

**PROPOSAL MANAGEMENT  
EFFICIENCIES (PME)**

**\$9,430,000  
+\$740,000 / 8.5%**

**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 approach to merit review relies on NSF staff making funding recommendations advised by *ad hoc* (mail), virtual (teleconference, videoconference, or other online meeting technology), and/ or in-person panel review. This process is time- and resource-intensive.

In recent years, the number and increasing complexity of proposals have created a greater workload for researchers, reviewers, and NSF staff. NSF’s eBusiness systems for managing the merit review process are based on old technologies that are expensive to maintain. Their functionality is dated and lags behind peer review management systems used by research journals and conference editors. The present proposal submission system is a barrier to the use of tools that could aid pre-review analysis, because it does not capture the content of proposals in a way that lends itself to use of modern textual and thematic analysis.

The Proposal Management Efficiencies (PME) activity is a continuing investment in improvements to NSF’s proposal management systems that are designed to: reduce the number of reviewers who must travel to NSF; broaden participation in the merit review process; improve the management of reviewers, review requests, and reviews; improve compliance checking and conflict-of-interest management capabilities; improve data quality and capture proposal content in a way that supports data-mining and content analysis; simplify proposal submission; and assess the impacts of merit review pilot activities.

**Total Funding for  
Proposal Management Efficiencies**

(Dollars in Millions)

| FY 2015<br>Actual | FY 2016<br>Estimate | FY 2017<br>Request |
|-------------------|---------------------|--------------------|
| <b>\$12.45</b>    | <b>\$8.69</b>       | <b>\$9.43</b>      |

**Goal**

The FY 2017 framework reflects updated goals for this investment. This activity will continue to broaden participation in the review process, reduce the average time commitment required of individual reviewers, increase the effectiveness of NSF program staff by reducing the clerical work required in basic proposal processing, improve the ability of NSF to identify potential conflicts of interest, and reduce the need to support outdated information technologies operating in parallel with more modern ones.

**Approach**

This activity consists of targeted investments aimed at improving NSF’s systems and processes for managing proposals. It is a continuing part of a multi-year investment. This activity supports NSF’s Strategic Plan through Strategic Goal 3: Excel as a Federal Science Agency, Strategic Objective 2: Use effective methods and innovative solutions to achieve excellence in accomplishing the agency’s mission.

Work on improving NSF’s eBusiness systems will be undertaken by existing information technology staff and by contractors retained for this purpose. Support for virtual panels will continue to be provided by operational infrastructure staff and existing information technology specialist positions within the research directorates, together with a modest amount of contractor support.

### Leadership structure and governance

The efforts to achieve proposal management efficiencies are coordinated by NSF's Enterprise Architecture Working Group (EAWG), which includes staff members from the research directorates, the Office of Integrative Activities, the Office of Information and Resource Management, and the Office of Budget, Finance, and Award Management.

### Mechanisms to be used

The principal components of this plan are:

- Personnel and infrastructure to support use of virtual meeting technologies for review panels;
- Deployment of a more capable infrastructure to support the identification, selection, and recruitment of reviewers and to manage the subsequent receipt of reviews; and
- Increased use of automation in the preliminary processing of proposals.

A virtual panel pilot began in FY 2012 focusing on an investigation of available technologies to support the use of virtual panels. FY 2014 included funding for expanding NSF's ability to conduct virtual panels and incorporated some basic compliance checks into NSF's existing proposal submission system. In addition, in 2014, NSF's Capital Planning and Investment Committee recognized a need for continuous improvement to the proposal and review management systems and their supporting infrastructure, and recommended that proposal management efficiency improvements be supported at a sustained level that can be efficiently managed by NSF staff. Accordingly, the initial effort to revamp the proposal submission system and improve the merit review management systems began in FY 2015. These activities will improve integration between the component systems that make up NSF's proposal and review management architecture and provide better business intelligence functionality to support portfolio management. It is expected that the sustained improvement effort will continue indefinitely, guided by a multi-year roadmap that is updated each year by the EAWG. Budget projections through FY 2019 are based on the current roadmap.

## **Investment Framework**

### **Proposal Management Efficiencies**

#### **Funding by Account**

(Dollars in Millions)

|  | <b>FY 2015</b> | <b>FY 2016</b>  | <b>FY 2017</b> |
|--|----------------|-----------------|----------------|
|  | <b>Actual</b>  | <b>Estimate</b> | <b>Request</b> |
| Technological Support for Proposal and Review Management                 | \$12.00        | \$8.25          | \$8.95         |
| Virtual Meeting Technologies - IT  | 0.10           | 0.10            | 0.10           |
| <b>Subtotal, Program Related Technology (R&amp;RA and EHR)</b>           | <b>\$12.10</b> | <b>\$8.35</b>   | <b>\$9.05</b>  |
| Impact Assessment  | 0.35           | 0.34            | 0.38           |
| <b>Subtotal, Other Program Related Administration (R&amp;RA and EHR)</b> | <b>\$0.35</b>  | <b>\$0.34</b>   | <b>\$0.38</b>  |
| <b>Total, Proposal Management Efficiencies</b>                           | <b>\$12.45</b> | <b>\$8.69</b>   | <b>\$9.43</b>  |

Totals may not add due to rounding.

Specific investments include:

- Continued experimentation with new virtual meeting technologies;
- Technological support for proposal and review management; and
- Assessment of impacts of program management efficiencies.

The support for proposal and review management is comprised of improvements in those parts of NSF's IT systems used to conduct the merit review process. The multiple component activities are listed below and are coordinated in a holistic fashion by the EAWG in order to maintain an integrated enterprise system. This began in FY 2015 and will continue through FY 2019.

- Transition NSF's client-server eBusiness systems used in reviewer and panel management to web-based systems;
- Develop and deploy a more sophisticated database of reviewers, which is easily searchable according to a rich set of criteria, including keywords associated with expertise and review history;
- Make enhancements so that researchers and other experts can volunteer online to serve as reviewers, indicating their expertise, experience, availability, and information that can be used to perform a preliminary screen for conflicts-of-interest;
- Enhance tools that NSF staff use to identify possible reviewers to include the ability to automatically suggest potential reviewers based on matching key criteria such as proposal topics, reviewer expertise, and review history;
- Add an eBusiness system module that tracks review requests and responses, and that automatically sends reminders about outstanding requests to reviewers and NSF staff;
- Deploy an enhanced proposal submission system that will include a suite of functions essential for improving data quality, conflicts-of-interest identification and management, and compliance checking;
- Deploy a modern, rules-based, automated proposal compliance checking system integrated within NSF's proposal submission pipeline;
- Increase integration between the systems that make up NSF's proposal and review management architecture; and
- Provide enhanced business intelligence functionality to support portfolio management.

**FY 2015 – FY 2016**

Use of Virtual Meeting Technologies for Merit Review

Since FY 2012, the agency has piloted the use of virtual panels as a way to increase and broaden participation, lower costs, and improve the merit review process' efficiency while maintaining quality. After several years of investments aimed at expanding NSF's use of virtual panels for proposal review, the percentage of panels conducted wholly virtual was 29.6 percent in FY 2014 and 25.2 percent in FY 2015. A similar proportion of panels combine both physically present and virtual panelists. Most of this activity is being transitioned from the category of an IT investment to normal operations. Consequently, in FY 2016 and beyond, the only budget component of this activity that remains under proposal management efficiencies is \$100,000 annually for licenses for experimentation with new virtual meeting technologies.

Technological Support for Proposal and Review Management

The activities already begun in FY 2015 or planned for FY 2016 include:

- Migrating merit review applications built on aging unstable client-server technology to modern web-based technology. The initial focus has been to migrate tools used to set up and conduct panels;
- The use of a unique customer ID system will be piloted, beginning with Graduate Research Fellows;
- The implementation of a reviewer invitation management system (beginning in FY 2016 with deployment in FY 2017);
- Modernizing proposal submission capabilities to provide workload efficiencies to NSF staff and the research community, implementing features that will further automate the preliminary processing of proposals, including increased automated checks for compliance with basic proposal requirements. So

far, NSF implemented automated compliance checking for a set of rules specific to the Grant Proposal Guide and a first set of solicitation-specific rules;

- Making new business intelligence capabilities available to program staff to help with reviewer selection and portfolio management. To date, new enterprise reporting tools have been added. These provide both pre-designed report types and a tool for creating custom-designed report types.

#### Assessment of Impacts of Proposal Management Efficiencies

To provide information on the impacts of Proposal Management Efficiency activities on external stakeholders, NSF has engaged an external party to conduct surveys of NSF reviewers and investigators to assess workload, the impacts of the technologies used to support merit review, and the quality of feedback provided to proposers. In addition to the activities described here, since FY 2012, NSF staff members have undertaken a number of pilot activities to test several approaches to achieving further efficiencies in the proposal management process. The surveys include the collection of ancillary data so that statistical analysis will be able to separate changes in the management of proposals and reviews, including merit review pilot activities, from confounding variables such as the effects of the research domain to which the proposals and reviewers belong, the type of home institution, and basic demographic data variables. The first survey was conducted in November 2015 and results will be available in May 2016. Surveys will be conducted annually thereafter.

#### **FY 2017 Request**

##### Use of Virtual Meeting Technologies for Merit Review

\$100,000 annually for licenses for experimentation with new virtual meeting technologies.

##### Technological Support for Proposal and Review Management

The following activities will continue:

- The migration of merit review applications built on aging unstable client-server technology to modern web-based technology;
- The implementation of a modern, rules-based, automated proposal compliance checking system;
- Modernization of the proposal submission system; and
- The deployment of advanced proposal data management capabilities.

#### Assessment of Impacts of Proposal Management Efficiencies

- Data from the merit review survey conducted at the end of FY 2016 will be analyzed and used to provide information on the research community's experiences with NSF's merit review process; and
- The merit review survey will be repeated.

#### **FY 2018 – FY 2019**

##### Use of Virtual Meeting Technologies for Merit Review

The bulk of the support for the use of virtual meeting technologies has transitioned to normal operations. To incorporate the continual evolution of virtual meeting technologies, it is anticipated that \$100,000 will be invested annually for licenses for experimentation with new virtual meeting technologies.

##### Technological Support for Proposal and Review Management

- The migration of merit review applications built on aging unstable client-server technology to modern web-based technology will continue;
- The implementation of a modern, rules-based, automated proposal compliance checking system will be completed in FY 2018;
- A new researcher database (principal investigators and reviewers) will be developed by FY 2019. It will include researcher self-registration capability, and tools for identifying potential reviewers based on matching key criteria such as proposal topics, reviewer expertise, and review history;

- Modernization of the proposal submission system will be a continuous activity;
- Interactive panel system services will be modernized during FY 2018 and FY 2019; and
- The deployment of advanced proposal data management capabilities will be a continuous process.

Assessment of Impacts of Proposal Management Efficiencies

- Data from the survey conducted towards the end of the prior fiscal year will be analyzed and used to provide information on the research community's experiences with NSF's merit review process; and
- The merit review survey will be repeated annually.

**Evaluation Framework**

The effectiveness of NSF's technological support for virtual meetings and proposal and review management will be monitored and evaluated by the EAWG based on status reports from the Division of Information Systems and feedback from NSF staff testing or using the technologies. EAWG meets monthly and receives a comprehensive quarterly update from DIS. EAWG provides guidance to DIS on adjustments to the program management efficiencies implementation roadmap, as required.

Quantitative and qualitative data on staff, reviewer, and PI demand will be obtained through surveys. Data on the individuals who participate in the merit review process will be obtained from NSF's Enterprise Information System. The number, size, duration and cost of virtual panels, as well as the per-proposal review costs of virtual and in-person panels will be obtained from internal administrative data. Changes in the tracked quantities will be analyzed to determine if the goals have been achieved. A statistical comparison of merit review indicators will be made, with some of that information being included in the National Science Board's annual report on the merit review process. NSF will discuss information gathered through the survey of proposers and reviewers with directorate advisory committees.