

PROPOSAL MANAGEMENT EFFICIENCIES

Overview

The merit review process is one of NSF's critical business functions. Effective merit review recognizes high-quality research, including high-risk, high-reward or potentially transformative ideas, empowers NSF to support such proposals, and retains the confidence and trust of NSF's external stakeholders. NSF's current approach to merit review relies on NSF staff making funding recommendations advised by *ad hoc* (mail) and panel review. This process is time-and resource-intensive.

NSF's merit-review programs face extraordinary pressures as proposal numbers grow. Competition for funding has increased significantly. Between 1999 and 2012, the number of full and preliminary proposals evaluated increased by 79 percent, and funding rates dropped from 32 percent to 24 percent¹. Additionally, workload has increased for researchers, reviewers, and NSF staff. These systemic stresses may be prompting some researchers to submit fewer innovative ideas. The workload of panel reviewers and the travel time involved means that some experts are reluctant or unable to serve on review panels held at NSF. The growth in the number of review panels led to a steady growth of nine percent per year, between FY 2007 and FY 2011, in NSF's travel-related obligations. In FY 2011, the direct cost to NSF of holding face-to-face panels, excluding salary, was over \$38 million. Through the implementation of a pilot program of expanded use of virtual panels and increased use of non-refundable tickets, this was reduced to under \$33 million in FY 2012. To mitigate some of the stresses on NSF's merit review system, a number of critical investments, described below, have been identified.

Total Funding for Proposal Management Efficiencies

(Dollars in Millions)

FY 2013 Actual	FY 2014 Estimate	FY 2015 Request
-	\$2.53	\$9.12

Goals

The goals of NSF's Proposal Management Efficiencies activities are:

- Reduce the amount of staff time, per proposal, required to conduct merit review;
- Reduce the average time burden placed on individual reviewers;
- Reduce the per-proposal cost of the review process;
- Increase the number of qualified individuals who participate in the review process; and
- Improve the ability of institutions to submit successful proposals.

Approach

An NSF-wide working group looked at the merit review processes used by other research funding agencies, discussed the benefits and drawbacks of different possible approaches with researchers and university administrators on numerous NSF Advisory Committees, talked with reviewers, and consulted with the National Science Board (NSB). Based on this, NSF determined that significant improvements in workload and cost could be achieved. In addition, NSF determined that the aging technologies that NSF uses to support its merit review processes constitute a risk to one of NSF's critical lines of business. A

¹ Sources: Reports to the National Science Board on NSF's Merit Review Process, FYs 2001 (NSB 02-21, www.nsf.gov/nsb/documents/2002/nsb0221/nsb0221.pdf - for FY 1999 data) and 2012 (NSB 13-33, www.nsf.gov/nsb/publications/2013/nsb1333.pdf). In FY 1999, 29,957 full or preliminary proposals were competitively reviewed; in FY 2012, the number was 53,748.

Proposal Management Efficiencies

plan was devised to invest in information and communications technology, personnel, and increased use of automation, training, and outreach to institutions. The principal components of this plan are:

- **Virtual Meeting Technologies:** Provision of personnel and infrastructure to support much greater use of virtual meeting technologies for review panels. This supports Goals 2, 3, and 4.
- **Review Management Support:** Deployment of a more capable infrastructure to support the identification, selection, and recruitment of reviewers and to manage the receipt of reviews. This supports Goals 1 and 4.
- **Automated Preliminary Processing:** Increase use of automation in the preliminary processing of proposals for compliance to standards. This supports Goal 1 and 5.
- **Demand Management:** Outreach to individual institutions to help increase proposal success rates and reduce the submission of non-competitive proposals. This supports Goal 5.

The efforts to further improve the management of NSF's merit review process are led by staff within the Office of International and Integrative Activities in collaboration with staff in the research directorates, the Office of Information and Resource Management, and the Office of Budget, Finance, and Award Management.

Virtual Meeting Technologies

The predominant review method used has become the review panel, convened at NSF, where a set of experts assemble to evaluate proposals. Beginning in FY 2012, NSF has experimented with increasing its use of virtual meeting technologies to hold synchronous review panels. Methods have included teleconferences, commercial video-conferencing technologies, and "virtual world" software. This investment continues NSF's expanded use of virtual review panels and will restrain travel costs associated with the panels, broaden the range of reviewers participating in panels, and reduce the average workload of individual reviewers. The investment includes:

- Infrastructure to enable NSF to conduct a significant fraction of review panels as virtual panels;
- Implementation of online training for moderators and reviewers; and
- Collection of feedback from participants to continually improve the efficacy of virtual panels.

Review Management Support

This multi-year investment aims to reduce the NSF staff time used in identifying potential reviewers and communicating with reviewers, and to improve the return rate for *ad hoc* reviews. Beginning in FY 2015, NSF will replace outdated and expensive client-server technology with modern, web-based technology. In addition, pilot studies will be held to investigate the best way to make the following set of enhancements to NSF's eBusiness systems:

- Develop and deploy a more sophisticated database of reviewers with enhanced search features;
- Enhance Research.gov so that researchers and other experts can volunteer online to serve as reviewers;
- Enhance tools to identify possible reviewers to include automatic suggestions of potential reviewers based on matching key criteria such as proposal topics, reviewer expertise, and review history;
- Deploy an automated tool that flags potential conflicts of interest; and
- Add an eBusiness system module that tracks review requests and responses, and that automatically sends reminders about outstanding requests to reviewers and NSF staff.

Increased Automation of the Preliminary Processing of Proposals

Although NSF's current online submission system performs some automatic checks of the structure and content of submitted proposals, many of the proposal preparation requirements are not automatically checked. NSF staff manually checks proposals for compliance, detracting from the time available for other parts of the merit review process. In the future, NSF will ameliorate this situation by deploying an enhanced automated compliance checker. This will involve:

- Revision of proposal preparation criteria to simplify implementation as business rules in an automated, rule-based compliance checking system;
- Requirements definition, development, testing, and initial deployment of the expanded compliance checking functionality in the online proposal submission system; and
- Ongoing maintenance of the expanded compliance checking system.

Demand Management

The rate at which submitted proposals to NSF are funded varies widely between institutions. Reducing this variation would improve the workloads of reviewers and NSF staff. NSF plans a program of enhanced outreach that is tailored to individual institutions. The outreach will include:

- Making available statistics describing the institution’s proposal submission rate, success rate, and participation in the merit review process to permit a comparison to groups of similar institutions, and exploring possible reasons for anomalies;
- A discussion of the institution’s policies on proposal submission and impacts on proposers and reviewers; and
- Assistance in the design of mentoring programs for the faculty on proposal preparation and review.

The outreach will propagate best practices; encourage networking between institutions; and improve the flow of ideas between NSF and the research community. The potential return on investment for NSF is significant; even a one percent reduction in overall proposal pressure corresponds to a reduction in staff workload that is similar to adding five or six new staff members. There are also benefits for the institutions. Reductions in the number of proposals that institutions must submit to support their faculty members’ research programs benefits both their faculty and staff.

Investment Framework

Proposal Management Efficiencies Funding

(Dollars in Millions)

Activity	FY 2013	FY 2014	FY 2015
	Actual	Estimate	Request
FTE (to support Demand Management)	-	2.0	2.0
Virtual Meeting Technologies ¹	-	\$2.23	\$0.10
Review Management Support	-	-	2.72
Automated Preliminary Processing	-	-	6.00
Demand Management ²	-	-	-
Assessment of Impact of Pilot Activities	-	0.30	0.30
Total, Proposal Management Efficiencies	-	\$2.53	\$9.12

Totals may not add due to rounding.

¹ Support for Virtual Meeting Technologies through the Agency Operations and Award Management (AOAM) account is \$1.56 million at the FY 2014 Estimate, and \$1.21 million at the FY 2015 Request.

² Support for Demand Management through the Agency Operations and Award Management (AOAM) account is \$420,000 for both the FY 2014 Estimate and the FY 2015 Request.

FY 2012 – FY 2014

Virtual Meeting Technologies

In FY 2012, NSF initiated an assessment of several technological and organizational approaches to virtual meetings and began developing training modules for NSF staff and reviewers. In FY 2013, NSF conducted a medium-scale pilot activity with a goal of at least five percent of review panels being wholly virtual. This goal was significantly exceeded; 28 percent of FY 2013 panels were virtual (for more information, see FY 2013 Annual Performance Report in Performance chapter). NSF also conducted a smaller scale pilot activity using asynchronous virtual panel technology, began the development of online training tools, and began assessing the impacts of the use of virtual panels. In FY 2014, virtual panels are being used at an expanded scale. A more functional, semi-automated system to support asynchronous virtual panels will be created.

Automated Preliminary Processing

Using existing staff resources in FY 2013, NSF enhanced FastLane to implement additional high-priority business rules. Planning will continue in FY 2014 for a more robust business rules system.

Demand Management

In FY 2013, a pilot activity with outreach to a small number of research institutions was conducted. In FY 2014, this will be expanded to more institutions.

FY 2015 Request

Virtual Meeting Technologies

Support for virtual panels will continue with a target that at least 33 percent of panels will be conducted as virtual panels (for more information, see FY 2015 Annual Performance Plan in Performance chapter). The funds requested will support infrastructure (including cloud-based virtual meeting services, conference room upgrades, and enhanced desktop equipment) and contract services to provide user support to NSF staff and reviewers.

Review Management Support

NSF will begin migrating merit review applications built on aging unstable client-server technology to modern web-based technology. This includes those that support merit reviews of NSF proposals and management of reviewers. The initial focus will be to migrate systems used to set up and conduct panels. This will increase the reliability of these mission-critical applications, provide workload efficiencies to staff, and make it easier to make changes to systems to respond to emerging NSF business needs.

Automated Preliminary Processing

NSF will begin requirements definition, development, and initial testing of an automated proposal compliance checking system with an estimated FY 2016 deployment.

Demand Management

NSF will refine and expand targeted outreach activities to reach 40-100 institutions.

FY 2016 and Beyond

Virtual Meeting Technologies

Support for virtual panels will continue. Guidelines and procedures for virtual panel use will be standardized based on the results of the preceding multi-year pilot activity.

Review Management Support

NSF will continue migrating merit review applications built on aging unstable client server technology to modern web-based technology and make additional enhancements to NSF's eBusiness systems informed by the results of ongoing pilot activities.

Automated Preliminary Processing

NSF will continue to modernize pre-award and proposal submission capabilities to provide workload efficiencies to NSF staff and the research community.

Demand Management

Continue a program of targeted outreach to approximately 40-100 institutions per year.

Evaluation Framework

Assessments of Impacts of Merit Review Pilot Activities

In FY 2013 through FY 2014, NSF staff have been undertaking a number of pilot activities to test whether further efficiencies can be achieved in the merit review process. In FY 2015, NSF will engage an external party to conduct surveys of NSF reviewers, investigators, and panel moderators to assess workload; the impacts of the technologies used; and the quality of feedback provided to proposers. These will be used to assess the impacts of the pilot activities and to provide information for inclusion in NSF's report to the NSB on the merit review process. Additionally, a new pilot activity will be developed and implemented to assess the potential impacts of changing the existing compensation model for FACA meeting participants.

Virtual Meeting Technologies

NSF will track the number, size, duration, and cost of virtual panels. It will compare per-proposal review costs of virtual and in-person panels, and collect feedback from virtual panel participants and moderators. This feedback will be discussed with NSF's directorate Advisory Committees. NSF will make agency-wide statistical comparisons of merit review indicators for virtual and in-person panels, including statistics on the success rates of demographic groups of investigators and the various classes of proposing institutions. NSF will examine trends in the number of individual panelists used and their average workload. This information will be used to optimize virtual panel procedures, determine the optimal level of virtual panel usage, and set outyear targets.

Review Management Support

NSF will collect data on the staff time spent identifying, selecting, recruiting, and obtaining reviews from reviewers. Pre- and post-deployment data will be compared.

Automated Preliminary Processing

NSF will collect feedback from NSF staff on early prototypes and after the initial deployment. Feedback from submitting institutions will be collected during a pilot deployment. The feedback will be used as input to the final stages of development and deployment, and help determine efficacy and accuracy.

Demand Management

NSF will solicit feedback from institutions visited and will examine the rate of submissions and proposal funding in years following outreach and compare with baseline data.