

# International Research Network Connections (IRNC)

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## Program Solicitation

NSF 04-560

*Replaces Document NSF 97-106*



### National Science Foundation

Directorate for Computer and Information Science and Engineering

Division of Shared Cyberinfrastructure

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

June 07, 2004

## SUMMARY OF PROGRAM REQUIREMENTS

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### General Information

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**Program Title:**

International Research Network Connections (IRNC)

**Synopsis of Program:**

The United States research and education community communicates, cooperates and collaborates with colleagues in the global community. Members of this community access remote instruments, data, and computational resources located throughout the world, often as part of international collaborations. Similarly, major NSF investments in large-scale science and engineering facilities located both inside and outside the U.S. are utilized by multi-national research and education collaborations. To support such activities, NSF solicits proposals for International Research Network Connections (IRNC).

NSF expects to make a small number of awards to provide network connections linking U.S. research networks with peer networks in other parts of the world. Links funded by this program are intended to support science and engineering research and education applications. Funded projects will assist the U.S. research and education community by enabling state-of-the-art international network services similar to and interconnected with those currently offered or planned by domestic research networks.

Preference will be given to solutions which provide the best economy of scale and demonstrate the ability to link the largest communities of interest with the broadest services.

**Cognizant Program Officer(s):**

- Douglas G. Gatchell, Program Director, Directorate for Computer & Information Science & Engineering, Division of Shared CyberInfrastructure, 1105 N, telephone: (703) 292-8962, fax: (703) 292-9060, email: [dgatchell@nsf.gov](mailto:dgatchell@nsf.gov)

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

- 47.070 --- Computer and Information Science and Engineering

### Eligibility Information

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- **Organization Limit:**

U.S. organizations or consortia led by U.S. organizations.

- **PI Eligibility Limit:** None Specified.
- **Limit on Number of Proposals:** None Specified.

### Award Information

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- **Anticipated Type of Award:** Standard or Continuing Grant or Cooperative Agreement
- **Estimated Number of Awards:** 3 to 6
- **Anticipated Funding Amount:** \$5,000,000 (pending availability of funds)

### Proposal Preparation and Submission Instructions

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#### A. Proposal Preparation Instructions

- **Full Proposal Preparation Instructions:** This solicitation contains information that supplements the standard 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.
- **Indirect Cost (F&A) Limitations:**

Please note that NSF does not typically fund Independent Research and Development (IR&D) and/or Facilities Capital Cost of Money (FCCM) as part of an indirect cost rate.

- **Other Budgetary Limitations:** Not Applicable.

#### C. Due Dates

- **Full Proposal Deadline Date(s)** (due by 5 p.m. proposer's local time):  
June 07, 2004

### Proposal Review Information

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- **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

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- **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

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The United States research and education community communicates, cooperates and collaborates with colleagues in the global community. Members of this community access remote instruments, data, and computational resources located throughout the world, often as part of international collaborations. Similarly, major NSF investments in large-scale science and engineering facilities located both inside and outside the U.S. are utilized by multi-national research and education collaborations. To support such activities, NSF solicits proposals for International Research Network Connections (IRNC).

NSF expects to make a small number of awards to provide network connections linking U.S. research networks with peer networks in other parts of the world. Links funded by this program are intended to support science and engineering research and education applications. Funded projects will assist the U.S. research and education community by enabling state-of-the-art international network services similar to and interconnected with those currently offered or planned by domestic research networks.

Preference will be given to solutions which provide the best economy of scale and demonstrate the ability to link the largest communities of interest with the broadest service offering.

## Background

In 1990, NSF published the solicitation "International Connections Management to NSFNET (ICM)," NSF 90-69. The purpose of that solicitation was to consolidate the management and engineering of connections between the U.S. research community and similar communities abroad. In addition, the ICM program assisted other countries to connect to the global Internet by supporting an infrastructure for interconnection with the U.S. Internet. The ICM efforts were followed by a new program described in the solicitation "High-Performance International Internet Services (HPIIS)," [NSF 97-106](#). The HPIIS program encouraged international connections to the NSF's vBNS (very high-speed Backbone Network Service) which had been developed to provide the U.S. research community an alternative to the highly congested commercial Internet. Today, an advanced and evolving system of domestic and international networks exists to meet the needs of researchers and educators in the U.S. and their counterparts in Canada, Europe, and Asia.

## II. PROGRAM DESCRIPTION

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The infrastructure and associated services proposed in response to this solicitation must address U.S. research and education needs with respect to international collaboration and communication that advance science and engineering. Plans for meeting the evolving service needs of the research and education community should also be described. Proposals should include discussions of the following in the Project Description which can be up to 20 pages:

### A. Connection Goals

The highest priority is enabling and enhancing communication and collaboration between the U.S. and international science and engineering research and education communities. The availability of limited resources means that preference will be given to solutions which provide the best economy of scale and demonstrate the ability to link the largest communities of interest with the broadest services. Proposals should describe how this will be accomplished.

Given the characteristics of state-of-the-art networking technologies, it is possible that the above priority can be satisfied by shared links that are also used for experiments that prototype the next generation of international connectivity services. Proposals should describe plans for experimentation, if any.

This solicitation is also interested in innovative and forward-looking approaches to promote the development of a rational global network architecture. In this regard, proposals should address the question of how their international links will become an integral component of the global science and engineering research and education network environment and how they will fit into a rational global network architecture. For example, solutions which offer incentives to foreign connection points to share circuits or encourage the establishment of national or regional distributed exchange points might be considered.

### B. Services and System Design

Proposals should describe the services to be provided, the technologies on which they are based, and relevant timelines for service activation and enhancements.

The IRNC should use technologies (including protocols) that provide a reliable, leading-edge service for research and education. For example, some of the links to key continents must support individual sessions at end-to-end data transfer rates approaching ten gigabits per second in an uncongested use mode. The system design should provide this capability consistent with high-capacity and long-distance delay products. Proposed technologies must also be compatible with the research networks of the countries that are to be connected, and with their plans (where available) for the introduction of new technologies. Initially, support for the current Internet Protocol (IPv4), the next generation Internet Protocol (IPv6), and multicast IP will be expected for all IRNC projects. There may be a need to provide different quality of service classes in response to dynamic requests from applications. Thus, protocols which provide for scheduling and resource reservation may also be required for the IRNC depending on the circumstances, application requirements, or network link provisions. Finally, service provisioning will require management and operations (monitoring, quality control, statistics collection, reporting, etc.) at multiple protocol levels. Unless agreed to, all protocols and services will be based on open standards or draft standards.

Proposals should describe the overall system design including: connection plans on both ends of the international links; (briefly) the networks to be connected, and the technical characteristics of the IRNC links; supported layer 1-3 technologies; routing and switching strategies; security mechanisms and privacy policies; and relevant timelines for technology deployment and service activation. Alternate designs, each separately priced, for providing reliable services may also be provided.

Grid services, end-to-end measurement and performance monitoring services (including visibility into application use of network links), security services and other middleware related services will likely demand cooperation and collaboration between the various connected networks. A capability to respond to emerging service needs in a timely manner with expanded or enhanced services is key to successful projects. Hence, in addition to the description of the initial technologies to be employed, proposals should outline how the proposed IRNC should evolve and specify the plans for introducing new networking technologies and services. Proposals should assess the risks and benefits of adopting such new technologies including plans to assure high quality services during the transition to any proposed future deployments.

### C. Organization Description

Because of the nature and geographic extent of the efforts involved, interested parties may choose to form consortia of organizations that can work together to provide the needed services. Consortia may consist of any number of U.S. and foreign, profit and not-for-profit entities. Awards resulting from this solicitation will be made to lead U.S. organizations.

Proposals should describe the organizations that are involved including:

- Experience and qualifications applicable to the provisioning, operation and management of the proposed projects and, for the lead organizations, evidence of effective project management experience including management of sub-awards (if any);
- Experience the consortia members have had working together in similar projects;
- Planned organization and governance of the proposing consortia;
- A description of each organization's proposed facilities (in appropriate amount of detail to reflect the relative role of each organization); and
- Documentation of technical and managerial qualifications of key personnel, including those who are part of any sub-awards.

### D. Operations, Monitoring and Quality Assurance Plan

Proposals should describe procedures and facilities (with special emphasis on Network Operations Centers and Network Information Centers) for monitoring the quality, availability and effectiveness of the services provided. Procedures for fault isolation, problem resolution, and service assurance should be described. Coordination and collaboration with other Network

Operation Centers and end user organizations will be key to effective network management. Proposals should describe procedures for working with personnel from interconnected networks to identify and to resolve problems and to support end-to-end service guarantees. Special attention should also be given to plans for measuring and ensuring end-to-end performance for high-end applications.

Proposals should also include a description of the targeted performance and quality of service guarantees, and a discussion of the rationale for and validity of the proposed service metrics for providing reliable end-end service. Such metrics for service use, availability, and performance might include: utilization (averaged over appropriate timescales), packet drop rate, round trip time, jitter and time sensitive latency, for example. Possible control methods, where applicable, for guaranteeing IRNC resources to U.S. researchers and educators in a shared link environment should also be outlined. Proposals should leverage existing measurement and analysis tools to support gathering service metrics and troubleshooting performance.

#### E. Use of International Links

Links funded by this program are intended to support science and engineering research and education applications. Therefore, the networks they connect must also be primarily for these purposes. These networks typically have appropriate use policies and those policies shall govern traffic flow over the IRNC links. Known or expected usage policies, along with processes for enforcing or implementing the policies, should be described.

In addition, connection points may enforce their own routing policies. Proposers should describe their proposed U.S. and international connection policies.

#### F. Shared Infrastructure Proposals

Sharing infrastructure and services can improve the economics for users and institutions. This includes not only use of research network resources provided by others but also the use of network resources for non-research use. If services or infrastructure are shared, measures must be taken to ensure that IRNC communities are provided with their fair share of capacity, priority, and reliability subscribed under IRNC awards, and on terms that are at least as favorable as those received by any other customer of the service provider.

If a shared-link or other common infrastructure environment is utilized, proposals must include descriptions of service metrics, control methods, and related service guarantees for providing IRNC to the research and education community.

Discussion of capacity allocation and performance monitoring to ensure fair sharing should be clearly presented.

#### G. Budget Narrative

The budget narratives should be included in the Project Description, and should include sufficient detail to explain and justify the proposed price and value over the period of the award.

Each year's budget narrative must contain information about the specific services proposed and must explain the significant prices-to-NSF associated with each service/facility provided. This pricing information must provide a quantifiable basis for determining the reasonableness of the proposed price to be funded by NSF. Examples of supporting information include:

- Documented estimates of the value, or current market price of the proposed services;
- Measurable criteria such as, price per unit of bandwidth made available to the U.S. research community;
- Service metrics and/or quality-of-service parameters of this solicitation and their relation to proposed pricing; and
- Market value of special supplies, over and above the service provider's standard equipment, needed to provide the

required services.

### III. ELIGIBILITY INFORMATION

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The categories of proposers identified in the [Grant Proposal Guide](#) are eligible to submit proposals under this program announcement/solicitation.

Because of the nature and geographic extent of the efforts involved, interested parties are encouraged to form consortia of organizations that can work together to provide the needed services. Consortia may consist of any number of U.S. and foreign, profit and not-for-profit entities. All awards resulting from responses to this solicitation will be made to U.S. organizations as cooperative agreements, standard or continuing grants of up to a five-year duration. NSF support for IRNC projects funded as a result of this competition will not exceed a total of \$5 million per year.

### IV. AWARD INFORMATION

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The total NSF funding expected for IRNC is \$5 million per year. The number of awards made will depend, among other things, on the amount of funds requested from NSF and by the quality of the proposals received.

If the award is a cooperative agreement, NSF may negotiate with IRNC awardees for similar and/or related services required by the U.S. research and education community as such needs arise. This approach is taken because of the increasing importance to the research and education community of remote access to computational and information resources, and the rapid development and deployment of newer technologies to provide such access and the unpredictable geographic nature of research.

Awards made for IRNC will be in the form of cooperative agreements, standard or continuing grants for a period of up to five years. It is expected that awards will be announced in the late fall of 2004.

### V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

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#### A. Proposal Preparation Instructions

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##### **Full Proposal Instructions:**

Proposals submitted in response to this program announcement/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/cgi-bin/getpub?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](mailto:pubs@nsf.gov).

The following instructions and those in Section II supplement the GPG guidelines:

- Appendix. Proposing organizations should include a letter from each consortium member indicating their intention to participate in the project. An authorized representative at the consortium member's organization should sign the letter.

Proposers are reminded to identify the program announcement/solicitation number (04-560) in the program announcement/solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

## **B. Budgetary Information**

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### **Cost Sharing:**

Cost sharing is not required in proposals submitted under this Program Solicitation.

### **Indirect Cost (F&A) Limitations:**

Please note that NSF does not typically fund Independent Research and Development (IR&D) and/or Facilities Capital Cost of Money (FCCM) as part of an indirect cost rate.

## **C. Due Dates**

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Proposals must be submitted by the following date(s):

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

June 07, 2004

## **D. FastLane Requirements**

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Proposers are required to prepare and submit all proposals for this announcement/solicitation through the FastLane system. Detailed instructions for 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](mailto: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 announcement/solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this announcement/solicitation.

*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. Proposers are no longer required to provide a paper copy of the signed Proposal Cover Sheet to NSF. Further instructions regarding this process are available on the FastLane Website at: <http://www.fastlane.nsf.gov>

## **VI. PROPOSAL REVIEW INFORMATION**

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### **A. NSF Proposal Review Process**

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Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers.



Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

The National Science Board approved revised criteria for evaluating proposals at its meeting on March 28, 1997 ([NSB 97-72](#)). All NSF proposals are evaluated through use of the two merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

On July 8, 2002, the NSF Director issued [Important Notice 127](#), Implementation of new Grant Proposal Guide Requirements Related to the Broader Impacts Criterion. This Important Notice reinforces the importance of addressing both criteria in the preparation and review of all proposals submitted to NSF. NSF continues to strengthen its internal processes to ensure that both of the merit review criteria are addressed when making funding decisions.

In an effort to increase compliance with these requirements, the January 2002 issuance of the GPG incorporated revised proposal preparation guidelines relating to the development of the Project Summary and Project Description. Chapter II of the GPG specifies that Principal Investigators (PIs) must address both merit review criteria in separate statements within the one-page Project Summary. This chapter also reiterates that broader impacts resulting from the proposed project must be addressed in the Project Description and described as an integral part of the narrative.

Effective October 1, 2002, NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary. It is believed that these changes to NSF proposal preparation and processing guidelines will more clearly articulate the importance of broader impacts to NSF-funded projects.

The two National Science Board approved merit review criteria are listed below (see the [Grant Proposal Guide](#) Chapter III.A for further information). 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 he/she is qualified to make judgments.

#### **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 and original 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?

NSF staff 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.

#### **Additional Review Criteria:**

In addition to the criteria described above, the following criteria will be used:

- The research networks proposed for IRNC connection and the rationale for connecting them (e.g., geographic span, institutions/communities/resources connected, their importance to the U.S. research community, services offered, relationship to a rational global network architecture etc).
- Ability to obtain, operate, and maintain high-capacity low delay circuits and to provide high-performance network services. Ability to monitor and provide information and statistics on link usage characteristics including science and engineering use or application use. Capabilities of Network Operations Center(s) (NOC) and plans for inter-network NOC cooperation and collaboration.
- Quality of the engineering and implementation plans for deploying evolving technologies and scaling of service needs. Quality of plans for enhancing the robustness of services, including restoration and backup services.

#### **B. Review Protocol and Associated Customer Service Standard**

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All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/solicitation will be reviewed by Ad Hoc and/or panel review.

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.

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 Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

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 date of receipt. The interval ends when the Division Director accepts the Program Officer's recommendation.

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**

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## A. Notification of the Award

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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 Division 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.A. for additional information on the review process.)

## B. Award Conditions

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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 (NSF-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 agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

\*These documents may be accessed electronically on NSF's Website at [http://www.nsf.gov/home/grants/grants\\_gac.htm](http://www.nsf.gov/home/grants/grants_gac.htm). Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from [pubs@nsf.gov](mailto:pubs@nsf.gov).

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at <http://www.nsf.gov/cgi-bin/getpub?gpm>. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Website at <http://www.gpo.gov>.

### Special Award Conditions:

Following the establishment of awards, awardees will be required to develop operational agreements with the connected research networks.

## C. Reporting Requirements

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For all multi-year awards (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

The report should include a Project Plan for the next program year.

### The following reporting and review requirements pertain only to COOPERATIVE AGREEMENTS:

1. Quarterly reports with performance-monitoring results and narratives as well as discussions of trends, problems, recommendations, etc., must be sent to the IRNC Program Officer or published electronically. Episodic reports may also be requested by the IRNC Program Officer, as warranted by circumstances.

2. In addition to required reporting to NSF, awardees must provide public current status information by means of:
  - Public World Wide Web Page(s) containing project descriptions and pointers to relevant information such as milestones, operational information such as outages (including trouble tickets), general performance parameters (such as circuit utilization "strip charts," circuit availability, scheduled down times), contact information for key people and/or functions (e.g., Network Information and Operations Centers);
  - E-mail lists for disseminating operational status notifications; and
  - Other means (e.g., inclusion in existing newsletters) as may be proposed.
3. These and any other methods to be employed for making information about operational and project status available to other network operators and to the general public should be described.
4. The progress, plans, and services of all the providers will be assessed annually. In particular, the quality and quantity of the services should be ascertainable annually during the period of the award by performance measures for cooperative agreements, determination(s) may be made at any time about any additional, increased, decreased, or modified services within the general scope and context of the award, and NSF may negotiate appropriate modification(s) to the award(s).
5. In addition to annual review by NSF, the IRNC projects will be externally reviewed after 18 months of operation to provide additional input to NSF regarding the performance of the awardee(s) and to recommend any appropriate award modifications.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for the PI and all Co-PIs. 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. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, 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.

## VIII. CONTACTS FOR ADDITIONAL INFORMATION

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General inquiries regarding this program should be made to:

- Douglas G. Gatchell, Program Director, Directorate for Computer & Information Science & Engineering, Division of Shared CyberInfrastructure, 1105 N, telephone: (703) 292-8962, fax: (703) 292-9060, email: [dgatchell@nsf.gov](mailto:dgatchell@nsf.gov)

For questions related to the use of FastLane, contact:

- Crystal R. Champion-Payne, Program Specialist, Directorate for Computer & Information Science & Engineering,

## IX. OTHER PROGRAMS OF INTEREST

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The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at <http://www.nsf.gov/cgi-bin/getpub?gp>. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF *E-Bulletin*, which is updated daily on the NSF Website at <http://www.nsf.gov/home/ebulletin>, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's *Custom News Service* (<http://www.nsf.gov/home/cns/start.htm>) to be notified of new funding opportunities that become available.

## ABOUT THE NATIONAL SCIENCE FOUNDATION

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The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF, although some programs may have special requirements that limit eligibility.

*Facilitation Awards for Scientists and Engineers with Disabilities* (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the GPG Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

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 or (800) 281-8749
  
- **To Order Publications or Forms:**  
  
Send an e-mail to: [pubs@nsf.gov](mailto:pubs@nsf.gov)  
  
or telephone: (703) 292-7827
  
- **To Locate NSF Employees:** (703) 292-5111

#### PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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