general spacecraft data archives: <http://nssdc.gsfc.nasa.gov/space/netdex.html>

A PI or Co-I on a qualifying magnetospheric mission may also propose as a PI 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 (similar non-duplication rules apply to presently active ISTP Guest Investigator Program investigations selected for FY 1997 and FY 1998).

Questions concerning the Magnetospheric missions should be addressed to:

Dr. Lawrence Zanetti
Research Program Management Division
Code SR
Office of Space Science
NASA Headquarters
Washington DC 20546-0001
Telephone: (202) 358-0888
Facsimile: (202) 358-3097
E-mail: lzanetti@hq.nasa.gov

B. Heliospheric Missions

A Heliospheric Physics Guest Investigator program that supports research relating to the analysis of data from the heliospheric missions (Pioneer 10 and 11, the Voyager Interstellar Mission, Ulysses, IMP-8, and the Solar Anomalous, and Magnetospheric Particle Explorer (SAMPEX)) underwent comprehensive review in 1997, resulting in three-year awards that subscribed the available budget for this activity through Fiscal Year 2000. However, additional proposals of exceptional scientific merit utilizing heliospheric mission data will be considered under this SEC GIP. Proposals combining data from Heliospheric missions with other SEC mission data are especially pertinent. Questions concerning Heliospheric Missions should be addressed to:

Dr. James C. Ling
Research Program Management Division
Code SR
Office of Space Science
NASA Headquarters
Washington DC 20546-0001
Telephone: (202) 358-0897
Facsimile: (202) 358-3097
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C. Solar Missions

• SOlar and Heliospheric Observatory (SOHO): SOHO is a mission of international cooperation between ESA and NASA. Proposals are invited as part of the SEC GIP requiring new SOHO observations, analysis of existing data, theoretical analysis in relation to SOHO observations, or ancillary ground-based observations. Two types of Guest Investigator participation in the SOHO mission are foreseen.

- For the coronal experiments, GI's will be attached to an experiment team, and within that team have priority rights for the analysis of certain data sets or priority rights for a certain type of analysis. This mode of participation will apply to data from the following investigations: Coronal Diagnostic Spectrometer (CDS), Extreme-ultraviolet

Imaging Telescope (EIT), White Light and Spectrometric Coronagraph (LASCO), Solar Ultraviolet Emitted Radiation (SUMER), Solar Wind Anisotropies (SWAN), and Ultraviolet Coronagraph Spectrometer (UVCS).

- The data for the particle and helioseismology experiments do not lend themselves to being split up into 'events,' observing sequences, or time intervals, and, therefore, approved GI's will be included as members of the PI teams and share the rights and obligations of the team members. This mode of participation will apply to data from the following investigations: Charge, Element, and Isotope Analysis (CELIAS), Suprathermal and Energetic Particle analyzer (COSTEP), Energetic Particle Analyzer (ERNE), Global Oscillations at Low Frequencies (GOLF), Variability of Solar Irradiance (VIRGO), and the Michelson Doppler Imager/Solar Oscillations Imager (MDI/SOI).

The recommendations for selection of GI proposals addressing SOHO will be made by the SOHO Guest Investigator Selection Committee (GISC) whose members are appointed by ESA and NASA. The mission PI teams will be asked for their comments on relevant proposals. Proposals will be evaluated according to their overall scientific merit, relevance to the SOHO mission, compatibility with declared SOHO PI team objectives, and feasibility. It is necessary but not sufficient for approval for a GI proposal addressing SOHO that the proposed work add to the expertise existing within the SOHO experiment team rather than simply duplicating it. Proposals combining data from SOHO with other SEC mission data are especially pertinent. GI's proposing from non-U.S. institutions are expected to obtain funding for their research from their national institution (see Section C.4 in Appendix C).

Prospective Guest Investigators are strongly encouraged to contact the PI team to which they wish to be attached in an early stage of their proposal preparation in order to achieve early clarification of the following two critical questions:

1) Are the proposed observations feasible using SOHO instruments, and, if so, can they be carried out with a reasonable amount of effort and time?

2) Is the proposed investigation in direct conflict with that of the SOHO PI teams, either through duplication of declared major PI team objectives, or interference with planned observations? Note that in this regard, SOHO PI teams may recommend to prospective GI's that they consider different SOHO teams if this seems more appropriate.

Interested parties may consult the December 1995 issue of *Solar Physics*, or may see the detailed SOHO information found at the World Wide Web site <http://sohowww.nascom.nasa.gov/>.

Eligibility: U.S. PI's on the SOHO mission may not receive funding from or propose as a PI to this Guest Investigator program. SOHO Co-I's may propose as GIP PI's but must include in their proposal a description of their mission responsibilities, which must not duplicate the research proposed in the GI program.

• Transition Region and Coronal Explorer (TRACE). Proposals are invited as part of the SEC GIP for TRACE scientific research--data analysis and theory--that heavily utilize the publicly open database (all data from TRACE, regardless of age). The TRACE PI may not receive funding from or propose as a PI to this Guest Investigator program. TRACE Co-I's may propose to this GI program as PI's but must include in their proposal a description of their mission responsibilities, which must not duplicate the research proposed in the GI program. Proposals combining data from TRACE with other SEC mission data are especially pertinent. Information on TRACE may be found at URL <http://www.space.lockheed.com/TRACE/welcome.html>.

• Yohkoh. Proposals are invited as part of the SEC GIP for Yohkoh scientific research--data analysis and theory--that heavily utilize the publicly open database (data older than one year, see <http://umbra.nascom.nasa.gov/yohkoh/data_availability.html>. The U.S. PI on Yohkoh may not receive funding from or propose as a PI to this Guest Investigator program. Yohkoh Co-I's may propose to this GI program as PI's but must include in their proposal a description of their mission responsibilities, which must not duplicate the research proposed in the GI program. Proposals combining data from Yohkoh with other SEC mission data are especially pertinent. Information on Yohkoh may be found at: <http://www.space.lockheed.com/SXT/homepage.html>.

Questions concerning the GI programs for these Solar Physics missions should be addressed to the Discipline Scientist:

Dr. William Wagner
Research Program Management Division
Code SR
NASA Headquarters
Office of Space Science
Washington DC 20546-0001
Telephone: (202) 358-091
Facsimile: (202) 358-3097
E-mail: william.wagner@hq.nasa.gov

3. Programmatic Information

Proposals whose intent or purpose is to extend or directly supplement existing investigations already funded for approved space flight missions or SR&T 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 the existing efforts.

For all SEC missions, one to three year awards at a funding level of about $75K to $100K per year are expected to result from this opportunity, for which total funding is expected to be up to $2M in the first year. For multiple year awards, funding approval for the

subsequent year(s) will be based upon the tangible scientific achievements of the first year and the continued program need and funds thereafter. This program is expected to increase to approximately 10 to 15 percent of the participating missions' funding in subsequent years. At those subsequent year levels, it is expected that cooperative projects for groups of scientists can be competed.

The schedules for submission of the Notice of Intent and proposal are given in Table 1 of the cover letter of this NRA. The World Wide Web site for submitting both the NOI and the Cover Page/Proposal Summary (see Appendix C.5) is <http://props.oss.hq.nasa.gov>; proposers without access to the Web or who experience difficulty in using this site may contact Ms. Debra Tripp (E-mail: deb.tripp@hq.nasa.gov) for assistance. Note that the NOI, as well as the Cover Page, will request an indication of the mission or missions whose data are called for in the proposed investigation.

Hard copies of the proposals are to be delivered to:

ROSS-98 NASA Research Announcement
Sun-Earth Connection Guest Investigator Program
Jorge Scientific Corporation
Suite 700
400 Virginia Avenue, SW
Washington, DC 20024
Phone number for commercial delivery: (202) 554-2775

General questions concerning this program element should be addressed to:

Dr. Lawrence Zanetti
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Code SR
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