Proposals for Community Instruments and Facilities (CIF)

PROGRAM SOLICITATION
NSF 20-596

National Science Foundation

Directorate for Geosciences
    Division of Atmospheric and Geospace Sciences

Letter of Intent Due Date(s) *(required)* (due by 5 p.m. submitter's local time):

    October 21, 2020

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

    December 10, 2020

IMPORTANT INFORMATION AND REVISION NOTES

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 20-1), which is effective for proposals submitted, or due, on or after June 1, 2020.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

    Community Instruments and Facilities (CIF)

Synopsis of Program:

    The intent of the Community Instruments and Facilities (CIF) solicitation is to provide the NSF-sponsored atmospheric sciences research community with access to specialized instrumentation for field and laboratory-based studies. The CIF solicitation requests proposals from instrument and facility providers who will make their equipment available for community use through an NSF-defined request process. Support will be provided for limited technician time, minor upgrades, and travel for outreach.

    The Community Instruments and Facilities (CIF) solicitation is intended to expand the suite of instruments and facilities available to the atmospheric science community supported by NSF. Proposals funded through this solicitation will promote research and education in areas currently supported by the Atmospheric Science programs. Detailed descriptions of research programs of the Atmosphere Section within AGS are available at - https://www.nsf.gov/funding/programs.jsp?org=AGS

Cognizant Program Officer(s):

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

- Shree Mishra, telephone: (703) 292-8521, email: sumishra@nsf.gov

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

- 47.050 --- Geosciences

Award Information

Anticipated Type of Award: Continuing Grant

Estimated Number of Awards: 3 to 15

The number of awards will vary depending on the number of proposals received, their scientific merit and programmatic considerations.

Anticipated Funding Amount: $750,000 to $3,000,000

Awards will range from a minimum of $50,000 per year to a maximum award size of $250,000 per year.

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

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.

Who May Serve as PI:

No restrictions

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or Co-PI: 1

An individual may participate as PI, co-PI, or other Senior Personnel on at most one proposal for this solicitation. Note that any individual whose biographical sketch is provided as part of the proposal will be considered as Senior Personnel in the proposed activity, with or without financial support from the project.

In the event that any individual exceeds this limit, any proposal submitted to this solicitation with this individual listed as PI, co-PI, or Senior Personnel after the first proposal is received at NSF will be returned without review. No exceptions will be made.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is required. Please see the full text of this solicitation for further information.

- **Preliminary Proposal Submission:** Not required

- **Full Proposals:**

  - Full Proposals submitted via FastLane: *NSF Proposal and Award Policies and Procedures Guide* (PAPPG) guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.
  - 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: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide).

B. Budgetary Information

- **Cost Sharing Requirements:**

  Inclusion of voluntary committed cost sharing is prohibited.

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

  Not Applicable

- **Other Budgetary Limitations:**

  Not Applicable

C. Due Dates

- **Letter of Intent Due Date(s)** *(required)* (due by 5 p.m. submitter's local time):

  October 21, 2020

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Proposal Review Information Criteria

Merit Review Criteria:

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

Award Administration Information

Award Conditions:

Standard NSF award conditions apply.

Reporting Requirements:

Standard NSF reporting requirements apply.

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I. INTRODUCTION

The Division of Atmospheric and Geospace Sciences (AGS) aims to extend the intellectual frontiers in atmospheric and geospace sciences by making responsible investments in fundamental research, technology development, and education that enable discoveries, nurture a vibrant, diverse scientific workforce, and help attain a prosperous and sustainable future.

To facilitate fundamental research in the atmospheric sciences, AGS supports state-of-the-art instruments and facilities that can be requested by the NSF research community.

The Community Instruments and Facilities (CIF) solicitation is intended to expand the suite of instruments and facilities available to the atmospheric science community supported by NSF. Proposals funded through this solicitation will promote research and education in areas currently supported by the Atmospheric Science programs. Detailed descriptions of research programs of the Atmosphere Section within AGS are available at - https://www.nsf.gov/funding/programs.jsp?org=AGS

II. PROGRAM DESCRIPTION

The Community Instruments and Facilities (CIF) solicitation is intended to make existing instruments and facilities more broadly available to the NSF-sponsored atmospheric science community. For the purpose of this solicitation a CIF is defined as a complex and/or expensive, stationary or portable, instrument or facility that already exists at the host institution and may be deployable or laboratory-based. CIF does not include common-use instrumentation (e.g. radiosonde systems), major research facilities (e.g. aircraft), or computing. CIF should be used to support basic research and education in atmospheric sciences supported by programs in the AGS Division's Atmosphere Section (see https://www.nsf.gov/funding/programs.jsp?org=AGS for a current list of programs in AGS).

Awards will provide funding of $50k-$250k/year for up to 5 years for management and maintenance activities associated with the CIF. The CIF award is intended to augment ongoing funding streams and not be used as the main source of support for the CIF. The PI is responsible for ensuring that the CIF is operational and adequately staffed for field or laboratory observations and that the user will receive quality-controlled data within an agreed-upon timeline following the CIF use. Allowed CIF expenses may include well-justified personnel support for managerial and technical activities, minor repairs and upgrades, and travel for outreach. The cost to operate the CIF for community requests will be funded by NSF separately through individual science proposals by CIF users.

It is expected that the CIF PIs will provide quality-controlled data (including quality assessments, metadata, and supporting ancillary information) to the National Center for Atmospheric Research (NCAR) to enable data access by the broader community. It is anticipated that NCAR will serve as the long-term repository for the data.

It is expected that all instruments and facilities supported through this solicitation already exist. Preference will be given to instruments and facilities that were developed or acquired primarily under NSF funding.

How NSF envisions the provisioning of CIF:

An institution possesses an instrument that it wishes to make available for community use and submits a successful proposal in response to the CIF solicitation. Through a CIF award, NSF provides funding: 1) to maintain the instrument in a state of readiness; 2) for the time involved in managing community inquiries, assessing the feasibility of projects, and providing cost estimates to CIF users; and 3) for outreach costs to highlight the capabilities and availability of the CIF.

Potential scientific users engage the CIF PI to assess availability and suitability of the use of the CIF for the proposed research. The potential user then submits an NSF proposal for the use of the CIF. The NSF user proposal includes the cost of the use of the CIF. NSF reviews the submission and confirms the feasibility of the request. If the user proposal is funded, the CIF PI ensures that required measurements are obtained, and data are made available to the science proposal PI in the agreed-upon timeline and provided to NCAR for long-term data archiving.

CIF Proposal Information:

Specific details on the requirements for the CIF proposal are provided in Section V, under the Proposal Preparation and Submission Instructions. In a broad sense, proposers need to provide a description of the CIF and the science that would be enabled, an estimate of community usage, a plan for engaging the community, and management and operational plans that ensure that the CIF is operational and can be adequately staffed for field or laboratory observations.

Proposers are encouraged to explore innovative outreach efforts to broaden participation of underrepresented groups in experiential learning and to highlight the availability of the CIF to potential users. Examples of requested support could include : 1) short courses or summer institutes focused on engaging representatives of underrepresented groups, (faculty and/or students); 2) partnerships with faculty at minority serving institutions and/or community colleges to make instrumentation available to their students and faculty for courses and research (Letter of Collaboration required); 3) outreach to engage K-12 educators and/or students in field or laboratory studies involving experiential learning using the proposed instrumentation; 4) unique webcasting, social media or other activities to promote awareness of the facilities; and 5) travel to annual conferences of professional societies focused on fostering enhanced diversity in science (e.g., National Association of Black Geoscientists (NABG) -- http://www.nabg-us.org ,Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) -- http://www.sacnas.org , American Indian Science and Engineering Society (AISES) -- http://www.aises.org).

III. AWARD INFORMATION

Anticipated Type of Award: Continuing Grant

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IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.

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In the event that any individual exceeds this limit, any proposal submitted to this solicitation with this individual listed as PI, co-PI, or Senior Personnel after the first proposal is received at NSF will be returned without review. No exceptions will be made.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent *(required)*:

Letters of Intent (LOI) **in response to the initial due date** are required for a planned proposal submission and need to follow the current *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (**NSF 20-1**).

Proposals that are not preceded by a LOI will be **returned without review**. LOIs are used by NSF to help NSF program staff gauge the size and range of the competition, enabling earlier selection and better management of reviewers and panelists, including avoiding potential conflicts of interest in the review process.

The LOI may be up to three pages in length and **must contain the following information**:

1. Proposal Title: This must begin with "CIF:" and follow with an informative title.
2. Name and departmental affiliation of the Principal Investigator (PI).
3. Name(s) and departmental affiliation(s) of the Co-PI(s) and all senior personnel.
4. Synopsis of the proposal that includes a summary of the capabilities and current operational status of the proposed CIF, the need for and anticipated benefit of the CIF to the atmospheric science community, and organization structure.
5. Estimated budget.

For additional information regarding LOI submission please see the PAPPG Chapter I.D.1.

Letter of Intent Preparation Instructions:

When submitting a Letter of Intent through FastLane in response to this Program Solicitation please note the conditions outlined below:

- Submission by an Authorized Organizational Representative (AOR) is required when submitting Letters of Intent.

- Submission of multiple Letters of Intent is not permitted

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

- 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 Proposal & Award Policies & Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@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: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). 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) 292-8134 or by e-mail from nsfpubs@nsf.gov.

See PAPPG Chapter II.C.2 for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the PAPPG instructions.

Proposals must follow the requirements specified in the PAPPG or the NSF Grants.gov Application Guide, except where different instructions are provided below.

Cover Sheet

i. NSF Unit of Consideration - Proposals submitted to this solicitation will be directed to the Lower Atmosphere Observing Facilities (LAOF) program within the Division of Atmospheric and Geospace Sciences (AGS).
ii. Proposal Title - This must begin with "CIF:" and follow with an informative title.

Project Description

In addition to the requirements in the PAPPG, the project description of the CIF proposal should include the following information in clearly delineated sections:

- Description of the CIF: Describe the capabilities, technical specifications, original funding source, expected lifetime, and current operational status.
- Community need and intrinsic merit of the science that will benefit from broader use of the CIF : Explain how the proposed CIF would provide a unique research capability or access to instrumentation not otherwise readily available to the atmospheric sciences community. Elaborate on the potential areas of science that may be advanced using the CIF.
- Management and Operation Plan: Describe how and by whom the requested instrumentation is to be operated and maintained. Include details

regarding user scheduling, decision making procedures, and relevant safety provisions. Provide a financial plan and anticipated schedule for short- and long-term maintenance and operation of the CIF including a detailed breakout of projected user charges. User charges may vary by each use case and should be considered a mix of a recharge rate and the specific costs required to conduct a project (e.g. expendables, personnel time, travel, shipping). Technical support personnel in the department must be described and biosketches for these personnel included as Supplemental Documents. If the functionality and usability of the CIF instrument is significantly reduced during the CIF award period and the cost of repair or replacement is significantly above the cost of routine maintenance, NSF may terminate the award.

- CIF Utilization Plan: Discuss the plan for operating the CIF, including strategies for supporting access to and utilization of the infrastructure by target research communities. Describe how performance as a CIF provider will be measured and evaluated. Provide an example of an external user case, from initial contact by the requestor, to assessment of the feasibility of the request, to the use of the facility, to the provision of the final processed data. Describe the training and technical support available to users of the CIF and the degree to which the CIF could be operated independently by the user science team.

Supplemental Documents:

- Biographical sketches for technical personnel that are not considered Senior Personnel.
- For proposals that require support from the major NSF supported Lower Atmosphere Observing Facilities (LAOF) such as NCAR and University of Wyoming King Air (UWKA), letters of collaboration are required from the AOR of the facility agreeing to provide the needed facility resources described in the proposal. Examples are integration of a community instrument on the research aircraft supported by the LAOF program. Any additional facility-related costs should be clearly explained in the Budget Justification. Proposals requiring support from the major LAOF facilities, but lacking letters of collaboration may be returned without review.
- Letters of Collaboration are **not** allowed except if explicitly required as per the above paragraph.
- **Data Management Plan:** All proposals must describe plans for data management and sharing of the products of research. Investigators are encouraged to reference the AGS data management guidance while drafting their data management plan - https://www.nsf.gov/geo/geo-data-policies/ags/ags-data-mgt-guidance-apr2018.pdf.

  The proposal must describe how data collected during the use of the CIF will be quality controlled and made publicly available, including exclusionary period rules, data access policies, and data support for users of the CIF. Data provided by the CIF must include supporting ancillary information regarding the processing of raw data such as baseline quality control flags, documentation on instrument calibration, metadata, and other ancillary information pertaining to the processing of raw data. It is anticipated that long term data management and archiving will be provided by NCAR.

- **Postdoctoral Researcher Mentoring Plan:** Post-doc support as a primary means to provide facility support is discouraged. However, postdocs may be included on the award if their participation results in significant career growth opportunities. If a postdoc is included, the PIs must submit a postdoctoral researcher mentoring plan. Refer to the PAPPG for guidance on the postdoctoral researcher mentoring plan.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Budget Preparation Instructions:

The budget should be commensurate with the level of additional support needed to maintain the instrument or facility as a CIF. Costs for routine maintenance and minor improvements may be placed in the "Equipment" or "Materials and Supplies" sections, as defined in the **PAPPG**. Travel costs may be requested for supporting outreach efforts. Costs for use of the facility by NSF-supported researchers will be funded separately. Data processing costs should be considered part of the user charge. Proposals should include a budget for each year of support requested, for up to 5 years. Budgets can range from a minimum of $50,000 per year to a maximum award size of $250,000 per year. **Proposals that exceed this maximum will be returned without review.**

Funding provided for the CIF will NOT support:

- New instrumentation costs.
- Major upgrades and/or repairs.
- Construction or renovation of laboratory space.
- Direct costs of maintaining infrastructure or building systems or general-purpose systems or platforms.

C. Due Dates

- **Letter of Intent Due Date(s)** *(required)* (due by 5 p.m. submitter's local time):

  October 21, 2020

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

  December 10, 2020

D. FastLane/Research.gov/Grants.gov Requirements

For Proposals Submitted Via FastLane or Research.gov:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: https://www.fastlane.nsf.gov/a1/newstan.htm. To prepare and submit a proposal via Research.gov, see detailed technical instructions available at: https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html. For FastLane or Research.gov user support, call the FastLane and Research.gov Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov or

rgov@nsf.gov. The FastLane and Research.gov Help Desk answers general technical questions related to the use of the FastLane and Research.gov systems. 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.

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. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: https://www.grants.gov/web/grants/applicants.html. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical 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.

Proposers that submitted via FastLane or Research.gov may use Research.gov to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Building the Future: Investing in Discovery and Innovation - NSF Strategic Plan for Fiscal Years (FY) 2018 – 2022*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

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

A. Merit Review Principles and Criteria

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

1. Merit Review Principles

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

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

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

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

2. Merit Review Criteria

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

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

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

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

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

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

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

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

Additional Solicitation Specific Review Criteria

i. What is the intrinsic merit of the science to be enabled by broader use of the CIF?
ii. To what extent does the proposed CIF provide a unique research capability or access to instrumentation not otherwise available to the atmospheric sciences research community?
iii. Is the plan for supporting community access and utilization well conceived?
iv. How effective is the community outreach plan?
v. Does the operation and management plan adequately describe the ability of the CIF provider to operate and maintain the CIF during the award period?

B. Review and Selection Process

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

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

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

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

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as

confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

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

*These documents may be accessed electronically on NSF's Website at https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

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 no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

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

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

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

VIII. AGENCY CONTACTS

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

General inquiries regarding this program should be made to:

- Shree Mishra, telephone: (703) 292-8521, email: sumishra@nsf.gov

For questions related to the use of FastLane or Research.gov, contact:

- FastLane and Research.gov Help Desk: 1-800-673-6188

  FastLane Help Desk e-mail: fastlane@nsf.gov.

  Research.gov Help Desk e-mail: rgov@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: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on NSF's website.

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

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

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

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.E.6 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.

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> - **For General Information**   (703) 292-5111
>   (NSF Information Center)**:**
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> - **TDD (for the hearing-impaired):**   (703) 292-5090
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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 System of Record Notices, NSF-50, "Principal Investigator/Proposal File and Associated Records," and NSF-51, "Reviewer/Proposal File and Associated Records." 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
Office of the General Counsel
National Science Foundation
Alexandria, VA 22314

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