

## PROPOSAL MANAGEMENT EFFICIENCIES

**\$8,650,000**  
**-\$470,000 / -5.2%**

### 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 process faces extraordinary pressures as proposal numbers grow and success rates decline. Competition for funding has increased significantly. Between FY 1999 and FY 2013, the number of full and preliminary proposals evaluated increased by 79 percent, and funding rates dropped from 32 percent to 22 percent.<sup>1</sup> 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 combined cost to NSF of proposal review panel compensation and travel, was over \$36 million.<sup>2</sup> Through the implementation of expanded use of virtual panels and increased use of non-refundable tickets, this was reduced to under \$24 million in FY 2013. To mitigate some of the stresses on NSF's merit review system, a number of critical investments, described below, have been identified.

### Goal

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

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

### Total Funding for Proposal Management Efficiencies

(Dollars in Millions)

FY 2014 Actual	FY 2015 Estimate	FY 2016 Request
<b>\$2.53</b>	<b>\$9.12</b>	<b>\$8.65</b>

### Approach

An NSF-wide working group examined 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

<sup>1</sup> In FY 1999, 29,957 full or preliminary proposals were competitively reviewed; in FY 2013, the number was 53,690. 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](http://www.nsf.gov/nsb/documents/2002/nsb0221/nsb0221.pdf) - for FY 1999 data) and 2013 (NSB 14-32, [www.nsf.gov/nsb/publications/2014/nsb1432.pdf](http://www.nsf.gov/nsb/publications/2014/nsb1432.pdf)).

<sup>2</sup> When other direct costs to NSF of holding face-to-face panels, excluding salary, are added, the total cost was approximately \$38 million.

uses to support its merit review processes constitute a risk to one of NSF's critical lines of business. A plan was developed 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.
- **Technological Support for Proposal and Review Management:** Deployment of a more capable infrastructure to support the identification, selection, and recruitment of reviewers, to manage the receipt of reviews, to increase automation of the preliminary processing of proposals for compliance to standards, and to provide tools for portfolio management. This supports Goals 1, 4, 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 improve further NSF's merit review process are undertaken by staff in the program directorates, the Office of Integrative Activities, 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. The travel costs associated with review panels are a budget burden. 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 the panel costs, broaden the range of reviewers participating in panels, and reduce the average workload of individual reviewers.

#### Technological Support for Proposal and Review Management

In the prior year's request, this investment was divided into two separate items, one focusing on reviews and reviewers and one focused on proposals. Here they are combined to better reflect the way in which this effort is managed internally. This multi-year investment aims: to reduce the NSF staff time used in identifying potential reviewers and communicating with reviewers; to improve the return rate for *ad hoc* reviews; to automate more of the checks for compliance with proposal preparation requirements; to modernize pre-award and proposal submission capabilities; and to provide more advanced capabilities to support portfolio management. The FY 2016 investment will continue work begun in FY 2015 to replace outdated and expensive client-server technology with modern, web-based technology and to modernize pre-award and proposal submission capabilities to provide workload efficiencies to NSF staff and the research community.

#### 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 will continue a program of enhanced outreach that is tailored to individual institutions. The outreach will include web-based information sharing and direct dialogue. 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 Estimates**

(Dollars in Millions)

Activity	FY 2014 Actual	FY 2015 Estimate	FY 2016 Request
Virtual Meeting Technologies	\$2.23	\$0.10	\$0.10
Technological Support for Proposal and Review Management	-	8.72	8.25
Assessment of Impact of Pilot Activities	0.30	0.30	0.30
<b>Total</b>	<b>\$2.53</b>	<b>\$9.12</b>	<b>\$8.65</b>

Totals may not add due to rounding.

**FY 2014 – FY 2015**

Virtual Meeting Technologies

In the years prior to FY 2014, NSF initiated an assessment of several technological and organizational approaches to virtual meetings, began developing training modules for NSF staff and reviewers, and conducted a medium-scale pilot activity in which virtual panels were conducted primarily with a specific virtual meeting platform, and conducted a smaller scale pilot activity using asynchronous virtual panel technology. In FY 2014 and FY 2015, the virtual panel pilot is continuing at an expanded scale with a FY 2015 target that at least 33 percent of panels be conducted as virtual panels. Alternative virtual meeting platforms are being piloted. An alternative approach to asynchronous virtual panels is being tested.

Technological Support for Proposal and Review Management

This investment comprises improvements in those parts of NSF’s IT systems used to conduct the merit review process. Planning for a more robust business rules system to support proposal processing was conducted in FY 2014. In FY 2015, an initial implementation of a system to check requirements that apply to all NSF proposals is being rolled out and NSF will begin requirements definition, development, and initial testing of a more sophisticated automated proposal compliance checking system that can implement program-specific requirements. In FY 2015, NSF is beginning the migration of 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 is 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.

Demand Management

A pilot activity involving outreach to a small number of research institutions was conducted in late FY 2013 and in early FY 2014. In FY 2015, an access-controlled web-portal has been developed to support the outreach. Continuation of the pilot has been postponed until later in FY 2015. In the second half of FY 2015, planning is anticipated for more demand management activities in FY 2016.

## **FY 2016 Request**

### Virtual Meeting Technologies

Support for virtual panels will continue with a target of at least 40 percent of panels being conducted as virtual panels. Guidelines and procedures for virtual panel use will be standardized based on the results of the preceding multi-year pilot activity. Improved virtual meeting technology will be used as new tools become available. Per diem compensation for individuals participating virtually in NSF meetings, including virtual panelists, will be decreased from the current \$280 per day to a new level of \$200 per day.

### Technological Support for Proposal and Review Management

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. NSF will continue to modernize pre-award and proposal submission capabilities to provide workload efficiencies to NSF staff and the research community. This includes continued work on an automated proposal compliance checking system that can implement program-specific requirements.

### Demand Management

NSF will continue to refine and implement its demand management activities.

## **FY 2017 – FY 2018**

### Virtual Meeting Technologies

In FY 2017 and beyond, the use of virtual panels will be a standard component of NSF's merit review process. Improved virtual meeting technology will continue to be used as new tools become available.

### Technological Support for Proposal and Review Management

NSF will continue migrating merit review applications built on aging unstable client server technology to modern web-based technology. NSF will continue to modernize pre-award and proposal submission capabilities to provide workload efficiencies to NSF staff and the research community. This includes the completion of work on an automated proposal compliance checking system that can implement program-specific requirements. A new researcher database (principal investigators and reviewers) will be developed with researcher self-registration capability and tools for identifying potential reviewers. NSF's eBusiness systems will be extended to include a component that tracks review requests and responses, and that automatically sends reminders about outstanding requests to reviewers and NSF staff. Advanced proposal data management capabilities to support portfolio management will be deployed.

### Demand Management

NSF will continue to refine and implement its demand management activities.

## **Evaluation Framework**

To support evaluation of the impacts of the pilots and to identify further potential to enhance the merit review process, in FY 2014 NSF engaged a contractor to develop and conduct surveys of NSF reviewers, investigators, and program officers to assess workload, the technologies used to support merit review, and the quality of feedback provided to proposers. The surveys will collect ancillary data so that statistical analysis will be able to separate the impacts of merit review core and pilot activities from the effects of the research domain to which the proposals and reviewers belong, the type of home institution, and basic demographic data variables. Surveys will be conducted in late FY 2015 and FY 2016. The resulting data will be made available to programs considering using the approaches that have been piloted or considering modifications to their existing approaches to merit review to inform their choices.