Management and Operation of the Virtual Astronomical Observatory

PROGRAM SOLICITATION
NSF 08-537

National Science Foundation

Directorate for Mathematical & Physical Sciences
Division of Astronomical Sciences

National Aeronautics and Space Administration

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

April 22, 2008

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Management and Operation of the Virtual Astronomical Observatory

Synopsis of Program:

Proposals are solicited to manage and operate the Virtual Astronomical Observatory (VAO) through a cooperative agreement with the National Science Foundation (NSF), in partnership with the National Aeronautics and Space Administration (NASA).

The Virtual Astronomical Observatory will serve to link a multitude of astronomical data sets into an integrated system that allows automated search and analysis among all cataloged objects. The VAO will provide access to data sets, create and maintain data protocols and standards, and provide analysis tools and services to the astronomical research and educational community. The VAO is expected to act as an enabling and coordinating structure to facilitate the development of tools, protocols, and collaborations necessary to utilize fully the scientific potential of current and future astronomical data.

Any implementation of the VAO and its ongoing operation will build on the framework for virtual observatories being developed by the U.S. National Virtual Observatory (NVO) project and the NASA astrophysics data centers, within the international context provided by the International Virtual Observatory Alliance (IVOA). Any proposed implementation of the VAO must utilize the IVOA and NVO established standards and protocols for unified content descriptors, catalog, data and database access, data models, and documents. NVO tools and services should be incorporated in any proposed implementation of the VAO. Proposals must include a transition plan describing how the framework established by the NVO project and its current activities will be continued and evolve into the proposed management structure and long-term operations of the VAO.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Nigel Sharp, Program Director, Division of Astronomical Sciences, NSF, 1045 S, telephone: (703) 292-4905, fax: (703) 292-9034, email: nsharp@nsf.gov

- Jeffrey Hayes, Discipline Scientist, NASA, telephone: (202) 358-0353, fax: (202) 358-3096, email: jhayes@nasa.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 43.001 --- National Aeronautics and Space Administration (Science)
- 47.049 --- Mathematical and Physical Sciences

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 1 See Section V.A. for information on collaborative proposals.

Anticipated Funding Amount: $5,500,000 Funding of up to $5.5M is expected to be available in FY2008 and up to $6M annually for the period FY2009-FY2012 pending availability of funds.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Proposals may be submitted by all U.S. organizations, including universities and colleges, non-profit, non-academic organizations, for-profit organizations, and government sponsored organizations. Because access to NASA centers and Federally Funded Research and Development Centers (FFRDCs) sponsored by NASA or NSF is open to any awardee, such centers and FFRDCs will not be eligible as primary proposers, only as supporting partners, participating to meet the NSF and NASA responsibilities negotiated under the award instrument.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or Co-PI:

There are no restrictions or limits.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required

- **Preliminary Proposal Submission:** Not required

- **Full Proposal Preparation Instructions:** This solicitation contains information that deviates from the standard NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full text of this solicitation for further information.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required under this solicitation.

- **Indirect Cost (F&A) Limitations:** Not Applicable

- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

  April 22, 2008

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions: Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements: Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

The National Research Council decadal survey report of 2000, "Astronomy and Astrophysics in the New Millennium," recommended, as its highest priority small initiative, the creation of a national virtual observatory. Recognizing that astronomy "faces a revolution in data collection, storage, analysis and interpretation of large data sets", the survey committee envisioned a virtual observatory that would "link the major astronomical data assets into an integrated, but virtual, system to allow automated multiwavelength search and discovery among all cataloged astronomical objects." This virtual observatory would not only provide access to data sets, but would also create and maintain data protocols and standards and provide analysis tools and services for the astronomical community. The survey committee also recognized the potential of a virtual observatory for education and outreach and as a tool for increasing science literacy.

In response to this recommendation NSF and NASA created a National Virtual Observatory (NVO) Science Definition Team (SDT), whose charge was to define and formulate a joint NSF/NASA initiative to pursue the NVO goals, using input from the U.S. astronomy community. The SDT produced a report to NASA and NSF which can be found at http://www.nsf.gov/mps/ast/nvo_report.jsp.

At the same time, the NSF funded the development of the Framework for the National Virtual Observatory, while NASA continued to support the creation and maintenance of archives from space astrophysics missions and their distributed data systems through the NASA data centers. Both agencies have funded a number of smaller research projects contributing to the NVO development effort. Through the International Virtual Observatory Alliance (IVOA), which coordinates international VO development efforts, the virtual observatory is developing with shared and agreed-upon global standards and protocols.

These development efforts have established and continue to develop and refine standards and protocols that serve as the framework for a fully functional virtual observatory. With this framework in place, NSF and NASA are now soliciting proposals for the implementation, long-term operation and management of a Virtual Astronomical Observatory (VAO) for the US community.

II. PROGRAM DESCRIPTION

The Virtual Astronomical Observatory will serve to link a multitude of astronomical data sets into an integrated system that allows automated search and analysis among all cataloged objects. The VAO will provide access to data sets, create and maintain data protocols and standards, and provide analysis tools and services to the astronomical research and educational community. The VAO is expected to act as an enabling and coordinating structure to facilitate the development of tools, protocols, and collaborations necessary to utilize fully the scientific potential of current and future astronomical data. Any implementation of the VAO and its ongoing operation should build on the framework for virtual observatories being developed by the U.S. NVO project and the NASA astrophysics data centers, with the shared and agreed-upon international standards established by the IVOA. Information on the U.S. NVO project is available at http://us-vo.org. Those proposing may also find it helpful to review the report made to NASA and NSF by the NVO Science Definition Team, which can be found at http://www.nsf.gov/mps/ast/nvo_report.jsp.

Any proposed implementation of the VAO must utilize the IVOA and NVO established standards and protocols for unified content descriptors, catalog, data and database access, data models, and documents. NVO tools and services must be incorporated in any proposed implementation of the VAO. Proposals must include a transition plan describing how the framework established by the NVO project and its current activities will be continued and evolve into the proposed management structure and long-term operations of the VAO. The management of the VAO is expected to work closely and in cooperation with the current NVO management in making this transition and to ensure the continued smooth operation of current NVO-supported activities, including international coordination.

The scope of the proposals should focus on, but is not limited to:

- standards support;
- software and systems development and maintenance;
- software and documentation curation;
- interface and coordination with computing resources;
- user support;
- planning for media migration and long-term data preservation;
- interface with the national and international communities through the IVOA and other means; and
- education and outreach activities.

III. AWARD INFORMATION

The initial award will be for a duration of 5 years, beginning October 1, 2008, with anticipated annual funding of up to $5,500,000 in FY2008 and up to $6,000,000 annually over the period FY2009-FY2012.

Funding will be provided by both NSF and NASA. NSF funding is expected to be up to $4M in FY2008 and no more than $4.5M per year for the period FY2009-2012. NASA funding is expected to be at the level of $1.5M per year. Annual funding increments will be determined on the basis of annual program plans submitted by the awardee to NSF and NASA and approved by NSF and NASA, subject to the availability of appropriated funds.

The award mechanism is anticipated to be in the form of a cooperative agreement issued by NSF between NSF and the awardee. If a NASA-funded center is selected in partnership with a non-governmental entity that will serve as prime awardee, NASA will fund its center's activities directly.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Proposals may be submitted by all U.S. organizations, including universities and colleges, non-profit, non-academic organizations, for-profit organizations, and government sponsored organizations. Because access to NASA centers and Federally Funded Research and Development Centers (FFRDCs) sponsored by NASA or NSF is open to any awardee, such centers and FFRDCs will not be eligible as primary proposers, only as supporting partners, participating to meet the NSF and NASA responsibilities negotiated under the award instrument.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or Co-PI:

There are no restrictions or limits.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Instructions: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the guidelines specified in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-PUBS (7827) or by e-mail from nsfpubs@nsf.gov.

Important Proposal Preparation Information: FastLane will check for required sections of the full proposal, in accordance with *Grant Proposal Guide* (GPG) instructions described in Chapter II.C.2. The GPG requires submission of: Project Summary; Project Description; References Cited; Biographical Sketch(es); Budget; Budget Justification; Current and Pending Support; Facilities, Equipment & Other Resources; Data Management Plan; and Postdoctoral Mentoring Plan, if applicable. If a required section is missing, **FastLane will not accept the proposal.**

Please note that the proposal preparation instructions provided in this program solicitation may deviate from the GPG instructions. If the solicitation instructions do not require a GPG-required section to be included in the proposal, insert text or upload a document in that section of the proposal that states, "Not Applicable for this Program Solicitation." Doing so will enable FastLane to accept your proposal.

Please note that per guidance in the GPG, the Project Description must contain, as a separate section within the narrative, a discussion of the broader impacts of the proposed activities. Unless otherwise specified in this solicitation, you can decide where to include this section within the Project Description.

Proposals for the management and operation of the VAO may be submitted by all U.S. organizations, including universities, colleges, non-profit, non-academic institutions, for-profit organizations, and government sponsored organizations. NASA centers and FFRDCs sponsored by NSF or NASA may participate *only* as supporting partners to the lead institution/organization and prime awardee.

Collaborative proposals may be submitted either as a single proposal, in which a single award is requested, with subawards administered by the lead organization, or by simultaneous submission of proposals from different organizations, with each organization requesting a separate award. All collaborative proposals must clearly describe the roles to be played by the other organizations, specify the managerial arrangements, and explain the advantages of the multi-organizational effort within the project description.

Project Description:

The project description of each proposal must not exceed 30 pages. It should present the proposing organization's vision of the VAO in the national and global context of astronomical research and education. Each proposal should address the proposing organization's scientific, technical, and managerial qualifications to operate the VAO, and should address, but not be limited to, the following:

- standards support;
- software and systems development and maintenance;
- software and documentation curation;
- interface and coordination with computing resources;
- user support;

- planning for media migration and long-term data preservation;
- interface with the national astronomical community;
- interface with the international community through the IVOA and other means; and
- education and outreach activities.

Essential components of the proposal include:

1) A Management and Transition Plan

This plan must fully describe the proposed organization and management structure for the VAO. If the proposal includes participation by a NASA center, in consideration of its funding directly by NASA outside the central VAO office, the proposing institution/organization must describe in detail how the management and oversight of activities at the NASA center will be integrated with that of the centrally funded VAO operation. Attention should be given to mechanisms for interacting with the larger astronomical community both nationally and internationally and for providing oversight and user feedback.

The plan must identify key positions in the management structure and either identify and provide professional biographical information for persons identified as Key Individuals, or describe a process by which key personnel will be identified. Proposing organizations may propose as Key Individuals persons currently involved in the NVO project collaboration.

The proposal must present a plan for the transition from the development of the NVO framework to an implementation of the fully functional, user-oriented VAO. The management of the VAO is expected to work closely and in cooperation with the current NVO management to ensure the continued smooth operation of current NVO-supported activities during the transition, with particular attention to maintaining international collaboration and participation in standards activities, continuing development in key areas such as the registry, Data Access Layer, Virtual Observatory Query Language, etc., and supporting the public applications (e.g. DataScope, registry interface, OpenSkyQuery, etc.).

2) A Technical Program Plan

The proposal must describe the technical needs of the VAO in order to accomplish the scientific objectives. This includes plans for acquisition and maintenance of computing facilities, plans for upgrades of existing facilities or development of new capabilities. The proposal must describe mechanisms to be used for prioritizing capabilities and new initiatives.

3) An Education and Outreach Plan

The proposal must describe planned education and public outreach activities, both within the VAO and in collaboration with other organizations or programs. Staffing and budget details must be sufficient to show clearly which activities are included within the proposed budget.

Budget:

Proposers shall provide all staffing and budgeting information needed to describe how proposers will fulfill the expectations in Sections I and II of this solicitation. Requested budget amounts for each year of the proposal should reflect the level considered necessary to perform the activities described in the proposal, subject to the funding limitations specified in Section III.

Collaborative proposals originating from a NASA Center or the Jet Propulsion Laboratory must be submitted with fully loaded costs including procurement, civil service labor, travel, service pools, center G&A, and corporate G&A. In compliance with the full cost policies, proposals that are submitted by non-NASA organizations but that involve a NASA organization must ensure that any NASA costs are fully documented in compliance with full cost accounting and include an agreement by the center management that the commitment will be honored for the price quoted. The web address for NASA's Full Cost Initiative is: http://www.hq.nasa.gov/fullcost.

Proposers are reminded to identify the program solicitation number (NSF 08-537) in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost Sharing: Cost sharing is not required under this solicitation.

Other Budgetary Limitations: FY2008 budget should not exceed $5.5 million. The budget for FY2009-FY2012 should not exceed $6 million annually.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

April 22, 2008

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this program solicitation through use of the NSF FastLane system. Detailed instructions regarding the technical aspects of proposal preparation and submission via FastLane are available at: http://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane Website at: https://www.fastlane.nsf.gov/fastlane.jsp.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in the GPG as Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: http://nsf.gov/bfa/dias/policy/merit_review/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years (FY) 2011-2016*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the core strategies in support of NSF's mission is to foster integration of research and education through the programs, projects and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students, and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the variety of learning perspectives.

Another core strategy in support of NSF's mission is broadening opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (GPG Chapter II.C.2.d.i. contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter II.C.2.d.i., prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and

Broader Impacts: The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
   a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
   b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

In addition to the above merit review criteria, each proposal will be evaluated on the basis of:

- The quality of the proposing organization's overall vision for the VAO;
- The suitability, quality and cost effectiveness of the management plan for operating and maintaining the VAO;
- The suitability, experience, and professional stature of key management individuals, both within the proposing organization and within the VAO;
- The proposing organization's experience in operating scientific facilities;
- The experience and stature of key scientific and technical staff;
- The extent and quality of specified educational programs; and
- The potential for appropriate partnerships with universities, non-Federal observatories, and industry.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review.

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will be completed and submitted by each reviewer. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications. After an administrative review has occurred, Grants and Agreements Officers perform the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award notice, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

Special Award Conditions: Awards will be made for a period of 5 years. Awards are expected to be made as cooperative agreements between NSF and the awardee. Cooperative agreement awards will be administered in accordance with NSF's Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) which can be found at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=cafatc60107.

Performance and progress toward meeting the goals and objectives originally proposed as well as those of long-range plans will be evaluated on the basis of regular reports and site visits as necessary. These evaluations will lead to a joint agency decision before the end of the 4th year of funding either to request a renewal proposal from the managing organization or to issue a new solicitation for the management and operation of the VAO for the next 5-year period.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). Within 90 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

The managing organization will be required to provide quarterly and annual reports. Annual submission of yearly program plans and long range plans for periods of 5 years will be required. Annual site visits may be arranged at the discretion of NSF and NASA. The agencies may request special reports on an ad hoc basis but all such requests will be coordinated by the agencies. Details of the reporting requirements will be specified in the final cooperative agreement.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Nigel Sharp, Program Director, Division of Astronomical Sciences, NSF, 1045 S, telephone: (703) 292-4905, fax: (703) 292-9034, email: nsharp@nsf.gov

- Jeffrey Hayes, Discipline Scientist, NASA, telephone: (202) 358-0353, fax: (202) 358-3096, email: jhayes@nasa.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

- Kim S. Elliott, Computer Specialist, 1053 S, telephone: (703) 292-4894, email: kelliott@nsf.gov

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding

opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on NSF's website at https://public.govdelivery.com/accounts/USNSF/subscriber/new?topic_id=USNSF_179.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this new mechanism. Further information on Grants.gov may be obtained at http://www.grants.gov.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 55,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at http://www.nsf.gov

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230

- **For General Information** (NSF Information Center)**:** (703) 292-5111

- **TDD (for the hearing-impaired):** (703) 292-5090

- **To Order Publications or Forms:**

  Send an e-mail to: nsfpubs@nsf.gov

  or telephone: (703) 292-7827

- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting

burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
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