

NATIONAL SCIENCE FOUNDATION MAJOR FACILITIES GUIDE,
OMB Clearance No. 3145-0239

Part A. Justification

1. **Background.** The National Science Foundation Act of 1950 (Public Law 81-507) sets forth NSF's mission and purpose:

“To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense....”

The Act authorized and directed NSF to initiate and support:

- basic scientific research and research fundamental to the engineering process,
- programs to strengthen scientific and engineering research potential,
- science and engineering education programs at all levels and in all the various fields of science and engineering,
- programs that provide a source of information for policy formulation, and other activities to promote these ends.

Among Federal agencies, NSF is a leader in providing the academic community with advanced instrumentation needed to conduct state-of-the-art research and to educate the next generation of scientists, engineers and technical workers. The knowledge generated by these tools sustains U.S. leadership in science and engineering (S&E) to drive the U.S. economy and secure the future. NSF’s responsibility is to ensure that the research and education communities have access to these resources, and to provide the support needed to utilize them optimally and implement timely upgrades.

The scale of advanced instrumentation ranges from small research instruments to shared resources or facilities that can be used by entire communities. The demand for such instrumentation is very high, and is growing rapidly, along with the pace of discovery. For major facilities and shared infrastructure, the need is particularly high. This trend is expected to accelerate in the future as increasing numbers of researchers and educators rely on such major facilities, instruments, and databases to provide the reach to make the next intellectual leaps.

NSF currently provides support for facility construction from two accounts: The Major Research Equipment and Facility Construction (MREFC) account, and the Research and Related Activities (R&RA) account. The MREFC account, established in FY 1995, is a separate budget line item that provides an agency-wide mechanism, permitting directorates to undertake major facility projects greater than \$100M and mid-scale research infrastructure projects between \$20M and \$100M. Smaller mid-scale and research instrumentation projects continue to be supported from the R&RA Account.

Facilities are defined as shared-use infrastructure, instrumentation and equipment that are accessible to a broad community of researchers and/or educators. Facilities may be centralized or may consist of distributed installations. They may incorporate large-scale networking or computational infrastructure, multi-user instruments or networks of such instruments, or other infrastructure, instrumentation and equipment having a major impact on a broad segment of a scientific or engineering discipline. Historically, awards have been made for such diverse projects as accelerators, telescopes, research vessels and aircraft, and geographically distributed but networked sensors and instrumentation.

The growth and diversification of major facility projects require that NSF remain attentive to the ever-changing issues and challenges inherent in their planning, construction, operation, management and oversight. Most importantly, dedicated, competent NSF and awardee staff is needed to manage and oversee these projects; giving the attention and oversight that good practice dictates and that proper accountability to taxpayers and Congress demands. To this end, there is also a need for consistent, documented requirements and procedures to be understood and used by NSF program managers and awardees for all such major projects.

The *Major Facilities Guide* (MFG) is comprised of documents specifically relating to the Foundation's management and oversight of the design, construction, and operations of major scientific facilities. The MFG is designed for use by both our customer community and NSF staff and supplements the NSF Proposal & Award Policies and Procedures Guide (PAPPG) for the purpose of providing detailed guidance regarding NSF management and oversight of major facilities.

A revised version of the *NSF Major Facilities Guide* (including a listing of Significant Changes), effective July 2021 is included as **Exhibit 1** to this Supporting Statement

2. Use of Information.

Facilities are an essential part of the science and engineering enterprise, and supporting them is one major responsibility of the National Science Foundation (NSF). NSF makes awards to external entities—primarily universities, consortia of universities or non-profit organizations—to undertake construction, management and operation of facilities. Such awards frequently take the form of cooperative agreements. NSF does not directly construct or operate the facilities it supports. However, NSF retains responsibility for overseeing their development, management and successful performance.

The Major Facilities Guide is intended to:

- Provide step-by-step guidance for NSF staff and awardees to carry out effective project planning, management and oversight of major facilities while considering the varying requirements of a diverse portfolio;
- Clearly state the policies, processes and procedures pertinent at each stage of a facility's life cycle from development through construction, operations, and divestment; and
- Document and disseminate “good practices” identified over time so that NSF and awardees can carry out their responsibilities more effectively.

This version of the *Major Facilities Guide* reflects new legislation applicable to major facilities, NSF's expectations for construction schedules for alignment with good practices, minimum competencies for project personnel, and guidance on the content of Segregation of Funding Plans and how to scale earned value management systems (EVMS). The *Guide* does not replace existing formal procedures required for all NSF awards, which are described in the Proposal & Award Policies & Procedures Guide (PAPPG). Instead, it draws upon and supplements it for the purpose of providing detailed guidance on NSF policy and procedures related to the planning and oversight of major facilities and mid-scale projects. All facilities projects require merit and technical review, as well as approval of certain deliverables. The level of review and approval varies substantially from standard grants, as does the level of oversight needed to ensure appropriate and proper accountability for federal funds. The requirements, recommended procedures and good practices presented in the *Guide* apply to any facility significant enough to require close and substantial interaction with the Foundation and the National Science Board.

This *Guide* will be updated periodically to reflect changes in requirements, policies and/or procedures. Award Recipients are expected to monitor and adopt the requirements and best practices included in the *Guide* which are aimed at improving management and oversight of major facilities and mid-scale projects and at enabling the most efficient and cost-effective delivery of tools to the research and education communities.

The submission of proposals and subsequent project documentation to the Foundation related to the development, construction and operations of major facilities is part of the collection of information. This information is used to help NSF fulfill this responsibility in supporting merit-based research and education projects in all the scientific and engineering disciplines. The Foundation also has continuing commitment to provide oversight on facilities development and construction which must be balanced against monitoring its information collection so as to identify and address any excessive reporting burdens. NSF has approximately thirty-seven (37) major facilities in various stages of development, construction, operations and termination. Facilities undergoing a major upgrade may be classified in both design or construction and operations at the same time. Two to four (2 to 4) new awards are made approximately every five (5) years based on science community infrastructure needs and availability of funding. Among the twenty-two major facilities, there are approximately seven (7) facilities annually that are either in development or construction. These stages require the highest level of reporting and management documentation per the *Major Facilities Guide*. NSF estimates there will be twelve (12) mid-scale projects in progress at a given time.

3. Use of Automation.

All collected data is submitted electronically either through the NSF FastLane System or through two modernized systems that are replacing FastLane: Grant.gov and Research.gov.

The NSF FastLane System uses internet/web technology to facilitate the way NSF does business with the research, education, and related communities. All FastLane functions are accessed by using a web browser on the internet. FastLane modules are used for the following interactions between NSF and the science and engineering research and education community:

- communicate the Foundation's strategic priorities to proposer and awardee communities;
- proposal preparation & submission, including electronic signatures;
- proposal reviews;
- panel travel initiation;
- panel electronic funds transfer information;
- interactive panel system for panel meetings (including proposal ranking and submission and approval of panel summaries);
- proposal and award status inquiries (proposal status includes release of reviews to PIs and co-PIs);
- revised proposal budget preparation and submission;
- supplemental funding request preparation and submission including electronic signatures;
- access to award letters for use by PIs, Co-PIs, and Sponsored Project Offices;
- post award administrative notifications and requests for NSF approval;
- organizational management; and
- review and/or revision of organizational information.

Grants.gov also provides a common Website to simplify competitive discretionary grant management and eliminate redundancies for federal grants. There are 26 Federal grant-making agencies, including state, local and tribal governments, academia and research institutions, and not-for-profits. Since the inception of Grants.gov, NSF has been an active partner in Federal-wide electronic grant efforts. NSF continues to work with representatives from Federal research agencies under the auspices of the Research and Related subcommittee, to maintain and update the SF 424 (R&R), a standardized application for use with research and research-related proposals. NSF continues this leadership role by participating in various committees of the Council on Financial Assistance Reform (COFAR).

Proposers are authorized to submit proposals to NSF via either Grants.gov or the NSF FastLane system. Until such a time, however, as Grants.gov is able to accept all types of NSF proposal formats through the Grants.gov portal, a separately cleared application format for use by NSF applicants remains necessary.

Research.gov is NSF's grants management system that provides easy access to research-related information and grants management services in one location. Research.gov is the modernization of FastLane, providing the next generation of grants management capabilities for the research community.

In March 2013, NSF transferred all project reporting from FastLane to Research.gov. NSF awardee institutions also must use Research.gov to access all online financial services required for grants management, thus eliminating the quarterly Federal Financial Reports.

4. Efforts to Identify Duplication.

No duplication exists since no other federal agency collects data pertaining to these NSF facilities.

5. **Small Business Considerations.** Not applicable.

6. **Consequences of Less Frequent Collection.**

NSF requires periodic reporting and reviews on facility status throughout the facility life cycle. The *Major Facilities Guide* contains requirements and guidance on the type and frequency of reports and reviews, which can vary significantly with the life cycle stage and with the unique details of each major facility. All status and review reports are collected electronically. The frequency of collection of information is at a level that allows NSF to be good stewards for funding and managing awards,

Materials related to proposal submission for funding awards are collected per the process described in the *NSF Proposal and Award Policies and Procedure Guide* (PAPPG).

7. **Collection Inconsistent with Guidelines in 5 CFR 1320.6.**

There are no inconsistencies with 5 CFR 1320.6.

8. **Federal Register Notice.**

Public Notice for the *Major Facilities Guide* was published in the Federal Register on February 2, 2021, at 86 FR 7884, and 22 comments were received from five sources. A summary of the comments received in response to NSF's request for public comment on the *Major Facilities Guide* is as follows:

- 7 requested clarifications and content regarding the fourth pillar, Mission Alignment, of information security programs for major facility cybersecurity programs;
- 12 requested clarifications and updates on the processes and requirements associated with NSF oversight of the various stages of the facility lifecycle; and
- 3 requested clarifications regarding NSF "No Cost Overrun" Policy and budget contingency for the construction stage of major facility projects.

Exhibit 2 contains the full text of the comments received in response to the Federal Register Notice and the associated NSF response.

Outside Consultation.

The policies and guidelines for management and oversight of awards related to major facilities have been developed over many years, with assistance from many external sources. These sources include other Federal agencies and industry experts with expertise in areas applicable to the unique facilities under NSF awards, as well as proposing organizations.

Additionally, a large percentage of NSF program officers, who are responsible for making funding recommendations, are from the research community. These individuals bring

experience and practical knowledge of constructing and operating NSF facilities and have provided significant input on how the guide materials can be improved.

9. **Gifts or Remuneration.** Not applicable.

10./11. **Confidentiality/Sensitive Questions.** Not Applicable.

12. **Burden on the Public.**

The Foundation estimates that approximately five (5) Full Time Equivalents (FTEs) are necessary for each major facility project in design or construction to respond to NSF performance and financial reporting and project management documentation requirements on an annual basis; or 10,400 hours per year. The Foundation estimates approximately one and half (1.5) FTE for a major facility in operations to respond to NSF performance and financial reporting on an annual basis; or 3,120 hours per year. For mid-scale projects, the Foundation estimates approximately one (1) Full Time Equivalent (FTEs) is necessary for each mid-scale project to respond to NSF project management documentation requirements on an annual basis; or 2,080 hours per year. With seven (7) major facilities in design or construction (72,800 annual burden hours), eighteen (18) in operations (56,160 annual burden hours) and twelve (12) mid-scale projects (24,960 hours), this equates to roughly 153,920 public burden hours annually.

13. **Annualized Cost to Respondents.**

The cost to respondents varies by the type and amount of each agreement written, and will be the equivalent of a full-time associate professor, roughly \$100,000 per year.

14. **Annualized Cost to the Federal Government.**

The cost estimate for development of the updated NSF *Major Facilities Guide*, which we anticipate will be issued in November 2021, is \$191,600. The main method of accessing and printing this new Guide will be via download from the NSF website. The Foundation will print a limited number of copies at our in-house printing facility at a cost of \$2,860. The following supporting documentation is the basis used to develop the estimate of the cost to gather information, develop, coordinate and review the Guide. Individuals and/or offices instrumental in this process were polled to determine the staff estimates used.

Office of Budget, Finance & Award Management (BFA)

LF Office Head	1 month x SES = \$20,000
LF Office Staff combined	10 months x GS-15 (avg.) = \$145,000
CSB Staff combined	1 week x GS-14 (avg.) = \$3,000

Total BFA salaries = \$168,000

Program Directorates

BIO, GEO, MPS, ENG Staff Combined	7 days x AD-5 = \$5,000
CISE Staff combined	2 days x AD-5 = \$1,400

Total Salaries: \$174,400

Contractor Services

150 hours at an estimated cost of \$14,000

Estimated printing costs: \$0.20 per page x 320-page document x 50 copies = \$3,200

15. **Changes in Burden.** The burden rose because there are more mid-scale facilities in operation than in the prior request. The burden time remains the same.

16. **Publication of Collection.** Not applicable.

17. **OMB Expiration Date.** Not applicable.

18. **Exceptions for Certifications.** Not applicable.

B. **STATISTICAL METHODS.** Not applicable.

DATA COLLECTION INSTRUMENT, INCLUDING CORRESPONDING INSTRUCTIONS

See Exhibit 1

ATTACHMENTS:

National Science Foundation Act of 1950 (Public Law 81-507)

EXHIBITS:

Exhibit 1: Revised version of the *NSF Major Facilities Guide*, Effective July 2021

Exhibit 2: Public Comments Received on the *NSF Major Facilities Guide* along with associated NSF response.