

TeraGrid Phase III: eXtreme Digital Resources for Science and Engineering (XD)

Program Solicitation

NSF 08-571



National Science Foundation

Office of Cyberinfrastructure

Preliminary Proposal Due Date(s) (*required*) (due by 5 p.m. proposer's local time):

November 04, 2008

Deadline for preliminary proposals for Integrating Services

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

November 04, 2008

Deadline for full proposals for High-Performance Remote Visualization and Data Analysis Services

June 15, 2009

Deadline for full proposals for Integrating Services

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

TeraGrid Phase III: eXtreme Digital Resources for Science and Engineering (XD)

Synopsis of Program:

In many areas of research, a key to making advances is the ability of scientists and engineers to manipulate extremely large quantities of information. Examples include: numerical simulation and modeling; the analysis of very large datasets, whether generated by new generations of scientific instrumentation or by numerical models; and the mining of a wide range of collections of digital artifacts. At the largest scales, the resources needed to work with huge volumes of digital information are expensive and scarce. In recent years, the research community, with support from NSF, has developed the TeraGrid as a way of providing wide access to these scarce, expensive resources. The need for such widely shared, national resources continues to grow and as the currently funded phase of TeraGrid operations approaches its close, NSF is inviting innovative proposals for a new infrastructure to deliver the next generation of high-end digital services, as national resources, that will provide researchers and educators with the capability to work with extremely large amounts of digitally represented information.

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

- 47.080 --- Office of Cyberinfrastructure

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 3 to 6

Anticipated Funding Amount: \$32,000,000 It is anticipated that a total of up to \$32,000,000 will be available in the first year.

Eligibility Information

Organization Limit:

None Specified

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

A proposing organization may submit (or be a sub-awardee on) **either** a proposal for a single one of the four services listed in the Integrating Services section of the Program Description (Section II of this solicitation), **or** a proposal for the XD Coordination and Management Service (CMS) and one or more of the other three Integrating services.

Limit on Number of Proposals per PI:

None Specified

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not Applicable
- **Preliminary Proposals:** Submission of Preliminary Proposals is required. Please see the full text of this solicitation for further information.
- **Full Proposals:**
 - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. 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.
 - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: <http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf>)

B. Budgetary Information

- . **Cost Sharing Requirements:** Cost Sharing is not required under this solicitation.
- . **Indirect Cost (F&A) Limitations:** Not Applicable
- . **Other Budgetary Limitations:** Not Applicable

C. Due Dates

- . **Preliminary Proposal Due Date(s) (*required*)** (due by 5 p.m. proposer's local time):

November 04, 2008

Deadline for preliminary proposals for Integrating Services

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

November 04, 2008

Deadline for full proposals for High-Performance Remote Visualization and Data Analysis Services

June 15, 2009

Deadline for full proposals for Integrating Services

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria apply.

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

Over the past three years, the TeraGrid has revolutionized the way in which members of the academic science and engineering community use leading-edge digital resources in their research. As a recent external assessment of the TeraGrid noted, “The TeraGrid is among the best grids in the world with respect to providing resources to a broad and inclusive audience. The TeraGrid is: enabling leading edge science and engineering, providing access to world class heterogeneous resources for a large and diverse community of researchers and educators, [and] leading in innovative approaches to exploiting cyber-infrastructure.”

By pioneering the implementation of techniques to virtualize access to heterogeneous, geographically dispersed high-end computing, data management, and visualization resources, the TeraGrid enables researchers to move beyond working in batch mode on a single supercomputer by giving them the opportunity to select the right advanced digital resource for each research project they are working on and for each stage of each project.

Combining a considerable depth of user support and advanced consulting with a range of access modes that includes interactive, batch mode, by advance reservation, dedicated access, and web-based access, the TeraGrid has made advanced digital resources more usable by researchers and educators. Through a program of online and in-person training, education and outreach opportunities, the TeraGrid has lowered the barriers to the use of high-end digital resources. One result is that the TeraGrid has become vital infrastructure for many researchers across a broad array of research areas.

The scientific impacts of the TeraGrid resources have been felt in astronomy, astrophysics, atmospheric science, biochemistry, chemistry, civil engineering, computer science, condensed matter physics, earth science, materials research, mechanical engineering, nanotechnology, ocean science, particle physics, plasma physics, relativity, and the social, behavioral and economic sciences. In the twelve months ending March, 2007, over one quarter of a billion dollars worth of funded research was supported by the TeraGrid’s infrastructure.

The evolution of the TeraGrid has so far included a “construction phase,” (Phase I) embodied in the Distributed Terascale Facility and TeraGrid Extensions Program, and an initial operational phase (Phase II), formally referred to as the Extensible Terascale Facility. The TeraGrid is a collaborative activity in which a number of individual resource providers provide advanced digital resources and services within an integrating framework. Individual institutions may phase in and out as resource partners on time scales of a few years but the ensemble of services has a longer lifetime and provides a reliable infrastructure for research and education. Organizations preparing proposals may find more information about the current TeraGrid at www.teragrid.org or by contacting the Cognizant Program Officers.

Modern research and education are eagerly exploiting advances in observing and computational technologies, coupled with increasing expertise in the theory of complex systems. These advances drive researchers to work with increasingly large data sets, streaming data from observing systems, more complex multi-process and multi-scale simulations, more advanced forms of visualization, and to synchronize observation with analysis and modeling in multi-stage scientific workflows. These trends produce a greater demand for digital services at extreme scale, beyond those typically available within an individual university, and pose new challenges in how best to deliver such services.

The goal of this solicitation is to encourage innovation in the design and implementation of an effective, efficient, increasingly virtualized approach to the provision of high-end digital services – extreme digital services - while ensuring that the infrastructure continues to deliver high-quality access for the many researchers and educators that use it in their work. The integration of extreme-scale digital resources and services into a common framework that makes it easy for researchers to take advantage of multiple resources and services remains a challenge. Especially challenging is the desire of many researchers to be able to move between using local resources and national resources within a single, well integrated environment. New ideas and technologies have emerged that make it timely to revisit the architecture of the TeraGrid and to plan to address these challenges in the coming years. In preparation for the next operational phase of the TeraGrid (Phase III), to begin in 2010, NSF is encouraging proposals from any interested group capable of contributing to the design and execution of (a) the architecture and key integrating services that provide the common framework within which extreme digital services can be provided to researchers and educators, or (b) the provision of an advanced visualization and data analysis service within such a framework. Collaborative proposals are welcome.

The primary goal of the next phase of the TeraGrid is to enable major advances in science and engineering research, in the integration of research and education, and in broadening participation in science and engineering by under-represented groups, by providing researchers and educators with usable access to extreme-scale digital resources, beyond those typically available on a typical campus, together with the interfaces, consulting support and training necessary to facilitate their use. For this reason, we refer to the next phase of the TeraGrid as “eXtreme Digital”, “XD.”

II. PROGRAM DESCRIPTION

The experience of the TeraGrid and other projects in the U.S. and abroad that are focused on the ability to manipulate very large numbers of bits of information has shown that some key services are necessary for such an infrastructure to be effective. High-performance computing continues to grow in importance as a tool of research and education. Therefore, as was true in the TeraGrid, the provision of high-performance computing services remains one of the core services in the new infrastructure. In order to work with extremely large amounts of information in digital form, a significant digital storage capacity is required. Visualization is an important analysis tool for enabling researchers to interact with large volumes of information so remote visualization services are required. Effective software and algorithms are critical to permitting the manipulation, processing and analysis of very large amounts of digital information. The TeraGrid and its precursors have demonstrated that advanced user support is key to enabling a broad range of researchers and educators to work productively with advanced digital systems. Outreach and training are important for reducing the barriers to the use of advanced digital systems by the research and education community. Increasingly, communities of practice within research and education, share common software tools, primary data, and methods. Some of these groups have developed “Science Gateways” or “Computational end-stations,” virtual organizations that provide access to such resources through an online portal tailored to a specific community of practice. For a variety of reasons, the shared resources that enable researchers and educators to work with extremely large amounts of digital information are geographically distributed. In order to move large numbers of bits within this infrastructure requires high-bandwidth network connections between the nodes of the infrastructure and reliable mechanisms for moving data over these connections.

For many researchers and educators, it is likely that the digital resources that they draw upon will include both XD resources and computing systems and data collections on their home campuses, as well as digital data from observing systems or archives distributed around the world. XD should facilitate this. In addition, it is anticipated that an important external resource for some researchers will be the DataNet partnership (see [NSF 07-601](#)). One of the design goals of the architecture of XD should be ease of integration of XD and DataNet services.

This solicitation requests proposals for the provision of some of the services that will make up XD infrastructure.

Key attributes of XD will be that:

- It is designed and implemented in a way that is consistent with sound system engineering principles.
- Its design is clearly tied to the user requirements of the science and engineering research community.
- It is implemented using a flexible methodology that permits the architecture to evolve in response to changing user needs.
- By default, it will present the individual user with a common user environment regardless of where the resources being used are located and whence the user is authenticating.
- It will offer a highly capable service interface to “community user accounts,” such as science gateways, that encompasses all of the services that are made available to such accounts.
- Its design will cater both to research groups that require very large amounts of computational resources for long periods of time and to individuals who seek to use high-end computation to reduce the time required for running their applications to seconds or minutes so that they can rapidly and interactively explore their research questions.
- Its design will cater to both researchers whose computations require very little data movement and to researchers who are performing very data-intensive computations.
- It will include both a production infrastructure and a small-scale, schedulable test grid. The latter will be available both to the XD operators for testing software and administrative policies with new functionality prior to deployment on the production grid, and as an experimental platform for researchers developing new grid technologies.
- To the maximum extent possible, the initial implementation of the system architecture is designed to exploit existing software technology, with some customization, and does not require the development of new software.
- The underlying mix of computing, storage and visualization hardware is heterogeneous.
- The mix of computing, storage and visualization hardware will change with time.

High-Performance Computing and Storage Services

It is anticipated that the XD will contain between four and six nodes providing high-performance computing and storage services. These will be identified and funded through NSF’s “Track 2” program (see [NSF 05-625](#)) and its successors. Four or five of these nodes will provide production services. Several of these nodes may also provide access to and support for experimental high-performance computing resources.

High-Performance Remote Visualization and Data Analysis Services

It is anticipated that several XD nodes will provide advanced remote visualization services and sophisticated data analysis tools. Proposals for up to two such service providers are requested in this solicitation.

Coordination and Management Service

The XD Coordination and Management Service is a key component of XD. It will be responsible for (i) the design of the grid architecture of XD, (ii) the management of its implementation, (iii) the coordination of regular reporting of XD activities to NSF, (iv) the management of accounting, authorization, authentication, allocation and security services, (v) the coordination of the component services that make up XD, (vi) the maintenance of a responsive, user-centric operational posture for XD; (vii) the coordination of those service providers that provide access to physical resources to maintain a XD network that meets the needs of the user community.

Technology Audit and Insertion Service

The Technology Audit and Insertion Service (TAIS) will both provide quality assurance and quality control for XD and will review and test advanced software tools for manipulating, processing and analyzing very large amounts of information, as these tools become available. The Technology Audit and Insertion Service will use XD computational, storage and visualization services for testing advanced software tools and developing deployment strategies, in partnership with the relevant service providers.

Advanced User Support Service

“Advanced user support” is advanced consulting support that requires some commitment of time and effort by consulting staff that is measured in multiple person-months. It should cover a broad range of types of consulting, including support of researchers or research groups running complicated computer programs, researchers or research groups attempting to develop and use complex workflows, and researchers or research groups trying to develop or implement science gateways that harness XD resources in science gateways.

Training, Education and Outreach Service

The Training, Education and Outreach Service will implement a robust national portfolio of activities in each of the following areas: training for staff, current users and prospective users; the integration of research and education; and the broadening of participation in science and engineering that exploits the XD resources by under-represented demographic groups.

Architectural Drivers

The XD is envisioned as a high-end service provider for science and engineering research that requires access to resources that, collectively:

- deliver significant computational capability;
- can work with very large flows of data;
- can internally move data rapidly;
- can provide remote visualization of very large datasets;
- can store and manage large collections of data, whether organized in simple files, scientific databases, or collections of more general digital objects;
- can provide very responsive and reliable service for computation requiring relatively small amounts of computing cycles and data movement.

One of the signature features envisioned for XD is its ability to facilitate much broader access to high-end digital resources by masking some of the traditional complexity surrounding the use of high-end digital resources from the researchers who employ it. This should encompass:

- a process for obtaining access to resources that is simpler than the traditional allocations process for high-end computing, storage and consulting services;
- a simple user interface, including a single logical namespace for all resources and services offered;
- a common user environment across service providers and access points;
- a well-designed and robust service interface that provides mechanisms for community-developed portals to access the XD resources and services;
- a mechanism for a user to attach a local compute or storage resource, that satisfies a defined protocol standard, to the common user environment so that the user can exploit it from the common user environment as if it were an XD resource;

- user-friendly documentation and user support services based on commercial best practices;
- access modes that are much broader than batch computing;
- support for complex scientific workflows including the ability to combine the use of different XD resources into a single workflow;
- and a centrally coordinated, vigorous outreach and education program.

As background for what follows, it should be assumed that, at the outset of XD, the physical resources dedicated to XD will consist of the following:

- high-end computational resources deployed at 3-5 geographically distinct sites;
- 1-3 high-throughput resources consisting of pools of single-node or small multi-node computing systems;
- Large pools of medium-term storage (implemented as rotating disk or solid-state disk storage) at each high-end computational resource;
- Long-term storage at some of the high-end computational resources;
- 1-3 high-capability visualization resources supporting remote visualization.

It may be assumed that there will be on the order of ten, dedicated, geographically distinct nodes internal to XD at the outset of the project. Resources in the first four categories include the resources funded through the TeraGrid hardware refresh solicitation, [NSF 05-625](#). Resources in the fifth category include the awards associated with the High-Performance Remote Visualization and Data Analysis theme in this solicitation. The primary objective of the architectural design of XD should be to expose the functionality of these resources to users in the best way possible. It is not required that the design include the capacity to scale to a future number of nodes that is significantly larger than ten. Instead, the design should focus on providing the most productive user access to the dedicated XD nodes, together with interfaces that can be exploited by science gateway developers to integrate access to XD resources and local resources within a common user environment within the gateway.

It may be assumed that each node has the resources to connect at a bandwidth of at least 20Gbps to one or two points within the U.S. specified by the XD architectural design without requiring supplemental funds. The design is free to include a greater level of connectivity than this, either at the outset or part-way into the project, if the proposal demonstrates that significant positive impact on science and engineering research and education will result. If the design proposes more capable inter-node networking than 20Gbps, the budget should include provision for providing the necessary connections.

Proposal Process

The current solicitation seeks two types of proposals. The first type is for the provision of *High-Performance Remote Visualization and Data Analysis Services*. Only full proposals for these types of services are sought, there is no preliminary proposal phase.

The second type of proposal sought is for one or more *Integrating Services* (defined below). Proposals for Integrating Services should be submitted in two phases. In the first phase, a set of detailed preliminary proposals are solicited. These will be reviewed. In addition to feedback on the intrinsic merits of each proposal, reviewers will be asked to provide suggestions on how elements of different proposals might be combined to produce stronger proposals. In the second phase, based on the feedback from the reviewers, some or all proposers may be invited to submit full proposals. Further, some invitations to submit full proposals may be contingent on proposers of independently submitted preliminary proposals combining forces to submit a collaborative proposal. Proposers not receiving invitations to submit full proposals will not be eligible to submit full proposals.

High-Performance Remote Visualization and Data Analysis Services

Proposals are requested for providers of remote visualization and data analysis services, as part of the XD infrastructure. Up to two such awards will be made, each for up to \$3M per year for a duration of five years. Each proposal should include: the deployment and operation of one or more remote visualization systems, including all necessary hardware and software, the deployment of an initial set of powerful, reasonably general data analysis software tools, suitable for remote analysis of very large datasets and/or more general digital objects, such as three-dimensional scans, video data, scanned texts, etc, together with a suitable gateway portal to provide access to the visualization and analysis tools; and a plan for discovering and deploying more advanced data analysis tools as they become available during the lifetime of the award.

Integrating Services

A proposing organization may submit (or be a sub-awardee on) **either** a proposal for a single one of the four services listed in this Integrating Services section, **or** a proposal for the XD Coordination and Management Service (CMS) and one or more of the other three Integrating services. Please, see the Proposal Preparation Instructions for the page limits that apply to each option. Each service will only be funded once so between one and four awards are anticipated for Integrating Services.

XD Coordination and Management Service (CMS)

This solicitation seeks proposals for a service that will be responsible for (i) the design of the grid architecture of XD, (ii) the management of its implementation, (iii) the coordination of regular reporting of XD activities to NSF, (iv) the management of accounting, authorization, authentication, allocation and security services, (v) the coordination of the component services that make up XD, (vi) the maintenance of a responsive, user-centric operational posture for XD; (vii) the coordination of those service providers that provide access to physical resources to maintain a XD network that meets the needs of the user community. Proposals may include budgets of up to \$12,000,000 per year for a duration of five years for this service.

CMS proposals must include a carefully thought-out architectural design for the XD that is consistent with the types of XD nodes and services described in this solicitation. As noted above, it is anticipated that in the lifetime of XD, many researchers and educators will undertake projects that draw upon a mixture of XD resources, computing systems and data collections on their home campuses, and digital data from observing systems or archives distributed around the world. Drawing on lessons learned during the operation of the TeraGrid, it is important that the design of the architecture of XD facilitate, to the extent possible, the ability of users to “attach” local or other remote resources, such as a computing service or a data collection, to their XD environment in such a way that it can be used as if it were logically a part of the XD environment. For example, a researcher may wish to use this capability to execute a complex scientific workflow that combines the use of XD resources and local campus resources, or a user may wish to design a task that can, at different times, be executed on local campus resources and XD resources with little if any modification.

XD will support leading-edge science and engineering research in academia. In addition, as a national resource, it is anticipated that XD will include mechanisms to increase the rate of exchange of expertise and technology between academia and industry and to facilitate academic-industry research partnerships. These mechanisms should include providing opportunities to industry to enhance its expertise in the use of high-end digital services for research, design and supply-chain management through industrial partnership programs and other forms of collaboration between private sector and academic users. Other examples that might be considered are the exchange of services between XD and the private sector based on quid pro quo arrangements, and making available to the national researcher community open-source software, open-access data and novel hardware contributed by the private sector.

One of the design goals of XD should be integration with the archiving capabilities of the DataNet partnership [see NSF 07-601, available at <http://www.nsf.gov/pubs/2007/nsf07601/nsf07601.pdf>]. It is anticipated that the first set of DataNet awards will be announced prior to the proposal deadline.

Each proposal for this service should include an architectural design that can be fully implemented within the first year of the award. It should identify a set of specific software technologies, protocols and approaches, in existence at the time of proposal submission, that, absent the appearance of new technologies, could be used to implement the architectural design proposed. The cost, level of effort, schedule and any anticipated challenges associated with integration should be identified, justified and discussed. If the intention is to use a spiral design methodology for augmentation of the initial design during the lifetime of the project, the proposal should clearly describe the phases, the design targets for each phase and how each phase will be pursued in the context of an operational infrastructure.

Each CMS proposal should also include a clear explanation of the mechanisms to be used for coordinating the efforts of all of the XD service providers. It is anticipated that the cooperative agreements between NSF and TeraGrid service providers funded past the end of the current TeraGrid operational phase (for example, Track 2 awardees) will be modified to reflect their participation in the XD activity.

The XD coordination mechanisms proposed must include participation by representatives of the science and engineering research community that will use XD in high-level strategic planning and decision-making for XD.

Technology Audit and Insertion Service (TAIS)

This solicitation solicits proposals for a technology audit and insertion service that will: (i) continually test the user environment and capabilities provided by XD to ensure delivery of the highest possible quality of service (QOS). The TAIS will provide internal quality assurance and quality control for XD, measuring quantitative and qualitative metrics of quality of service and periodically report to the coordinating body for the XD. The proposal for the TAIS should include objective metrics of XD QOS that may be reviewed and revised by the XD in consultation with NSF as technology evolves; (ii) review and test advanced software tools for manipulating, processing and analyzing very large amounts of information, as these tools become available. The Technology Audit and Insertion Service will have user-level access to all XD computational, storage and visualization services and will use these for testing advanced software tools and developing deployment strategies, in partnership with the relevant service providers. Proposals from organizations that are also proposing to provide other XD services, or that currently provide services that will become part of XD, must ensure that the staff who would provide the quality assurance functions are distinct from the staff providing the other services and must explain the way in which the autonomy of the quality assurance staff will be preserved. Proposals may include budgets of up to \$3,000,000 per year for a duration of five years for this service.

Advanced User Support Service (AUSS)

This solicitation seeks proposals for a group that will coordinate and contribute to the provision of advanced user support for XD. The phrase, "advanced user support," is intended to mean advanced consulting support that require some commitment of time and effort by consulting staff that is measured in multiple person-months. It should cover a broad range of types of consulting, including support of researchers or research groups running complicated computer programs, researchers or research groups attempting to develop and use complex workflows, and researchers or research groups trying to develop or implement science gateways that harness XD resources in science gateways. It is anticipated that some of the expertise needed for such support will reside outside the proposing organization, at other institutions that may or may not be XD service providers, and that such expertise will be brought into the advanced support program via sub-awards from the Advanced User Support Service. Proposers should explain how a broad range of domain expertise will be included within the Advanced User Support structure. Funding for XD nodes providing high-performance computing, visualization and/or storage services includes support for consulting staff at that site who are tasked to provide advanced user support. One function of the Advanced User Support Service will be to coordinate the activities of the advanced user support staff at the XD nodes so that they form part of an integrated advanced user support service across XD. The Advanced User Support Service will also include consulting staff that are funded directly through the advanced user support service budget. Proposals may include budgets of up to \$8,000,000 per year for a duration of five years for this service.

Training, Education and Outreach Service (TEOS)

This solicitation seeks proposals for a group that will implement a robust, national portfolio of activities in each of the following areas: training for staff, current users and prospective users; the integration of research and education; and the broadening of participation in science and engineering that exploits the XD resources by under-represented demographic groups. This portfolio should be designed to ensure a nationwide impact. Proposals may include budgets of up to \$3,000,000 per year for a duration of five years for this service.

All proposals should include a clear articulation of the anticipated impact on science and engineering research and education that is expected from the service or services proposed. Each proposal should include a clear statement of user requirements of the service, together with an explanation of how the user requirements were collected. The description of how the service will be implemented and provided must explain how the proposed service will meet the requirements described. The proposal should include a requirements traceability matrix that shows how the individual requirements map to elements of the design of the service. (See Proposal Preparation Instructions below.)

III. AWARD INFORMATION

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 3 to 6

Anticipated Funding Amount: \$32,000,000 It is anticipated that a total of up to \$32,000,000 will be available in the first year.

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

IV. ELIGIBILITY INFORMATION

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the [Grant Proposal Guide](#), Chapter I, Section E.

Proposals are welcome to include academic-industrial partnerships. Examples of possible partnerships include, but are not limited to, instances in which the private sector partners:

- Add assets to XD subject to meeting all XD compatibility requirements,
- Draw on services provided by XD based on a quid-pro-quo arrangement with the awardee,
- Contribute software and data to the XD under open-source/open-access arrangements.

Other innovative partnership arrangements with industry are encouraged.

Organization Limit:

None Specified

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

A proposing organization may submit (or be a sub-awardee on) **either** a proposal for a single one of the four services listed in the Integrating Services section of the Program Description (Section II of this solicitation), **or** a proposal for the XD Coordination and Management Service (CMS) and one or more of the other three Integrating services.

Limit on Number of Proposals per PI:

None Specified

Additional Eligibility Info:

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Preliminary Proposals (required): Preliminary proposals are required and must be submitted via the NSF FastLane system, even if full proposals will be submitted via Grants.gov. Preliminary proposals are required only for proposals for Integrating Services. Preliminary proposals for High-Performance Remote Visualization and Data Analysis Services are not required and should not be submitted.

Exceptions to guidelines in the GPG follow

- The page limit for the Project Description section of the proposal is non-standard and varies with the service or services being proposed. See below for details.
- There is no page limit for the Budget Justification section.
- Certain information other than that described in the GPG should be submitted as Supplementary Documents (see below for details).
- Collaborative efforts may **only** be submitted as a single proposal, in which a single award is being requested. The involvement of partner organizations should be supported through sub-awards administered by the proposing organization.

Project Description Page Limits for Preliminary Proposals

For preliminary proposals for a Coordination and Management Service, if proposed separately, the length of the Project Description should not exceed thirty pages.

For preliminary proposals for any **one** of the Technology Audit and Insertion Service, Advanced User Support Service, or Training, Education and Outreach Service, if proposed separately, the Project Description should not exceed fifteen pages.

For preliminary proposals that include the Coordination and Management Service and one or more of the remaining three integrating services (the Technology Audit and Insertion Service, Advanced User Support Service, and/or Training, Education and Outreach Service), the Project Description should not exceed a total page-count equal to twenty-five plus five times the number of services included. (For example, a preliminary proposal that includes only the CMS and TEOS must have a Project Description that does not exceed thirty-five pages in length.)

Project Description Content for Preliminary Proposals

In addition to the requirements specified in the Grant Proposal Guide on material that must be included in the Project Description, proposals are asked to include the following:

- a clear statement of user requirements of the service, together with an explanation of how the user requirements were collected;

- a description of how the service will be implemented that includes an explanation of how the proposed service will meet the user requirements described;
- a requirements traceability matrix that shows how the individual requirements map to elements of the design of the service. Proposals for the Coordination and Management Service must include a separate requirements traceability matrix specific to the design of the overall XD architecture as well as a requirements traceability matrix for the design of other aspects of the Coordination and Management Service.

In addition, proposals for the Coordination and Management Service must include a clear description of each of the following items:

- the design of the grid and network architecture of XD, and the technologies that will be used initially to implement this architecture;
- the management of the architecture implementation process and how the architecture will be implemented in a way that provides for continuity of service to current users of the TeraGrid;
- the coordination of regular reporting of XD activities to NSF;
- the implementation and management of accounting, authorization, authentication, allocation and security services;
- the mechanisms for the coordination of the component services that make up XD, including the governance mechanisms that serve to maintain the collaboration between all of the XD partners;
- the ways in which a responsive, user-centric operational posture for XD will be maintained.

Supplementary Documents for Preliminary Proposals

Proposals should include the following sections as Supplementary Documents:

- A list of all institutions and companies involved in the project, together with their role within the project and the level of funding.
- A single, alphabetically ordered list of all people, in the academic or professional computing community, who have collaborated with (within the last 48 months), or have been a Ph.D. advisee or advisor of, any of the personnel involved in the proposed project. In this list, please include, next to the name of each conflicted individual, that individual's institution or company and the name of the project member with whom he or she has the conflict of interest. It is not necessary to list, as collaborators, personnel who are employees of an institution or company involved in the project.
- **Letters of endorsement should not be included in proposals.** Letters of commitment from individuals who are described in the Project Description as involved in the project in a senior capacity but who are not members of the lead proposing organization, or from representatives of institutions or organizations collaborating with the lead institution, are allowable. As described in the Grant Proposal Guide, Section II.C.2.j, such letters of commitment should be included in the Supplementary Documents section and do not count toward overall page limits. If letters of endorsement are included, NSF may choose to return the proposal without review.

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained 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) 292-7827 or by e-mail from pubs@nsf.gov. Proposers are reminded to identify this program solicitation number 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.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (<http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf>). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

Exceptions to guidelines in the GPG or NSF Grants.gov Application Guide follow.

- The page limit for the Project Description section of the proposal is non-standard and varies with the service or services being proposed. See below for details.

- There is no page limit for the Budget Justification section.
- Certain information other than that described in the GPG should be submitted as Supplementary Documents (see below for details).
- Collaborative efforts may **only** be submitted as a single proposal, in which a single award is being requested. The involvement of partner organizations should be supported through sub-awards administered by the proposing organization

Project Description Page Limits for Full Proposals

Full proposals for a High-Performance Remote Visualization and Data Analysis Service, the length of the Project Description should not exceed fifteen pages.

Full proposals for Integrating Services should follow the same requirements for length of the Project Description as preliminary proposals unless a different page-count limit is specified in the invitation to submit a full proposal.

Project Description Content for Full Proposals

In addition to the requirements specified in the Grant Proposal Guide or NSF Grants.gov Application Guide on material that must be included in the Project Description, full proposals for **all** types of services are asked to include the following:

- a clear statement of user requirements of the service, together with an explanation of how the user requirements were collected;
- a description of how the service will be implemented that includes an explanation of how the proposed service will meet the user requirements described;
- a requirements traceability matrix that shows how the individual requirements map to elements of the design of the service. Proposals for the Coordination and Management Service must include a separate requirements traceability matrix specific to the design of the overall XD architecture as well as a requirements traceability matrix for the design of other aspects of the Coordination and Management Service.

In addition, proposals for the Coordination and Management Service must include a clear description of each of the following items:

- the design of the grid and network architecture of XD, and the technologies that will be used initially to implement this architecture;
- the management of the architecture implementation process and how the architecture will be implemented in a way that provides for continuity of service to current users of the TeraGrid;
- the coordination of regular reporting of XD activities to NSF;
- the implementation and management of accounting, authorization, authentication, allocation and security services;
- the mechanisms for the coordination of the component services that make up XD, including the governance mechanisms that serve to maintain the collaboration between all of the XD partners;
- the ways in which a responsive, user-centric operational posture for XD will be maintained.

Supplementary Documents for Full Proposals

Proposals should include the following sections as Supplementary Documents:

- A list of all institutions and companies involved in the project, together with their role within the project and the level of funding.
- A single, alphabetically ordered list of all people, in the academic or professional computing community, who have collaborated with (within the last 48 months), or have been a Ph.D. advisee or advisor of, any of the personnel involved in the proposed project. In this list, please include, next to the name of each conflicted individual, that individual's institution or company and the name of the project member with whom he or she has the conflict of interest. It is not necessary to list, as collaborators, personnel who are employees of an institution or company involved in the project.
- **Letters of endorsement should not be included in proposals.** Letters of commitment from individuals who are described in the Project Description as involved in the project in a senior capacity but who are not members of the lead proposing organization, or from representatives of institutions or organizations collaborating with the lead institution, are allowable. As described in the Grant Proposal Guide, Section II.C.2.j, such letters of commitment should be included in the Supplementary Documents section and do not count toward overall page limits. If letters of endorsement are included, NSF may choose to return the proposal without review.
- A Project Execution Plan (PEP). The PEP should include the following items:
 1. A summary of the purpose of the service;
 2. A description of the project deliverables;
 3. A high-level Work Breakdown Structure (WBS);
 4. A Work Breakdown Structure dictionary defining the scope of the WBS elements;

5. A project budget broken out by WBS element;
6. A description of the methodology and assumptions used for estimating the budget components;
7. A project risk analysis and a description of the analysis methodology;
8. A project schedule;
9. A description of the organizational structure of the project team;
10. A description of the subcontracting strategy and controls;
11. A description of the Project Management Control System and financial and business controls to be used;
12. A description of the Configuration Management System to be used;
13. A plan for reporting on the technical and financial status of the project;
14. A description of project governance mechanisms;
15. Plans for internal and institutional oversight, external advisory committees, and for building and maintaining effective relationships with the broader research community that will utilize the service;
16. A description of quality control mechanisms to be used;
17. If appropriate, plans for systems integration, testing, acceptance, commissioning, and the transition to operational status, including appropriate criteria;
18. A cyber-security plan, if appropriate.

Eligibility to Submit Full Proposals for Integrating Services

Full proposals for Integrating Services will be accepted only from PIs who have submitted preliminary proposals and have been invited to submit a full proposal. In the review of preliminary proposals, reviewers will be asked to provide suggestions on how elements of different proposals might be combined to produce stronger proposals. Based on the feedback from the reviewers, some or all proposers may be invited to submit full proposals. Further, some invitations to submit full proposals may be contingent on proposers of independently submitted preliminary proposals combining forces to submit a collaborative proposal. Proposers not receiving invitations to submit full proposals will not be eligible to submit full proposals. Full proposals for Integrating Services submitted by PIs not invited to submit a full proposal will be returned without review. Prior to the deadline for full proposals for Integrating Services, NSF may hold a meeting of PIs invited to submit full proposals. It is anticipated that such a meeting will occur within a few weeks after the invitations to submit a full proposal are sent.

B. Budgetary Information

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

C. Due Dates

- **Preliminary Proposal Due Date(s) (required)** (due by 5 p.m. proposer's local time):

November 04, 2008

Deadline for preliminary proposals for Integrating Services

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

November 04, 2008

Deadline for full proposals for High-Performance Remote Visualization and Data Analysis Services

June 15, 2009

Deadline for full proposals for Integrating Services

D. FastLane/Grants.gov Requirements

- **For Proposals Submitted Via FastLane:**

Detailed technical instructions regarding the technical aspects of preparation and submission via FastLane are available at: <https://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>.

• **For Proposals Submitted Via Grants.gov:**

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. The Grants.gov's Grant Community User Guide is a comprehensive reference document that provides technical information about Grants.gov. Proposers can download the User Guide as a Microsoft Word document or as a PDF document. The Grants.gov User Guide is available at: <http://www.grants.gov/CustomerSupport>. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program where they will be reviewed if they meet NSF proposal preparation requirements. 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 who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the 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.

A. NSF Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two NSB-approved merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which the reviewer is qualified to make judgements.

What is the intellectual merit of the proposed activity?

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

Examples illustrating activities likely to demonstrate broader impacts are available electronically on the NSF website at: <http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf>.

NSF staff also will give careful consideration to the following in making funding decisions:

Integration of Research and Education

One of the principal strategies in support of NSF's goals 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 diversity of learning perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- 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.

B. Review and Selection Process

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

Primary method will be panel review. This may be supplemented by ad hoc review as necessary. In addition, full proposals for the Coordination and Management Service and/or Advanced User Support may be subjected to a site visit or reverse site visit.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. 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 is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, 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.

In all cases, 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 and 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.

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 letter, 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 letter; (4) the applicable award conditions, such as Grant General Conditions (GC-1); * or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. 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/general_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@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: Awardees will be required to participate in a collaborative management framework for the XD partnership.

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 before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after expiration of a grant, the PI also is required to submit a final project report.

Failure to provide the required annual or final project reports will delay NSF review and processing of any future funding increments as well as any pending proposals for that PI. 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 FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational) publications; and, other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete.

Additional monthly and quarterly reporting requirements will apply.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- Stephen Meacham, telephone: (703) 292-8970, email: smeacham@nsf.gov
- Abani Patra, telephone: (703) 292-8970, email: apatra@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.
- Crystal R. Aikens, telephone: (703) 292-4562, email: caikens@nsf.gov

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-

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, MyNSF (formerly the Custom News Service) 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 Regional 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. MyNSF also is available on NSF's Website at <http://www.nsf.gov/mynsf/>.

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 40,000 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 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: pubs@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
Division of Administrative Services
National Science Foundation
Arlington, VA 22230

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