

**Notice for Commerce Business Daily (CBD)
and
OSS Electronic Notification Service**

RESEARCH OPPORTUNITIES IN SPACE SCIENCE - 1999

This NASA Research Announcement (NRA) is a broad agency announcement as specified in FAR 6.102 (d) (2). NRA 99-OSS-NN, entitled "Research Opportunities in Space Science - 1999," will be available on or about January 19, 1999, by opening "Research Opportunities" from the menu on the NASA Office of Space Science (OSS) homepage at <www.hq.nasa.gov/office/oss/> on the World Wide Web. This NRA solicits proposals for supporting research, analysis, and technology across a broad range of different space science program elements relevant to the four defined OSS science themes, entitled Astronomical Search for Origins, Solar System Exploration, Structure and Evolution of the Universe, and The Sun-Earth Connection. Proposal due dates are staggered from April 19, through December 30, 1999. An electronically submitted Notice of Intent to propose is requested for all program elements. Participation through this NRA is open to all categories of U.S. and non-U.S. organizations, including educational institutions, industry, nonprofit institutions, NASA Centers, and other Government agencies. Further information about specific program elements may be obtained from the individual OSS Discipline Scientists listed in this NRA, while questions concerning general NRA policy issues may be directed to Dr. J. David Bohlin, , Code SR, Office of Space Science, NASA Headquarters, Washington, DC 20546-0001; E-mail: <david.bohlin@hq.nasa.gov>; phone: 202/358-0880.

**RESEARCH OPPORTUNITIES IN SPACE SCIENCE - 1999
(ROSS-99)**

NASA Research Announcement
Soliciting Basic Research Proposals

NRA 99-OSS-01
Issued: January 19, 1999

Proposals Due
Starting April 19, 1999,
and Ending December 8, 1999

Office of Space Science
National Aeronautics and Space Administration
Washington, DC 20546-0001

PREFACE

Significant Changes in ROSS-99 from ROSS-98

As a guide to proposers who may have responded to the 1998 NASA Research Announcement (NRA) 98-OSS-03, entitled *Research Opportunities in Space Science ñ 1998 (ROSS-98)*, below is a guide to some of the major changes to ROSS-99.

- In Appendix A, entitled *Science Program Elements Solicited by the ROSS-99 NRA*:
 - Two space astronomy and astrophysics discipline program elements that traditionally had been identified by wavelength (in particular, *Infrared, Submillimeter, Radio, Interferometry Astronomy* and *Ultraviolet, Visible, and Gravitational Astrophysics*) are now covered by three newly offered technique-oriented program elements.
 - The budgets of three ROSS-98 program elements are currently fully subscribed with existing multiple year proposals and are not open for new proposals in 1999, namely *Cosmic Ray Physics, Sun-Earth Connection Theory, and Heliospheric Physics*.
 - Two 1998 program elements were singular opportunities and are not open in ROSS-99, namely, those for *Advanced Composition Explorer (ACE) Guest Investigators* and for *Mission Concepts for Ultra Long Duration Ballooning*.
 - The *Sun-Earth Connection Guest Investigator* program that was initiated in ROSS-98 is technically still viable but currently has no budget. Therefore, proposals are not solicited in ROSS-99 unless a future addendum is released that announces that resources are now available to support new awards and provides an appropriate due date for proposals.
 - Owing to experience gained by the response to ROSS-98, the *Education/Public Outreach (E/PO)* program element (Section A.5.1) has been considerably revised and clarified. Therefore, anyone interested in submitting an E/PO task as a supplement either to a new research proposal or to an existing OSS research task is urged to read this section with care to ensure that their E/PO proposal responds to the revised criteria, is prepared in compliance with the revised formats, and is submitted according to established procedures.

- In Appendix C, entitled *Specific Guidance for Responding to the ROSS-99 NRA*:
 - Section C.1.1: A new subpart addresses the OSS policy concerning late proposals.
 - Section C.2: The importance of the timely receipt of a *Notice of Intent* to propose from each prospective proposer is emphasized.
 - Section C.3: This material has been rewritten to clarify why NASA OSS chooses not to use the ambiguous term “renewal proposal” for the administration of its programs.
 - Section C.5.1: Reference to page limits are deleted in deference to Section C.5.2.
 - Section C.5.2: The table entitled “Constituent Parts of a Proposal” now contains all page limits, which are binding unless otherwise noted in a program element in Appendix A. Other changes are that any list of *References* is no longer counted within the page limit for the body of the proposal and instead may be included separately without page limit; and the *Budget* for any optional *Education/Public Outreach* proposal is now uses a special form separate from the body of the E/PO proposal.
 - Section C.5.3:
 - For the *Cover Page*, the names and addresses of any Collaborators are also required in addition to those of any Co-Investigators.
 - The length of the *Proposal Summary* is now limited to 2000 characters by the Web site to which it is to be entered.
 - The *Summary of Personnel, Commitments, and Costs* must now list the names of any Collaborators in addition to the information requested for the PI and any Co-I’s.
 - The *Scientific/Technical/Management Section* now no longer includes the *References* within its page limits. Additional language emphasizes that every Co-Investigator listed must have a defined and significant role in the proposed investigation.
 - A one page *Curriculum Vitae* is now required for each key Co-Investigator unless otherwise specified in Appendix A. It is explicitly noted that *Vitae* for any Collaborators are not to be submitted.
 - The *Current and Pending Support* should now include any Program or Project Name that helps identify other awards that the PI and/or key Co-I’s may hold.
 - The language for the *Statement of Commitment from Co-I’s and/or Collaborators* has been extended to explicitly recognize that the proposed contribution of each such individual (which is required to be described in the proposal’s *Management* section) is subject to peer review.

- If the new proposal seeks to continue the same line of research as an expiring NASA OSS award, a *Final Progress Report* of that expiring award is now required.
- The *Budget Summary and Details* section now explicitly contains a number of important amplifications, including the procedure for the listing of budgets for any Co-I's from Government institutions; the requirement for all PI institutions, whether private sector or Government, to directly subcontract all private sector Co-I's; and the need to integrate any E/PO proposal costs with the final Research Budget

RESEARCH OPPORTUNITIES IN SPACE SCIENCE - 1999 (ROSS-99)

The mission of the Space Science Enterprise of the National Aeronautics and Space Administration (NASA) is to solve the mysteries of the universe, to explore the solar system, to discover planets around other stars, and to search for life beyond Earth. To carry out this mission, NASA's Office of Space Science (OSS) sponsors a broad range of research programs relevant to its four science themes, which are defined as:

- *Astronomical Search for Origins (ASO)* that addresses the origins of galaxies, stars, proto-planetary and extra-solar planetary systems, Earth-like planets, and the origin of life;
- *Solar System Exploration* (to be abbreviated as ESS), which seeks to understand all aspects of our Solar System, including the planets, satellites, small bodies, and solar system materials, as well as searching for possible habitats of life beyond Earth;
- *Structure and Evolution of the Universe (SEU)*, which involves the study of cosmology, the large scale structure of the universe, and the evolution of stars and galaxies, including the Milky Way and objects with extreme physical conditions; and
- *The Sun-Earth Connection (SEC)* that concerns the Sun itself as a typical star and as the controlling agent of the space environment of the Solar System, especially the Earth.

Further information about these themes may be found through the OSS homepage on the World Wide Web at <<http://www.hq.nasa.gov/office/oss/>>. In addition, this NRA, entitled "*Research Opportunities in Space Science - 1999 (ROSS-99)*," may be found by opening "*Research Opportunities*" from the menu at this same Web site.

OSS pursues these fundamental science themes using a wide variety of both space flight programs and investigations in basic science and technology. This NASA Research Announcement (NRA) solicits proposals for supporting research and technology (SR&T) investigations that seek to understand natural space phenomena and space science-related technologies across the full range of Program Elements relevant to OSS interests. Table 1 of this summary cover letter lists all the Program Elements solicited by this NRA in the order of their respective due dates for the submission of proposals. As a guide to their disciplinary relationships, Table 1 also cross references these Program Elements to the OSS science themes as noted above.

Appendix A contains detailed descriptions of each program element; its table of contents appears on page 5 of this cover letter. This Appendix is organized by the four OSS science themes, and then within each of these themes further subdivision by the Program Elements (in arbitrary order) of primary relevance to that theme (although in some cases a program element is of major importance to more than one science theme; see Table 1). Section 5 of Appendix A separately identifies Program Elements applicable to all themes. Questions about the programs elements in Appendix A may be directed to the respective Discipline Scientists identified for each one.

Appendix B provides the standard NASA guidance for responding to NRA's, and Appendix C provides amendatory guidance to Appendix B for the format and submission requirements for proposals to be submitted to this NRA. Appendix C incorporates a number of formats and/or procedures that are revised somewhat from those in the ROSS-98 NRA, as well as other OSS NRA's released throughout 1998. Therefore, interested proposers should carefully read both Appendix C in its entirety and the science Program Elements of interest in Appendix A before writing their proposals. Special attention is directed to the requirement for the electronic submission of both a Notice of Intent to propose, as well as of a combined Cover Page/Proposal Summary for the proposal itself.

OSS policy now strongly encourages participation by the space science community in education and public outreach activities with the goal of contributing to the broad public understanding of science. Therefore, proposers to this NRA are encouraged to propose Education/Public Outreach (E/PO) activities as an addition to any proposal submitted in response to this NRA; see Appendix A.5.1 for details. A proposed E/PO activity of merit will be used to discriminate between proposals of otherwise nominally comparable programmatic and scientific merits. Special attention is directed to the requirement that in order to be considered for evaluation, an E/PO proposal must be submitted electronically, as well as in hard copy with its "parent" research proposal.

Recommendations for funding will be based on the peer evaluation of each proposal's science and technical merits, its relevance to the objectives of the OSS science program element as described in this NRA to which it is submitted, and its requested budget. Additional specific criteria may be given in the individual Program Elements in Appendix A. In all cases, the Government's obligation to make awards is contingent upon the availability of appropriated funds from which payment can be made and the receipt of proposals in response to this NRA that NASA determines are acceptable for award.

Participation in this program is open to all categories of U.S. and non-U.S. organizations, including educational institutions, industry, nonprofit institutions, NASA Centers, and other Government agencies. Historically Black Colleges and Universities (HBCU's), other minority educational institutions, and small businesses and organizations owned and controlled by socially and economically disadvantaged individuals or women are particularly encouraged to apply.

SPECIAL NOTES:

(1) Because this NRA is released far in advance of the deadlines for many of the Program Elements in Table 1, additional programmatic information for any given element may develop before proposals are due. If so, such material will be added as an Amendment to this NRA as posted at its Web site no later than 90 days before the proposal deadline for that program element. It is the responsibility of the prospective proposer to check this site for updates concerning the program element(s) of interest.

(2) Required electronic submission through designated sites on the World Wide Web for certain elements of proposals in response to OSS NRA's was initiated with ROSS-98 and continues with this ROSS-99 NRA. NASA makes every effort to ensure the reliability and ease of accessibility of these sites, and maintains "hot lines" (E-mail addresses and/or phone numbers) for users who experience difficulties. However, difficulty in accessing and/or using these sites may arise at any point on the Web or with the user's own equipment. Therefore, prospective proposers are urged to access and submit the required materials well in advance the stated deadlines.

The following summary information applies to this ROSS-99 NRA:

- Program alpha-numeric identifier: NRA 99-OSS-01
- Date of NRA issue: January 19, 1999
- Notice of Intent (NOI) to propose:
 - Due date: See Table 1 below.
 - Web site for electronic submission: See Program Elements of interest in Appendix A.
- Submission of Proposals:
 - Page limits: See Section C.5.3 in Appendix C.
 - Required number: Signed original plus 15 copies (unless otherwise specified in Appendix A).
 - Due date: See Table 1 (~60 days after NOI due date).
 - Address for submission by mail: See Program Element of interest in Appendix A.
- Selecting Official: Director
Research Program Management Division
- Announcement of selections: Goal: 120 days after proposal due date.

- Initiation of funding for new awards: Goal: 60 days after proposal selection.

- Further information -
 - Science Program Elements: Program Element Discipline Scientists identified in Appendix A.

 - Programmatic policy/procedures: Dr. J. David Bohlin
 Research Program Management Division
 Code SR
 National Aeronautics and Space
 Administration
 Washington, DC 20546-0001
 Phone: (202) 358-0880
 E-mail: david.bohlin@hq.nasa.gov

Finally, note that NASA OSS maintains an electronic notification system to alert interested subscribers of the impending release of its research program announcements. Subscription to this service is accomplished through the OSS home page at <http://www.hq.nasa.gov/office/oss/>, select the menu item *Subscribe to E-mail Announcements*, and then follow the instructions within the subsection entitled *Space Science Research Announcements*. Owing to the increasingly multidisciplinary nature of OSS programs, this electronic service notifies subscribers of all future NASA OSS program announcements of any type that are released for any of the OSS science themes (anticipated to be 20 to 30 items per year). Regardless of whether this service is used or not, all OSS research announcements may be accessed and downloaded as soon as they are posted (about 8:00 AM Eastern Time on the day of their release) by linking through *Research Opportunities* on this OSS homepage menu.

Your interest and cooperation in responding to this ROSS-99 NRA are appreciated. Comments about the nature and/or structure of this inclusive NRA for many of the OSS supporting research and analysis programs are welcome. Such comments may be directed to either the Discipline Scientists identified for each program element in Appendix A or to the point of contact for Programmatic policy/procedures identified above.

Alan N. Bunner
 Science Program Director
 Structure and Evolution of the Universe

Carl B. Pilcher
 Science Program Director
 Solar System Exploration

Harley Thronson
 Acting Science Program Director
 Astronomical Search for Origins

George L. Withbroe
 Science Program Director
 The Sun-Earth Connection

APPENDICES to NRA 99-OSS-01

Notes:

- (i) Titles in italics are reorganized or discontinued from ROSS-98, or not open for competition in ROSS-99; see individual Program Elements for details.
- (ii) Many of the Program Elements in Sections A.2 and A.3 are also relevant to those in A.1; see Table 1 for details.

A. SCIENCE PROGRAM ELEMENTS OF THE ROSS-99 NRA

A.1 Astronomical Search for Origins

- A.1.1 Origins of Solar Systems
- A.1.2 Research in Exobiology

A.2 Structure and Evolution of the Universe

- A.2.1 High Energy Astrophysics
- A.2.2 Long-Term Space Astrophysics
- A.2.3 *Ultraviolet, Visible, and Gravitational Astrophysics*
- A.2.4 Astrophysics Data
- A.2.5 *Cosmic Ray Physics*
- A.2.6 Astrophysics Theory
- A.2.7 *Infrared/Submillimeter/Radio/Interferometry Astronomy*
- A.2.8 Space Astrophysics Detector Development
- A.2.9 Astrophysics Suborbital Research
- A.2.10 Space Astrophysics Research and Analysis

A.3 Solar System Exploration

- A.3.1 Cosmochemistry
- A.3.2 Planetary Astronomy
- A.3.3 Planetary Atmospheres
- A.3.4 Planetary Geology and Geophysics
- A.3.5 Planetary Instrument Definition and Development
- A.3.6 Planetary Major Equipment
- A.3.7 Jovian System Data Analysis
- A.3.8 Lunar Data Analysis
- A.3.9 Mars Data Analysis
- A.3.10 Near Earth Object Observations

A.4 The Sun-Earth Connection

A.4.0 Overview: The Sun-Earth Connection Science Theme

A.4.1 *Sun-Earth Connection Theory*

A.4.2 *Heliospheric Physics*

A.4.3 Ionospheric, Thermospheric, and Mesospheric (ITM) Physics

A.4.4 Magnetosphere Physics

A.4.5 Solar Physics Research, Analysis, and Suborbital

A.4.6 Magnetospheric and ITM Physics Suborbital

A.4.7 *Advanced Composition Explorer (ACE) Guest Investigator*

A.4.8 *Sun-Earth Connection Guest Investigator*

A.5 Interdisciplinary Program Elements

A.5.1 Education/Public Outreach

A.5.2 Applied Information Systems Research

A.5.3 *Mission Concepts for Ultra Long Duration Ballooning*

B. GENERAL INSTRUCTIONS FOR RESPONDING TO NASA RESEARCH ANNOUNCEMENTS

C. SPECIFIC GUIDANCE FOR RESPONDING TO THE ROSS-98 NRA

TABLE 1

SCIENCE PROGRAM ELEMENTS SOLICITED IN THE ROSS-99 NRA
(in order of proposal due dates)

[ASO - Astronomical Search for Origins; SEU - Structure and Evolution of the Universe; ESS - Solar System Exploration; SEC - The Sun-Earth Connection]

NRA <u>Appendix</u>	<u>Science Program Element (see Appendix A)</u>	NOI <u>Due Date</u>	Proposal <u>Due Date</u>	Relevant OSS Science Themes			
				<u>ASO</u>	<u>SEU</u>	<u>ESS</u>	<u>SEC</u>
A.2.1	High Energy Astrophysics	3/02/99	4/21/99		X		
A.3.2	Planetary Astronomy	3/11/99	4/21/99	X		X	
A.3.10	Near Earth Object Observations	3/11/99	4/21/99	X		X	
A.1.2	Research in Exobiology	3/02/99	4/27/99	X		X	
A.3.3	Planetary Atmospheres	3/02/99	5/03/99			X	
A.3.7	Jovian System Data Analysis	3/10/99	5/05/99			X	
A.2.4	Astrophysics Data	3/05/99	5/06/99	X	X		
A.2.2	Long-Term Space Astrophysics	3/05/99	5/07/99	X	X		
A.3.1	Cosmochemistry	3/17/99	5/12/99	X		X	
A.3.4	Planetary Geology and Geophysics	3/16/99	5/14/99			X	
A.2.8	Space Astrophysics Detectors	3/29/99	5/28/99	X	X		
A.2.10	Space Astrophysics Research and Analysis	3/29/99	5/28/99	X	X		
A.2.9	Astrophysics Suborbital	3/29/99	5/28/99	X	X		
A.4.9	Energetics and Dynamics of the Mesosphere and Lower Thermosphere: TIMED/CEDAR Collaborative Studies	4/07/99	6/03/99				X
A.3.11	Planetary Suborbital Research	4/09/99	6/08/99			X	
A.1.1	Origins of Solar Systems	4/19/99	6/21/99	X		X	
A.4.4	Magnetospheric Physics	5/07/99	7/09/99			X	X
A.4.3	Ionospheric, Thermospheric, & Mesospheric (ITM) Physics	5/07/99	7/09/99				X
A.4.6	Magnetospheric and ITM Suborbital	5/07/99	7/09/99				X
A.2.6	Astrophysics Theory	5/14/99	7/15/99	X	X		

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TABLE 1 (continued)

**SCIENCE PROGRAM ELEMENTS SOLICITED IN THE ROSS-99 NRA
(in order of proposal due dates)**

[ASO - Astronomical Search for Origins; SEU - Structure and Evolution of the Universe; ESS - Solar System Exploration; SEC - The Sun-Earth Connection]

NRA <u>Appendix</u>	<u>Science Program Element (see Appendix A)</u>	NOI <u>Due Date</u>	Proposal <u>Due Date</u>	Relevant OSS Science Themes			
				<u>ASO</u>	<u>SEU</u>	<u>ESS</u>	<u>SEC</u>
A.3.5	Planetary Instrument Definition & Development	6/01/99	8/04/99			X	
A.4.5	Solar Physics Research, Analysis, and Suborbital	6/30/99	9/01/99				X
A.3.9	Mars Data Analysis	8/06/99	9/08/99			X	
A.5.2	Applied Information Systems Research	7/15/99	9/15/99	X	X	X	X
A.3.8	Lunar Data Analysis	10/15/99	12/08/99			X	

A.2.3	Ultraviolet, Visible, and Gravitational Astrophysics	See A.2.8, 2.9, and 2.10.		X	X		
A.2.7	Infrared/Submillimeter/Radio/Interferometry Astronomy	See A.2.8, 2.9, and 2.10.		X	X		
A.3.6	Planetary Major Equipment	Per program of interest.				X	
A.5.1	Education/Public Outreach	Per program of interest.		X	X	X	X

A.2.5	Cosmic Ray Physics	Not open in ROSS-99.			X		
A.4.1	Sun-Earth Connection Theory	Not open in ROSS-99.					X
A.4.2	Heliospheric Physics	Not open in ROSS-99.					X
A.4.8	Sun-Earth Connection Guest Investigator	Not open in ROSS-99.					X

A.4.7	Advanced Composition Explorer (ACE) Guest Investigator	Solicited one time only in ROSS-98.					
A.5.3	Mission Concepts for Ultra Long Duration Ballooning	Solicited one time only in ROSS-98.					