Facility and Instrumentation Request Process (FIRP)

PROGRAM SOLICITATION
NSF 21-611

National Science Foundation
Directorate for Geosciences
Division of Atmospheric and Geospace Sciences

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

January 17, 2022
January 15, Annually Thereafter
    Track 3 (Field Campaign) Proposals
July 15, 2022
July 15, Annually Thereafter
    Track 3 (Field Campaign) Proposals

Proposals Accepted Anytime beginning October 1, 2021 following the timeline specified in the table in Section II, Program Description
    Track 1 (Education & Outreach) & Track 2 (Single Facility Request)

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 22-1), which is effective for proposals submitted, or due, on or after October 4, 2021.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:
Facility and Instrumentation Request Process (FIRP)

Synopsis of Program:

The Facility and Instrumentation Request Process (FIRP) solicitation describes the mechanism by which the research community can propose projects that require access to instrumentation and facilities sponsored by the Facilities for Atmospheric Research and Education (FARE) Program in the Division of Atmospheric and Geospace Sciences (AGS). FARE provides funding support to a variety of organizations to make specialized instrumentation and facilities available to the atmospheric science research community through the Lower Atmosphere Observing Facilities (LAOF) and the Community Instruments and Facilities (CIF) programs. FIRP allows for parallel evaluation of intellectual merit and broader impacts along with the feasibility of the proposed project.

All research proposals and education and outreach proposals that require the use of FARE-sponsored assets must be submitted through this solicitation. PIs requesting the use of FARE-sponsored facilities for a scientific and/or educational project must follow the guidelines for submission in this solicitation.

The FIRP solicitation offers three proposal submission tracks based on the type and purpose of the request:

- Track 1 - Education and Outreach.
- Track 2 - Single Facility Request.
- Track 3 - Field Campaigns.

Preference for funding will be given to proposals submitted to programs in the Division of Atmospheric and Geospace Sciences in the Geosciences Directorate. If you are planning to submit a proposal to a program outside AGS, including NSF-wide or Directorate-wide solicitations and solicitations released under the NSF 10 Big Ideas, please contact the FARE program director to discuss the timelines, review process, and budget request for the use of FARE assets.
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.

- Subhashree 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: Standard Grant or Continuing Grant

Estimated Number of Awards: 5 to 15

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

Anticipated Funding Amount: $10,000,000 to $20,000,000

Projects awarded under the FIRP solicitation will be funded by a combination of disciplinary science program and FARE program funding. Research proposal costs, such as PI salary, student support, travel and publications, materials and supplies will be funded by the relevant disciplinary science program(s). Field deployment and usage costs for LAOF and CIF will be funded by the FARE program.

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

Eligibility Information

Who May Submit Proposals:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the NSF Proposal & Award Policies & Procedures Guide (PAPPG), Chapter I.E. Unaffiliated individuals are not eligible to submit proposals in response to this solicitation.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

See text in the Project Description for limits on the frequency of Track 1 requests.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- Letters of Intent: Not required
- Preliminary Proposal Submission: Not required
- Full Proposals:

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

- **Full Proposal Deadline(s) (due by 5 p.m. submitter’s local time):**
  - January 17, 2022
  - January 15, Annually Thereafter
    - Track 3 (Field Campaign) Proposals
  - July 15, 2022
  - July 15, Annually Thereafter
    - Track 3 (Field Campaign) Proposals
- **Proposals Accepted Anytime beginning October 1, 2021 following the timeline specified in the table in Section II, Program Description**
  - Track 1 (Education & Outreach) & Track 2 (Single Facility Request)

**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**

To facilitate fundamental research in the atmospheric sciences, the Division of Atmospheric and Geospace Sciences (AGS) supports state-of-the-art instruments and facilities through the Facilities for Atmospheric Research and Education (FARE) Program. The FARE Program includes the Lower Atmosphere Observing Facilities (LAOF) and the Community Instruments and Facilities (CIF), which are described in the Program Description below.

This solicitation describes the process by which Principal Investigators can request access to FARE assets through proposals for research, education, and/or outreach projects. FIRP includes three proposal submission tracks that are based on the type and complexity of the request. Track 1 proposals are small requests for limited field or laboratory activities that are targeted at education and outreach. Track 2 proposals pertain to the use of a single CIF or other...
small facility within the LAOF. Track 3 proposals are for field campaigns that require significant lead time and planning. More details on the distinction between these Tracks is provided in the following section.

FIRP proposals will have two components: a proposal to NSF and a request to the facility provider. Track 1 proposals will describe the education and/or outreach activities that will be conducted with the FARE assets. Track 2 and 3 proposals will be research proposals that describe the use of FARE assets as part of the research plan. All proposals will be required to attach the Facility Request Document as a Supplementary Document as further described in this solicitation.

A major change from prior AGS Field Campaign procedures is the elimination of the Scientific Project Overview (SPO) and Experimental Design Overview (EDO) two-stage process.

II. PROGRAM DESCRIPTION

Observational science (including field and laboratory-based research) is critical to improving understanding of the multitude of processes in the Earth’s atmosphere. Many observations that are essential to unraveling the mysteries of the atmosphere can only be conducted using expensive platforms and/or highly specialized equipment. To facilitate this science, AGS provides access to a variety of specialized instrumentation and facilities that are supported through the Facilities for Atmospheric Research and Education (FARE) program. The suite of instruments and facilities are a combination of major research facilities (known as the Lower Atmosphere Observing Facilities, LAOF) supported through the National Center for Atmospheric Research and the University of Wyoming, and facilities funded through the Community Instruments and Facilities (CIF) solicitation NSF 20-596. The instruments and facilities that may be requested through the Facility and Instrumentation Request Process (FIRP) solicitation are listed at the following website: https://www.nsf.gov/geo/ags/programs/fare/

Please note that the FIRP list will be updated as new CIF awards are made. The list provides the names of FARE-sponsored facilities and the facility provider or point of contact (POC) for each LAOF/CIF.

The intent of the FIRP solicitation is to describe the mechanism by which the atmospheric science community can request the use of instrumentation and facilities that are sponsored by the FARE program.

Institutions without significant observational capabilities, primarily undergraduate institutions, minority serving institutions, and community colleges are especially encouraged to apply to the FIRP. For all three Tracks, proposers are encouraged to explore innovative outreach efforts to broaden participation of underrepresented groups in experiential learning.

Submission Tracks

The FIRP solicitation consists of three Tracks for requesting NSF-sponsored instrumentation and facilities. These Tracks are primarily based on the complexity of the request and determine the timelines and procedures that should be used to request AGS-sponsored facilities and instrumentation. The Tracks are described next, and the instructions for submission under each Track follow. If there are any questions about which Track you should be submitting under, please contact the FARE program director as early as possible.

Proposals for Track 1 should select the FARE program as the Unit of Consideration. Track 2 and 3 should select the relevant science program(s) as the Unit of Consideration.

Track 1 (Education and Outreach): Track 1 proposals are requests for limited field or laboratory activities that are targeted at education and outreach. Track 1 proposals must include educational activities in formal and informal settings that are based on state-of-the-art pedagogical knowledge aimed at providing hands-on student training in field or laboratory based observational research, and/or provide significant public outreach through coordinated events. The total proposal cost must be under $50,000.

An exception to the $50,000 cap is allowed for aircraft-based educational deployments using the Wyoming King Air, and the NCAR-operated C-130 and G-V. Track 1 requests for the C-130 and GV may only be made in conjunction with an already-funded field campaign or planned test flights. Stand-alone Track 1 requests may be requested with the Wyoming King Air after consultation with the FARE program director.

PIs of funded field campaigns should include education and outreach in their original plans and not rely on Track 1 proposals to augment the campaign. The focus of Track 1 proposals must be on education and outreach; projects with substantial research components should be submitted under Track 2 or Track 3.

Track 2 (Single Facility Request): Track 2 proposals are for domestic research projects that require a single CIF or LAOF facility. Small international collaborations with straightforward deployment requests may be requested for Track 2. PIs must consult with the FARE program director if an international deployment is requested under Track 2.

Deployments including aircraft or a network of instruments, or multi-year deployments, are not eligible under Track 2. Examples of Track 2 activities include the use of laboratory-based equipment or a single mobile radar/lidar facility.

Track 3 (Field Campaigns): Track 3 proposals are for the deployment of major LAOF such as aircraft or a combination of multiple LAOF or CIF. A proposal for a coordinated research campaign will fall under Track 3. Examples of Track 3 activities include research aircraft-based deployments, coordinated mobile remote sensing studies, and deployment of observing networks.

Proposal timelines and process

Track 1 (Education and Outreach):

Statements of Interest (SoI) are recommended, but not required. Please follow the SoI instructions below.

Track 1 proposals should be submitted between 9 and 12 months prior to the start of the education and/or outreach activity, or at least 12 months prior to the start of the activity for aircraft-based proposals. If a Track 1 aircraft-based proposal intends to coordinate activities with a funded field deployment, the PIs must notify the FARE program director as soon as possible to allow enough time for coordination and planning.

Track 1 PIs should engage with the relevant Facility Provider listed on the FARE webpage during the proposal preparation process to ascertain facility availability and suitability for a Track 1 proposal. The Track 1 PI will submit a request for the use of the Facility to the Facility Provider with a copy to the FARE
program director. The Facility Provider will be expected to provide a Facility Request Document with a Subaward budget that will be used in the Track 1 proposal. The Facility Request Document must be uploaded to the proposal as a Supplementary Document.

Track 1 proposals should be submitted to the FIRP Solicitation with FARE (1529) as the Unit of Consideration. Further guidance on proposal preparation is provided in Section V of this solicitation.

Track 2 (Single Facility Request):

If there is any ambiguity about whether a project belongs in Track 2, please contact the FARE Program Director on the same 24-month timeline as Track 3 (below). If a Track 2 proposal is submitted and NSF determines that it belongs in Track 3, it will be Returned Without Review (RWR).

PIs are required to submit a Sol via email to the FARE Program Director, with a copy to the relevant science Program Director, at least 15 months prior to the start of the research activity (not the proposed start date of the proposal). NSF will provide an email to the PI with the deadline information, and this email must be uploaded as a document entitled "FIRP – Program Officer Concurrence Email" in the Supplementary Documentation section.

Please follow the Sol instructions below.

Track 2 proposals should be submitted between 9 and 15 months prior to the start of the research activity.

Track 2 PIs should engage with the Facility Provider during the proposal preparation process to ascertain the facility availability and suitability for the proposed research. The Track 2 PI will submit a request for the use of the Facility to the Facility Provider and send a copy to the FARE program director. The Facility Provider will be expected to provide a Subaward budget and a Facility Request Document that can be used in the NSF proposal. The Facility Request Document must be uploaded to the proposal as a Supplementary Document.

Track 2 proposals should be submitted to the FIRP Solicitation with the most relevant science program as the Unit of Consideration. Further guidance on proposal preparation is provided in Section V of this solicitation.

Track 3 (Field Campaign):

PIs are encouraged to provide a Sol as soon as plans reach a mature stage and are required to submit the Sol no later than 24 months prior to the start of the research activity (not the proposed start date of the proposal). Instructions for the Sol follow this section.

Track 3 proposals have two submission timeframes, based upon the complexity of the facility deployment. Complexity of deployment is correlated with the lead time required to conduct the field campaign, which depends on the location of the project, the type of resource(s) required, the level of instrument integration needed, and the amount of interagency or international collaboration. NSF, in consultation with the facility provider(s), will determine the required deadline.

- Activities that are deemed “straightforward” will use the submission deadline that is between 15 and 21 months in advance of the campaign start date.
- Activities that are deemed “complex” will use the submission deadline that is between 18 and 24 months in advance of the start date.

As an example, an international field campaign using a research aircraft starting in June 2025 would be considered complex and would use the deadline between 18 and 24 months prior to the field campaign – July 15th, 2023.

NSF will provide an email to the PI with the deadline information, and this email must be uploaded as a document entitled "FIRP – Program Officer Concurrence Email" in the Supplementary Documentation section.

Track 3 research proposals should be submitted to the FIRP Solicitation with the most relevant science program as the Unit of Consideration. Further guidance on proposal preparation is provided in Section V of this solicitation.

Track 3 projects must be submitted as a single NSF proposal with subawards to collaborating institutions. Collaborative proposals or a package of individual proposals are prohibited.

Track 3 Facility Requests will be required to go through the Observing Facilities Assessment Panel (OFAP) process. This is an assessment of the feasibility of the experimental design by the facility providers that is managed by the National Center for Atmospheric Research’s Earth Observing Laboratory (NCAR EOL) and is NOT an assessment of the scientific merit of the project. At the end of the OFAP process, NSF will receive a document that describes the OFAP feasibility assessment. Track 3 PIs should submit the Facility Request through EOL’s Project Requests Online (PRESTO) system on the same timeline as the proposal submission to NSF. The PRESTO Facility Request form must be uploaded to the NSF research proposal as a Supplementary Document.

Statement of Interest (Sol) guideline:

The Sol should be no longer than 3 pages and must contain the following information.

- Project title;
- Names and affiliations of PIs, Co-PIs, and Senior Personnel;
- Requested dates for the deployment or desired deployment timeline;
- Summary of the proposed activity and the scientific objectives;
- List of Facilities requested along with the anticipated deployment dates and location;
- A rough order of magnitude total project budget estimate, exclusive of CIF and LAOF costs;
- Expected involvement of other funding agencies, whether domestic or international.
- The SOI must be emailed to the FARE Program Director on the timelines indicated above.

Summary of solicitation requirements:

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<tr>
<th></th>
<th>Track 1 - Standard Request</th>
<th>Track 1 - Aircraft Request</th>
<th>Track 2</th>
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<td>Description of integration with existing flight campaign (NCAR aircraft only)</td>
<td>Management Plan</td>
<td>Management Plan and Science Traceability Matrix</td>
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<td>Review of facility request</td>
<td>Within proposal review</td>
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<td>Within proposal review and at OFAP</td>
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### III. AWARD INFORMATION

**Anticipated Type of Award:** Standard Grant or Continuing Grant

**Estimated Number of Awards:** 5 to 15

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

**Anticipated Funding Amount:** $10,000,000 to $20,000,000

Projects awarded under the FIRP solicitation will be funded by a combination of disciplinary science program and FARE program funding. Research proposal costs, such as PI salary, student support, travel and publications, materials and supplies will be funded by the relevant disciplinary science program(s). Field deployment and usage costs for LAOF and CIF will be funded by the FARE program.

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

### IV. ELIGIBILITY INFORMATION

**Who May Submit Proposals:**

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), Chapter I.E. Unaffiliated individuals are not eligible to submit proposals in response to this solicitation.

**Who May Serve as PI:**

There are no restrictions or limits.

**Limit on Number of Proposals per Organization:**

There are no restrictions or limits.

**Limit on Number of Proposals per PI or co-PI:**

See text in the Project Description for limits on the frequency of Track 1 requests.
V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

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.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via FastLane. PAPPG Chapter II.D.3 provides additional information on collaborative proposals.

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.

FIRP proposals must follow the requirements specified in the NSF Proposal and Award Policies and Procedures Guide (PAPPG), except where different instructions are provided below.

Cover Sheet

- NSF Unit of Consideration.

Track 1 proposals: Select 1529 – Facilities for Atmospheric Research and Education (FARE) program as the Unit of Consideration.

Track 2 and 3 proposals: Select the most relevant science program as the Unit of Consideration. Grants.gov users should refer to Section VI.1.2. of the NSF Grants.gov Application Guide for specific instructions on how to designate the NSF Unit of Consideration. For assistance in determining which program(s) to choose, refer to the NSF Guide to Programs, which provides descriptions of NSF research-supporting programs.

Project Title. The project title must begin with “AGS-FIRP Track 1:“ or “AGS-FIRP Track 2:” or “AGS-FIRP Track 3:” and follow with an informative title.

Project Description:

Deviations from the PAPPG and expected additional information are discussed below. The project description should provide a strong scientific and/or education/outreach justification for the use of the FARE assets.

Track 1 Proposals:

- The Project Description is limited to 5 pages.
- The proposal should describe the education or outreach activity that will be conducted, the integration with existing or planned activities, and a rough estimate of the number of people that will participate in the education or outreach activities using a FARE-sponsored facility.
- If a PI has had a Track 1 award with a particular facility, they cannot submit another Track 1 proposal requesting the same facility within 3 years of the start date of the previously awarded Track 1 proposal.

Track 2 Proposals:

- Track 2 proposals must follow normal guidelines for NSF proposals as described in the NSF PAPPG.
- The 15-page Project Description should describe the project to be conducted as well as the role and method of use of the FARE assets.

Track 3 Proposals:

- Track 3 Project Descriptions are limited to 20 pages in length.
- The Project Description should present an integrated plan that discusses how the research will be conducted, including a description of the experimental techniques, and the distribution and use of observing systems and platforms, efforts for education, outreach and plans for addressing diversity, equity, and inclusion (DEI). Additionally, the PI should state and justify the optimal time frame for field operations.
- The Project Description must contain a section on results from any field campaign that has focused on the same and/or similar topic(s), including campaigns conducted by other researchers and groups.

Budget:

Track 1: Track 1 proposals are limited to $50,000 with the exception of airborne deployments. Costs related to PI/Personnel time for planning, outreach and time spent during the deployment are limited to 25% of the total budget. Proposals for CIF should include the facility usage costs as a subaward. Proposals for LAOF should include the budget estimate provided by the facility manager as a Supplementary Document. The proposal funding limit is inclusive of all costs to conduct
the project. Proposers are encouraged to explore innovative outreach efforts to broaden participation of underrepresented groups in experiential learning and may request funds to cover such activities. Travel costs may be requested for supporting outreach efforts. **Collaborative proposals are allowed for Track 1 projects.**

Track 2 and Track 3: There are no funding limits, though the PI is encouraged to engage with the FARE program director and relevant science program director regarding the scope of the project. Facility usage costs for CIF will be included as subaward(s). Facility usage costs for LAOF will be estimated by the facility manager for the requested facility and need to be included as a supplementary document. **Track 2 proposals can be collaborative. Collaborative proposals are not allowed for Track 3 projects. Costs for the participation of collaborating institutions for Track 3 should be included as subawards.**

Note: Proposal types such as RAPIDs, EAGERs, or proposals to cross-directorate solicitations, should include the cost of the facility use within that funding cap. If there is any uncertainty, please contact the FARE Program Director.

**Special Information & Supplementary Documents:**

The following documents are required for each Track.

**Track 1:**
- A copy of the Facility Request submitted to the facility provider.
- If the educational and outreach request is for a research aircraft, the PI must provide a supplemental document of up to 3 pages describing the “target of opportunity” flight(s) and the plan for integration with the existing field campaign or test flights.
- For LAOF requests, the budget must be included as a supplemental document.

**Track 2:**
- A copy of the Facility Request submitted to the facility provider.
- Management Plan of up to two pages is required. The Management Plan should discuss specific factors related to the use of the FARE-supported facility, such as who will operate the instruments and the expected data availability (e.g., timeline and what constitutes a finished product).
- An email regarding the submission deadline must be uploaded as a document entitled “FIRP – Program Officer Concurrence Email” in the Supplementary Documentation section of FastLane.
- For LAOF requests, the LAOF budget must be included as a supplemental document.

**Track 3:**
- A copy of the Facility Request submitted through the NCAR EOL PRESTO system.
- In 5 pages or less, provide a Management Plan and a Science Traceability Matrix. The Management Plan should include, but not be limited to, discussion of the management structure for the campaign, how deployment decisions will be made, potential integration with other observations, instrument operation, and expected data availability timeline (not to exceed one year from the date of completion of the field deployment).
- Roles and Responsibilities document – For all campaigns with 2 or more subawards, each institution must provide a document of up to 2 pages in length detailing the specific role of each institution, who is involved in the project, what instruments they will operate (if any), and what they individually expect to accomplish.
- An email regarding the submission deadline must be uploaded as a document entitled “FIRP – Program Officer Concurrence Email” in the Supplementary Documentation section of FastLane.
- For LAOF requests, the budget must be included as a supplemental document.

**Data Management Plan:** All proposals must describe plans for data management and sharing of the products of research. PIs must submit data obtained using FARE assets to NCAR for archiving, no later than 1 year from the date of completion of the project. Data archiving at NCAR will be provided via NCAR-hosted Geoscience Data Exchange for NSF (GDEX) and emails regarding data archiving can be directed to gdex@ucar.edu. If extenuating circumstances require an extension to the 1-year deadline, a request for extension must be sent to the FARE program director. 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/index.jsp](https://www.nsf.gov/geo/geo-data-policies/ags/index.jsp)

FIRP proposals, in the data management plan, must describe how data collected during the field deployment or use of the CIF/LAOF will be quality controlled and made publicly available, including exclusionary period rules, data access policies, and supplementary documents such as readme files to remove barriers to data usage by scientists and students who were not part of the field deployment or user team.

It is anticipated that long term data management and archiving for proposals funded by this solicitation will be provided by NCAR. Data provided to NCAR forarchiving must include supporting ancillary information regarding the processing of raw data such as baseline quality control flags, documentation on instrument calibration, metadata, and other necessary information pertaining to the processing of raw data. Data submitted for archiving must be accompanied by a "Readme" file. This file must contain adequate information that permits collaborators and other analysts to understand any limitations or special characteristics of the data that may impact its use. This data set documentation must accompany all data set submissions, including both preliminary and final.

**B. Budgetary Information**

Inclusion of voluntary committed cost sharing is prohibited.

**C. Due Dates**

- **Full Proposal Deadline(s) (due by 5 p.m. submitter’s local time):**
  - January 17, 2022
  - January 15, Annually Thereafter

- **Track 3 (Field Campaign) Proposals**
the programs, projects, and activities it considers and supports. 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 NSF's mission calls for the broadening of opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in 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 support 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 other underrepresented groups 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

Track 1 requests:

1. To what extent does the project provide a unique learning experience?
2. Does the proposed project significantly benefit the intended audience?
3. Is the intended audience well integrated into the field campaign activities (e.g. field campaign or other scientifically relevant efforts related to the deployment? Are the proposed educational activities and/or community outreach plans based on state-of-the-art pedagogic practices?
4. Are there well-defined project goals and metrics to assess the success of the proposed request?
5. Does the proposal present innovative outreach efforts to broaden participation of underrepresented groups in experiential learning?

Track 2 and Track 3 requests:

1. Is the proposed field deployment well-aligned with the science objectives?
2. Is the integration of the various components of the deployment request well-conceived? This includes, but is not limited to, integration of efforts across platforms, institutions and PIs, and planning for joint data analyses.
3. Are each of the instruments requested critical to achieving the objectives of the project?

**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. Proponents 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.


**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.

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:

- Subhashree 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.

ABOUT THE NATIONAL SCIENCE FOUNDATION

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

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

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

Facilitation Awards for Scientists and Engineers with Disabilities (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.

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 https://www.nsf.gov
• Location: 2415 Eisenhower Avenue, Alexandria, VA 22314

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

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

• To Order Publications or Forms:
  Send an e-mail to: nsfpubs@nsf.gov
  or telephone: (703) 292-8134

• 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 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
Policy Office, Division of Institution and Award Support
Office of Budget, Finance, and Award Management
National Science Foundation
Alexandria, VA 22314