National Aeronautics and
Space Administration

October 30, 1995

NRA 95-OSS-17

RESEARCH ANNOUNCEMENT

HIGH ENERGY ASTROPHYSICS

SUPPORTING RESEARCH

AND

TECHNOLOGY

PROGRAM

Appendices A-E

Letters of Intent Due: December 1, 1995

Proposals Due: February 1, 1996

NASA RESEARCH ANNOUNCEMENT

HIGH ENERGY ASTROPHYSICS

SUPPORTING RESEARCH AND TECHNOLOGY

PROGRAM

Appendices

Appendix A
NRA 95-OSS-17

THE HIGH ENERGY ASTROPHYSICS SUPPORTING RESEARCH AND TECHNOLOGY PROGRAM

I. SCOPE

This program is intended to provide basic support of the NASA High Energy Astrophysics (HEA) program. It should be noted that, in addition to the basic scientific merit of the proposed research, its relevance to NASA's HEA flight programs, both existing and planned, will be a significant factor in the proposal evaluation. A summary of the scientific goals of the HEA program is provided in Section III. This NRA solicits proposals for scientific investigations of cosmic phenomena via observations of their radiation in the high-energy spectral regime (~ 0.1 keV - 10 GeV). These investigations are expected to involve the design and development of scientific instruments and the construction of payloads for sounding rocket flights and high-altitude balloons. Investigations involving theoretical studies or analysis of data from past missions **are not** solicited by this Announcement. In addition, proposals for investigations involving ground-based observations of high-energy astrophysical phenomena will only be considered under this NRA to the extent that they are relevant to the overall goals of NASA's HEA Flight Program.

The total funding available for this program is presently expected to be approximately $9 million per year over the period of this NRA. There are no restrictions on the level of funding which may be requested for an investigation under this program. During the present year, ~40 grants are being supported at a total level of $9 million.

II. PROGRAM DURATION AND PROPOSAL SCHEDULE

The HEA Supporting Research and Technology (SR&T) Program is a continuing program. This NRA represents the merging of the previously separate solicitations for NASA's x-ray and γ-ray SR&T programs. The awards made under this NRA will be effective at the start of FY 1997 (October 1, 1996). The FY 1996 funding levels for existing grantees supported under the x-ray astronomy program will be those determined under NRA 93-OSS-03. For existing γ-ray grantees, an additional 6-month extension will be made, prorated on the FY 1995 funding level. Subsequent bridge funding for the remainder of FY 1996 will be provided, pending the outcome of the present review.

Current plans call for a new issuance of a NASA Research Announcement soliciting proposals for participation in this program approximately every 3 years. Proposers are encouraged to define an investigation which may be accomplished in a 3-year period. It is recognized that the proposed investigation may evolve with time. Accordingly, emphasis should be placed upon the first year's effort with as much detail as possible provided relevant to the planned second and third years' activities. Similarly, a detailed budget corresponding to the first-year program is required, together with as reliable an estimate as feasible of the projected budget for the succeeding years. It should be recognized that NASA can commit financial support on a 1-year basis only. Proposals for investigations requiring less than a 3-year time scale to complete are also acceptable, as are those which require a longer time scale to complete. In the latter case, the key projected activities beyond the initial 3-year period of the proposed effort should be identified.

Although unsolicited proposals relevant to NASA's HEA SR&T Program may be submitted at any time, such proposals will be treated and considered as if submitted in response to this NRA. Unsolicited proposals received that fall within the scope of an open NRA will be reviewed and evaluated at the same time and with any proposals received in response to that NRA. The next review of the HEA SR&T program is planned for shortly after the due date given on page 5 of the body of this NRA. Proposals received on or before that due date will be included in that review. Proposals received after that date will be considered late and their disposition will be at the discretion of the HEA Program Office, in accordance with the NASA policy on late proposals as stated in Appendix B, Paragraph 11 and the NASA FAR Supplement section 18-15.412. Unsolicited proposals received in the interim between the review for this NRA and the issuance of a subsequent solicitation (anticipated to occur at 3-year intervals) will be considered on a case-by-case basis in the context of the available funding at that time.

To facilitate planning for the peer review process, individuals who intend to submit proposals in response to this solicitation should submit (via email) a Letter of Intent as stipulated on page 5 of the body of this NRA (see also Appendix D, Section I.A for more details).

III. THE HIGH ENERGY ASTROPHYSICS FLIGHT PROGRAM

The Office of Space Science administers a vigorous program of space-based missions and suborbital investigations in the areas of x- and γ-ray astrophysics. The HEA program is directed toward investigations of astrophysical objects and phenomena as revealed by their radiation characteristics over the approximate energy range 0.1 keV - 10 GeV. The scientific objectives of this program include determination of the nature and physical parameters of such high-energy astrophysical systems as active stellar coronae, collapsed objects (white dwarfs, neutron stars, and black holes), γ-ray bursts, compact binary systems and associated accretion disks, supernova remnants, the hot phase of the interstellar medium, normal and active galaxies, clusters of galaxies, dark matter, and the diffuse x-ray and γ-ray background. A compilation of relevant NASA high-energy astrophysics missions and collaborative international programs (past, ongoing, and planned) is provided in Tables 1 and 2, and typical research areas presently supported under the HEA SR&T program are listed in Tables 3 and 4. Detailed summaries of the near-term goals of NASA's HEA program are provided in the most recent reports of NASA's X-ray and γ-ray Astronomy Program Working Groups. These reports represent a blueprint for NASA's objectives in the area of high-energy astrophysics, over the next decade or so, and should be consulted to assess the potential relevance of proposed investigations. Copies of the reports are available upon request.

IV. PROGRAM MANAGEMENT INFORMATION

NASA's HEA Supporting Research and Technology Program is managed by the Office of Space Science, Code S, National Aeronautics and Space Administration, Washington, DC 20546-0001. Questions regarding proposal format, evaluation procedures, or requests for further general information concerning the HEA program should be referred to the Staff Scientist named on page 5 of the body of this NRA.

TABLE 1 -- NASA X-RAY ASTRONOMY MISSIONS

MISSION	PRIMARY EMPHASIS
Small Astronomy Satellite-1 (SAS-1; "UHURU")	All-Sky X-ray Survey
Orbiting Solar Observatory-8 (OSO-8)	Solar and Cosmic X-ray Source Observations
Small Astronomy Satellite-3 (SAS-3)	Timing /Positioning Observations of Selected Cosmic X-ray Sources
High Energy Astronomy Observatory-1 (HEAO-1)	All-Sky X-ray Survey and Spectrophotometric Observations of Selected Cosmic X-ray Sources
High Energy Astronomy Observatory-2 (HEAO-2; *Einstein*)	Imaging and Spectroscopic Observations of Selected Cosmic X-ray Sources
Broad Band X-ray Telescope (Astro/BBXRT)	Non-Dispersive Spectroscopic Observations of Selected Cosmic X-ray Sources
Diffuse X-ray Spectrometer (DXS)	Spectroscopic Observations of the Soft X-ray Diffuse Background
Roentgen Satellite* (ROSAT)	All-Sky X-ray/EUV Survey and Imaging Observations of Selected Cosmic X-ray Sources
Asuka (ASCA, formerly ASTRO-D)*	Spatially-Resolved Spectroscopic Observations of Selected Cosmic X-ray Sources
Satelite de Aplicaciones Cientificas-B (SAC-B/CUBIC)	All-Sky Spectroscopic Survey of the Cosmic Diffuse X-ray Background
X-ray Timing Explorer (XTE)	Spectrophotometric Observations of Selected Cosmic X-ray Sources
Advanced X-ray Astrophysics Facility (AXAF)	High-Resolution Imaging/Spectroscopic Observations of Selected Cosmic X-ray Sources
Spectrum-X-Gamma*	High-Throughput, Moderate-Resolution Imaging, Spectroscopic and Polarimetric Observations of Selected Cosmic X-ray Sources
X-ray Multi-Mirror Mission* (XMM)	High-Throughput, Moderate-Resolution Imaging, Spectroscopic Observations of Selected Cosmic X-ray Sources
ASTRO-E*	Spatially-Resolved Spectroscopic Observations of Selected Cosmic X-ray Sources

* International Collaboration

TABLE 2 -- NASA γ-RAY ASTRONOMY MISSIONS

MISSION	PRIMARY EMPHASIS
Small Astronomy Satellite-2 (SAS-2)	All-Sky High Energy Survey
Orbiting Solar Observatory-7 (OSO-7)	All-Sky Intermediate Energy Survey
High Energy Astronomy Observatory-1 (HEAO-A4)	All-Sky Intermediate Energy Survey
High Energy Astronomy Observatory-3 (HEAO-C1)	All-Sky High Resolution Spectroscopic Survey
Solar Maximum Mission Astronomy (SMM)	Solar and Cosmic X- and Gamma-ray
International Sun-Earth Explorer/ International Cometary Explorer (ISEE/ICE)	Gamma-ray Bursts
Compton Gamma-ray Observatory (GRO)	All-Sky Wide-Band Survey
Global Geospace Program (GGS [Wind/TGRS/Konus])	Gamma-ray Burst Spectroscopy
High-Energy Transient Experiment (HETE)	Gamma-ray Burst Position Determination
INTEGRAL*	High-Resolution Spectroscopy
MARS94/Precision Gamma-ray Spectrometer* (PGS)	Gamma-ray Burst Spectroscopy

* International Collaboration

TABLE 3

CURRENT X-RAY ASTRONOMY RESEARCH AREAS

RESEARCH AREA	TECHNIQUE
High-resolution Imaging	Microchannel Plate Detectors Charge-coupled Devices
High-resolution Spectroscopy (Non-dispersive)	Microcalorimeters; Superconducting Tunnel Junctions
High-resolution Spectroscopy (Dispersive)	Reflection and Transmission Gratings Bragg-Crystal Spectrometers
High-throughput X-ray Optics	Conical Foil Mirrors; Kirkpatrick-Baez Glass Mirrors; Electroformed Wolter-I Mirrors
Very-high Resolution X-ray Optics	Azimuthal Mirror Sections
Polarimetry	Lithium Scattering; Bragg Crystals
Timing	Advanced Proportional Counters

TABLE 4

CURRENT γ-RAY ASTRONOMY RESEARCH AREAS

RESEARCH AREA	TECHNIQUE
Hard X-ray Imaging Spectroscopy	Coded-Aperture/Scintillator Telescopes; High-pressure Xenon Detectors; Cd Zn Te Detectors
Nuclear Line Spectroscopy	Germanium Detector Arrays; Scintillator Telescopes; Liquid Argon/Xenon Detectors; Superconducting Transition Detectors
Gamma-Burst Timing/Spectroscopy	Omni-Directional Scintillator/Germanium Detectors
Intermediate-energy Gamma-ray Astronomy	Compton Telescopes
High-energy Gamma-ray Astronomy	Drift Chamber Telescopes; Si strip detectors

GUIDELINES FOR PREPARATION OF PROPOSAL COST SUMMARIES

I. PROPOSAL COSTING DETAIL

Sufficient proposal cost detail and supporting information will facilitate a timely evaluation and award for selected proposals. Dollar amounts proposed with no explanation (e.g., Equipment: $58,000 or Labor: $110,000) may cause delays in proposal evaluation and award.

The proposed costing information should be sufficiently detailed to allow the Government to identify costed elements for evaluation purposes. Costs which are unreasonable, unallowable, or not allocable to the proposed effort will not be awarded. Each budget category should be explained. Offerors should exercise prudent judgment regarding the amount of detail necessary depending upon the complexity of the proposal. Where applicable, the cost section should include a breakdown by year and a total for all periods. While it is not mandatory that cost proposals conform exactly to these guidelines, information supplied at the level of detail shown in Section II will expedite the processing of the grant procurements for selected proposals.

II. EXAMPLES

The number and nature of the appropriate cost categories will vary with the particular plan for each proposed investigation. Examples of the level of detail requested for typical categories are provided below.

A. Direct Labor

Labor costs should be segregated by titles or disciplines with estimated hours and rates for each. Estimates should include a basis of estimate such as currently paid rates or outstanding offers to prospective employees. This format allows the Government to assess cost reasonableness by various means including comparison to similar skills at other organizations. Example:

	Hours	Rate	Amount
Principal Investigator	1,295	$19.34	$25,045
Assistant Investigator	330	$11.78	$ 3,887
Clerical Support	125	$ 8.70	$ 1,088
Total	1,750		$30,020

B. Travel Costs

Costs in this category should be provided as shown in the following example:

Trips	Destination	Duration	Airfare	Per diem	Total
1	Australia	6 days	$1,234	$550	$1,784
2	New Zealand	4 days	$1,456	$366	$3,644
Total					$5,428

C. Equipment Purchases

Costs in this category should be provided at the level of detail reflected in the following example:

Units	Type	Cost	Total
4	Pulse Height Analyzer	$4,399	$17,596

D. Indirect Costs

Indirect costs should be explained to an extent that will allow the Government to understand the basis for the estimate. Examples of prior year historical rates, current variances from those rates, or an explanation of other basis of estimates should be included.

Where costs are based on allocation percentages or dollar rates, an explanation of rate and application base relationships should be given. For example, the base to which the General and Administrative (G&A) rate is applied should be explained as: application base equals total costs before G&A less subcontracts.

E. Other Costs

Other applicable cost categories include purchase of expendable materials, computer services, communications costs, and publication expenses. The appropriate level of detail should be provided in each case.

III. BUDGET SUMMARY

Budget information should be summarized using the form supplied below (note additional instructions on the reverse side of the form).

ADDITIONAL INFORMATION REGARDING PROPOSAL SUBMISSION, EVALUATION, SELECTION, AND IMPLEMENTATION

The information contained in Appendix D augments/supersedes Appendix B and is applicable only to NRA 95-OSS-17.

I. PROPOSAL PREPARATION AND SUBMISSION

A. Letter of Intent to Propose

To facilitate planning for the proposal evaluation process and the timely selection of a scientific peer review panel, it will be useful if prospective investigators intending to submit proposals for participation in this program will notify NASA via email, as stipulated on page 5 of the body of this NRA. The letter of intent should contain the name and affiliation of the principal investigator and all co-investigators, and should summarize the primary research areas and objectives of the proposed investigation.

B. Proposal Preparation Procedures

A uniform proposal format is recommended to aid in proposal evaluation. Proposals:

1. Should contain a scientific and technical (as appropriate) description of the investigation and a cost plan (see Appendix C);

2. For investigators presently supported under this program, should include a discussion of past grant-related performance;

3. Should include a **complete listing of all awarded or pending research funding support** from NASA or other sources for the principal investigator and all co-investigators;

4. Must be limited in length to 25 pages or less, including cover pages (Appendix E, Parts 1 and 2), abstract, proposal body, references, short vitae, selected bibliography, and costing. Use a type-face no smaller than 10 point with 1-inch margins and single-spaced lines. Reviewers will be instructed and obligated to review only the first 25 pages;

5. Should not include reprints or preprints - where appropriate, such work should be summarized in the body of the proposal;

6. Must be accompanied by institutional certifications expressing compliance with Federal regulations regarding lobbying, debarment and suspension, and drug-free workplace.

C. Proposal Submission Information

The requisite number of copies of each proposal should be submitted to the address specified on page 5 of the body of this NRA, no later than the date given on that same page.

D. Foreign Investigations

Proposals from non-U.S. entities should not include a cost plan. Non-U.S. proposals and U.S. proposals which include non-U.S. participation must be endorsed by the respective government agency or funding/sponsoring institution in that country from which the non-U.S. participation is proposing. Such endorsement should indicate:

1. The proposal merits careful consideration by NASA; and

2. If the proposal is selected, sufficient funds will be made available to undertake the activity proposed.

The required number of proposals should be sent directly to the address given on page 5 of the NRA in time to arrive before the stated deadline. At the same time, one copy each of the proposal and the letter of endorsement should be sent to:

Ms. Shiron D. Gaines
Ref: NRA 95-OSS-17
International Relations Division
Code IRD
National Aeronautics and Space Administration
Washington, DC 20546-0001
USA

All proposals must be typewritten in English. All non-U.S. proposals will undergo the same evaluation and selection process as those originating in the United States. Non-U.S. proposals and U.S. proposals which include foreign participation must follow all other guidelines and requirements defined in this NRA.

All proposals must be received before the established closing date; those received after the closing date will be treated in accordance with NASA's provisions for late proposals (FAR Supplement 18-15-412, paragraphs A and B). If review and endorsement are not possible before the specified closing date, sponsoring non-U.S. agencies may, in exceptional situations, forward a proposal without endorsement to NASA's International Relations Division, Code IRD, along with the date when a decision on endorsement can be expected.

Successful and unsuccessful proposers will be contacted directly by the NASA Program Office coordinating the NRA. Copies of these letters will be sent to the sponsoring agency.

Should a non-U.S. proposal or a U.S. proposal with non-U.S. participation be selected, NASA's International Relations Division will arrange with the non-U.S. sponsoring agency for the proposed participation on a no-exchange-of-funds basis, in which NASA and the non-U.S. sponsoring agency will each bear the cost of discharging its respective responsibilities. Depending on the nature and extent of the proposed cooperation, these arrangements may entail:

1. A letter of notification by NASA; and/or

2. An exchange of letters between NASA and the sponsoring governmental agency.

II. PROPOSAL SELECTION

A. Evaluation and Selection Procedures

The scientific and technical merits of proposals will be evaluated by a scientific peer review panel. The highest rated proposals will then be considered in the context of the overall funding availability and programmatic needs. Final selection will be made by the Associate Administrator, Office of Space Science.

B. Evaluation Criteria

The following specific proposal-related evaluation criteria, listed in descending order of importance, will be used in evaluating proposals for investigations within the HEA SR&T program (**note that these criteria supersede those listed in Appendix B**):

1. The overall scientific and technical merit of the investigation.

2. The relevance of the proposed research to NASA's HEA program.

3. The technical feasibility of accomplishing the stated scientific goals (i.e., the viability and maturity of the proposed technical approach or analysis techniques and their suitability for the proposed investigation).

4. The competence and relevant experience of the principal investigator and any collaborators as an indication of their ability to carry the investigation to a successful conclusion within the requested resources, including timely publication of peer-reviewed journal articles. Past performance of the investigators relevant to work conducted under previous NASA HEA grants, if applicable, will be considered.

5 Overall standing among similar proposals available for evaluation and/or evaluation against the known state of the art.

6. The realism and reasonableness of the proposed cost and the relationship of the proposed cost to available funds.

Note that NASA may desire to select only a portion of a proposer's investigation, in which case the investigator will be given the opportunity to accept or decline such partial acceptance.

C. Implementation

Individuals responding to this Announcement will be notified of the outcome of the proposal selection process in accordance with the schedule outlined in this NRA. In the case of those investigations recommended for selection, discussions will be initiated concerning the specific terms under which the investigation will be implemented.

III. SCHEDULE

It is currently planned to solicit and review proposals for participation in the HEA SR&T program approximately every 3 years. Proposals received by the due date herein stipulated will be evaluated in the present review. The schedule of planned activities for the present review cycle of the HEA SR&T program is given on page 5 of the body of this NRA, with the Peer Review expected to be convened approximately 5 weeks after the due date, proposal selections to be made approximately 7 weeks after the due date, and initiation of funding to occur at the start of FY 1997 (October 1, 1996).

While the above plan represents NASA's intent, it should be realized that future circumstances and events could result in modifications to this schedule.

Proposal Forms

Below are templates for the following forms and certifications required for proposals submitted in response to this NRA:

- Cover page
- General form
- Certification of compliance with Federal regulations regarding lobbying
- Debarment and suspension certification
- Drug-free workplace certification.

Proposal for High Energy Astrophysics

Supporting Research and Technology Program

NRA 95-OSS-17

Cover Page

Principal Investigator(s)

Title	First Name	Initial	Last Name

Proposal Title

Department

Institution

Street Address | City/Town

State/County | Zip/Postal Code | Country

Telephone | Fax

E-Mail Address: Network Name | Network Address

Abstract (800 characters maximum including spaces ~ 150 words)

Proposal for High Energy Astrophysics

Supporting Research and Technology Program

NRA 95-OSS-17

General Form

Principal Investigator(s)

Title	First Name	Initial	Last Name

Proposal Title

Institutional Endorsement

Name of Official

Administrative Authority

Institution

Signature　　　　　　　　Date

Co-Investigator(s) Name	Institution

Budget Summary by Grant/Project Year

Grant/Project Year	1	2	3	Total
Amount Requested				