FY 2017 ANNUAL PERFORMANCE REPORT

In FY 2017, NSF tracked progress toward its three strategic goals using nine performance goals, two of which were Agency Priority Goals (APGs). Four of the nine goals fully achieved their targets in FY 2017 and five did not achieve one or more targets. Below is a tabular summary.

Goal ID	Performance Goal	FY 2016 Result
1	APG: Improve Graduate Student Preparedness	Achieved
2	APG: Invest Strategically in Public Participation in STEM Research	Achieved
3	Ensure that Key Program Investments are on Track	Achieved
4	Ensure that Research Infrastructure Investments are on Track	Not Achieved
5	Use Evidence to Guide Management Decisions	Partially Achieved
6	Make Timely Award Decisions	Not Achieved
7	Foster a Culture of Inclusion	Not Achieved
8	Evaluate NSF Investments	Achieved
9	Increase the Percentage of Panelists Participating in Merit Review Virtually	Not Achieved

Multiple years of trend data are available for NSF's quantitative performance measures (Goals 4, 6, and 9). Other performance goals monitor progress towards multiyear goals, such as implementation of a new process (Goals 7 and 8) or monitoring of strategically important investments (Goals 1, 2, 3, and 5).

Goal 1: Improve Graduate Student Preparedness (Agency Priority Goal)

Lead Organizations: Directorate for Geosciences, Directorate for Engineering, Directorate for Social and Behavioral Sciences.

Goal Statement
Improve STEM graduate student preparedness for entering the workforce.

Measure, Milestone, or Deliverable

FY	*Target*	*Final 2-Year Result*
2016-2017	By September 30, 2017, NSF will fund at least three summer institutes and 75 supplements to existing awards to provide STEM doctoral students with opportunities to expand their knowledge and skills to prepare for a range of careers.	Summer Institutes = 5 Supplements = 163
Trend Information		
This was a new goal in FY 2016. The topic was identified through the 2015 Strategic Review process.		

Discussion
A strong global economy relies on the ability to capitalize on technical innovations that result from a skilled and agile STEM workforce. To achieve this, the Nation's scientific workforce must evolve and mature to include more doctoral level researchers in positions outside of academia. These positions require comprehensive preparation in science at the graduate level, as well as proficiency in other critical skills. However, Ph.D. training remains largely focused on preparation for the research component of academic careers with an emphasis on skills needed at research institutions.

The purpose of this APG was to provide opportunities for science and engineering doctoral students to acquire the knowledge, experience, and skills needed for highly productive careers, inside and outside of academe. To achieve this goal, NSF took two approaches: piloting support for summer institutes, to provide students with broad experiences in professional development areas, and supporting supplements to existing research awards, to enhance graduate education opportunities. Supplements were categorized as either enhancing the student's *experience* or *activities*. Enhanced experience awards were single or collaborative awards for graduate students to acquire professional development experience. Enhanced activity awards went to "center-like" activities that support cohorts of graduate students with the goal of developing new "best practice activities for enhancing graduate student preparedness."

Goal Category	**FY 2016**	**FY 2017**	**Total**
Summer Institutes	1	4	5
All supplements	80	83	163
Enhanced experience	*68*	*77*	*139*
Enhanced activity	*12*	*6*	*18*

A portfolio analysis of the awards made under this APG is underway to inform future decision-making in this area.

Goal 2: Invest Strategically in Public Participation in STEM Research (PPSR) (Agency Priority Goal)

Lead Organizations: Directorate for Computer and Information Sciences and Engineering, Directorate for Education and Human Resources.

Goal Statement
Build the capacity of the Nation to solve research challenges and improve learning by investing strategically in crowdsourcing and other forms of public participation in science, technology, engineering, and mathematics research (PPSR).

Measure, Milestone, or Deliverable

FY	*Target*	*Final 2-Year Result*
2016-2017	By September 30, 2017, NSF will implement mechanisms to expand and deepen the engagement of the public in research.	EAGERs = 34 projects Supplements = 18 Research Coordination Networks = 2
Trend Information		
This was a new goal in FY 2016. The topic was identified through the 2015 Strategic Review process.		

Discussion
Scientists, mathematicians, and engineers have involved the public in their research efforts to solve challenging problems for centuries. These types of activities have been referred to in a variety of ways. For this goal, PPSR is used as an overarching term that includes citizen science, crowdsourcing research, and similar activities. PPSR has grown significantly in the past decade, in part due to new technological tools that facilitate interactions between scientists and participants. PPSR approaches can address new research questions and contribute to ongoing STEM research.

To achieve this APG, NSF used three specific funding mechanisms to fund proposals that explicitly include PPSR approaches:

- Early-concept Grants for Exploratory Research (EAGERs) are designed as "high risk-high payoff" awards with the potential to explore new areas within PPSR and/or further our understanding of how PPSR is leveraged to support scientific discovery and the public's engagement with research. NSF aimed to fund five EAGERs a year that included PPSR. Across both years, 40 such EAGERs, funding 34 separate projects,[1] were funded by five different directorates.
- Supplements to existing awards provide opportunities to include PPSR approaches in projects that are appropriate for PPSR but hadn't already incorporated PPSR approaches. NSF aimed to fund five supplements a year that included a focus on PPSR. At least 18 supplements supporting PPSR were funded over the two-year period, across at least five directorates. More supplements that meet the criteria may be identified.
- Research Coordination Networks (RCNs) support communication and coordination across disciplinary, organizational, institutional, and geographic boundaries. Two RCNs that support PPSR were funded over the APG period.

Over the course of FY 2016 and FY 2017, six Dear Colleague Letters were issued that called for proposals that helped achieve this APG, including one that was specifically issued as a result of the Priority Goal (NSF 17-047, "Dear Colleague Letter (DCL): Public Participation in Science, Technology, Engineering,

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[1] Some projects were submitted as collaborative proposals, resulting in multiple awards.

and Mathematics Research: Capacity-building, Community-building, and Direction-setting").

NSF also used mechanisms designed to receive input from stakeholder communities to ensure that its efforts to support PPSR were appropriately informed:

- <u>Convened stakeholders external to the federal government</u> to help NSF identify trends, opportunities, and gaps in PPSR, and inform how NSF targets funding opportunities towards scientific needs and public audiences. Over the two-year timeframe of this goal, NSF officials interacted with two NSF Advisory Committees and the national Citizen Science Association (CSA) steering committee, and conducted outreach at CSA's biennial meeting, among others. NSF also funded three PI-led conferences with significant PPSR components and called for conference proposals to support PPSR in NSF 17-047.
- <u>Conferred with other federal agencies</u> to inform and coordinate efforts related to PPSR. At least 17 such conferrals occurred in the timeframe of this goal, most often with the Office of Science and Technology Policy and the Federal Community of Practice for Crowdsourcing and Citizen Science, as well as with the Networking and Information Technology Research and Development Social Computing Interagency Working Group.
- <u>Issued communications</u> highlighting PPSR and related funding opportunities. A total of six funding opportunities were released, as well as a video, "Pick Your Passion with Citizen Science".[2]
  - NSF 16-031: DCL: Leveraging GLOBE to Increase Student Engagement and Diversity
  - NSF 16-059: DCL: Citizen Science and Crowdsourcing–Public Participation in Engineering Research
  - NSF 16-119 DCL: Support for Engaging Students and the Public in Polar Research
  - NSF 17-047: DCL: Public Participation in Science, Technology, Engineering, and Mathematics Research: Capacity-building, Community-building, and Direction-setting
  - NSF 17-055: DCL: Public Participation in Engineering Research: Water Quality
  - NSF 17-129: DCL: Support for Engaging Students and the Public in Polar Research

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[2] www.youtube.com/watch?v=5ijSk-QWwjw

Goal 3: Ensure that Key Program Investments are on Track

Lead Organization: Office of Budget, Finance, and Award Management.

Goal Statement
Ensure that key NSF-wide program investments are implemented and on track.

Measure, Milestone, or Deliverable

FY	Target	Result
2017	1. Monitor the progress of the following NSF-wide investments using a common set of milestones and indicators: NSF INCLUDES, INFEWS, Risk and Resilience, and UtB. 2. Review the results with senior leaders quarterly in data-driven performance reviews.	Achieved
Trend Information		
2016	Monitor the progress of the following NSF-wide investments using a common set of milestones and indicators: NSF INCLUDES, INFEWS, and UtB.	Achieved
2015	Monitor the progress of Cognitive Science & Neuroscience, CEMMSS, CIF21, SaTC, and SEES using a common set of milestones and indicators.	Achieved
2014 (new goal)	Monitor the progress of CEMMSS, CIF21, I-Corps™, INSPIRE, SaTC, and SEES using a common set of milestones and indicators.	Not achieved (4 of 6 monitored)

Discussion
NSF instituted this goal in FY 2014 to track the interim progress of major investments towards their long-term goals. Each year, NSF highlights a number of cross-agency investments in the NSF-Wide Investments chapter of its Budget Request to Congress. Although the overall impact of these investments will not be realized for many years, tracking near-term indicators of implementation and progress can help the agency make formative changes or course corrections.

In FY 2017, NSF successfully monitored the progress of four NSF-wide investments (NSF INCLUDES, INFEWS, Risk and Resilience, and Understanding the Brain) using a common set of indicators and reviewed the results with senior leaders. The indicators that NSF chose to measure were programmatic inputs and outputs that can provide valuable signals to managers and leaders about a program's vitality and potential success, as they address whether the program is being administered as planned or whether the program is generating enough interest from the community. NSF also added the second target in FY 2017 to monitor the presentation of results to leadership.

The following were tracked quarterly in FY 2017:
- Input indicator: progress towards the investment's funding level target.
- Output indicators: solicitations issued, proposals received, awards made.
- Program-specific activities: e.g. PI meetings, workshops, and/or evaluation contract deliverables.

These measures enabled managers and leaders to quickly gauge the status of a program's implementation, interest from the scientific community, whether the review process resulted in awards in a timely manner,

and whether the program has met its internal goals for short-term outcomes. Tracking these measures over time provided managers and leaders with the opportunity to assess whether mid-course corrections were needed to improve program management and/or the overall direction of the investment.

Goal 4: Ensure that Research Infrastructure Investments are on Track

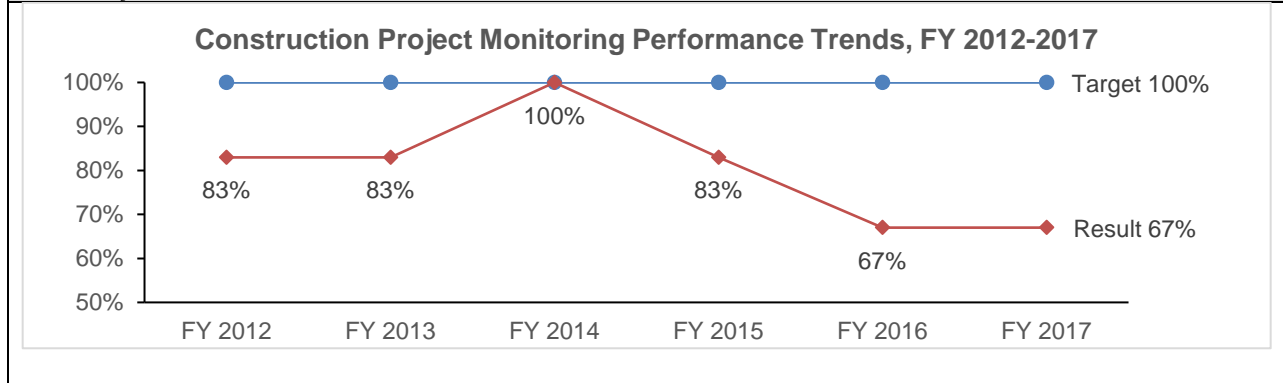Lead Organization: Large Facilities Office, Office of Budget, Finance, and Award Management.

Goal Statement
Ensure program integrity and responsible stewardship of major research facilities and infrastructure.

Measure, Milestone, or Deliverable

FY	*Target*	*Result*
2017	Construction Project Monitoring: For all (100 percent) MREFC facilities under construction that are over 10 percent complete, keep negative cost and schedule variance at or below 10 percent.	Not achieved (2 of 3 projects were within cost and schedule variances).

Trend Information

Construction Project Monitoring Performance Trends, FY 2012-2017

Discussion
The MREFC account supports the acquisition, construction, and commissioning of major research facilities and equipment that provide unique capabilities at the frontiers of science and engineering. Performance of construction projects funded by the MREFC account is monitored using the Earned Value Management (EVM) system. EVM is an integrated management control system for assessing, understanding, and quantifying what a contractor or field activity is achieving with program dollars. Monitoring cost and schedule is a standard measure of performance for construction projects. Projects that are under 10 percent complete are not considered eligible for this goal because EVM data is less meaningful statistically in the very early stages of a project.

Two of the three projects that were over ten percent complete by the end of FY 2017 were on track. At the end of FY 2017, the Daniel K. Inouye Solar Telescope (DKIST) was 78 percent complete and the Large Synoptic Survey Telescope (LSST) was 44 percent complete. Both projects had cost and schedule variances well below the 10 percent thresholds.

Explanation of Unmet Goal
The goal was not met because of schedule issues associated with the National Ecological Observatory Network (NEON), which was 75 percent complete at the end of FY 2017. These are discussed further in the NEON section of the MREFC Chapter of this Request.

Goal 5: Use Evidence to Guide Management Decisions

Lead Organization: Office of Information and Resource Management

Goal Statement
Use evidence-based reviews to guide management investments.

Measure, Milestone, or Deliverable

FY	Targets	Result
2017	HRStat 1. Monitor the progress of three workforce initiatives of strategic importance designed to meet the objectives of the Opportunities for Action in NSF's FY 2014 and FY 2015 Strategic Reviews for Strategic Goal 3, Objective 1. 2. Develop metrics to demonstrate whether NSF met its workforce goals for transition to the new NSF Headquarters. PortfolioStat 3. NSF's IT governance boards will evaluate and prioritize proposed investments for FY 2019. 4. NSF's information technology governance boards will maintain a "green status" with investments on the Federal IT Dashboard for cost and schedule attributes (within 10 percent of target) associated with major IT investments.	HRStat 1. Achieved 2. Achieved PortfolioStat 3. Achieved 4. Not achieved
Trend Information[3]		
2016	HRStat: 2 targets PortfolioStat: 2 targets	All targets achieved
2015	HRStat: 2 targets PortfolioStat: 2 targets	All targets achieved
2014 (new goal)	HRStat: 2 targets PortfolioStat: 2 targets	All targets achieved

Discussion
HRStat and PortfolioStat are processes in which agency leaders conduct regular data-driven reviews of human resources and IT portfolio information. HR Stat targets focus on development and refinement of a human capital management dashboard for senior management use, and on the reporting of those data to management in formal meetings. Portfolio Stat targets monitor NSF's IT investment evaluation process.

HR Stat
The three monitored initiatives (Target 1) were collecting and analyzing data from exit and engagement interviews and surveys, implementation of a new leadership development program, and staff retention through the move to the new headquarters. The analysis of exit and engagement data was completed in Q3 and findings about the general workforce were shared with NSF leadership in FY 2018. NSF's new

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[3] For the full target language from 2014 and 2015, please refer to the FY 2015 Performance Report in the FY 2017 NSF Budget Request (www.nsf.gov/about/budget/fy2017/pdf/56_fy2017.pdf). For full target language from 2016, please refer to the FY 2016 Performance Report (www.nsf.gov/about/budget/fy2018/pdf/59_fy2018.pdf).

leadership development program accepted candidate applications in Q4 of FY 2017, with the first cohort group to begin training in FY 2018. NSF set a goal of retaining 70 percent of the permanent workforce that was onboard at the end of FY 2015 through its move, which concluded at the end of FY 2017 (Target 2). The two-year retention rate of permanent staff through the end of FY 2017 was 86 percent.

Portfolio Stat
NSF's IT governance bodies (the Enterprise Architecture Working Group, Capital Planning and Investment Control Working Group, and the IT Resources Board) prepared the FY 2019 IT budget request and prioritized the IT investment portfolio (Target 3). To inform their investment decisions, cost and schedule data (Target 4) were presented to the governing bodies throughout the course of the fiscal year. Major investments reviewed included Enterprise Business Intelligence (BI), Public Access, and Proposal Management Efficiencies.

Explanation of Unmet Goal
At the end of FY 2017, one of the monitored project activities under Mission Support Systems had a cost variance from the target greater than 10 percent, resulting in "yellow" status for that investment and an unmet Target 4.
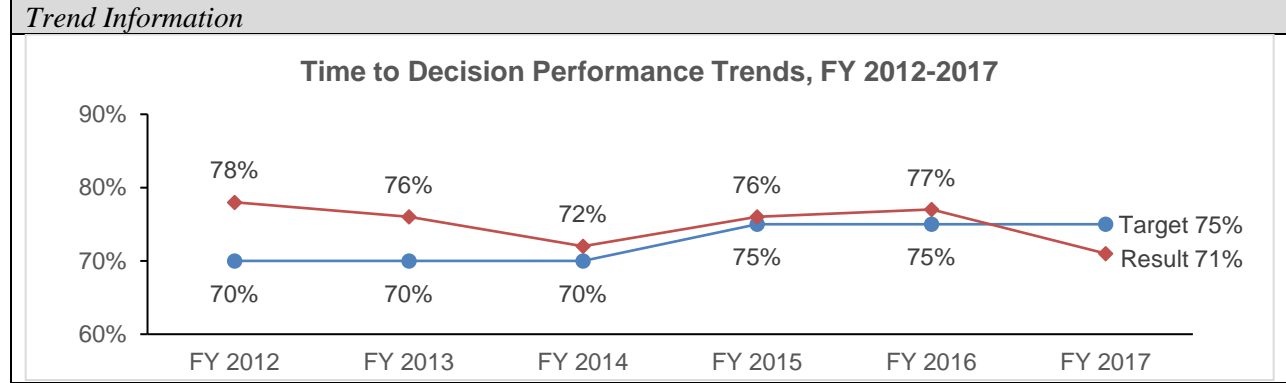
Goal 6: Make Timely Award Decisions

Lead Organization: Office of Integrative Activities.

Goal Statement
Inform applicants whether their proposals have been declined or recommended for funding within 182 days, or six months, of deadline, target, or receipt date, whichever is later.

Measure, Milestone, or Deliverable

FY	Target	Result
2017	75 percent.	Not achieved. Result = 71 percent.
Trend Information		

Time to Decision Performance Trends, FY 2012-2017

Discussion
Time to decision or "dwell time" is the amount of time that passes between receipt of a proposal and notification to the principal investigator about the funding decision. One of the most significant issues raised in customer satisfaction surveys is the time it takes NSF to process proposals. Too long a time period inhibits the progress of research as it delays the funding process, but too short a time period may weaken the merit review process by forcing premature decisions. The six-month target seeks to strike a balance between the need of the investigator for timely action and the need of NSF for a credible merit review system.

Explanation of Unmet Goal
NSF staff were directed to prioritize processing award decisions ahead of decline decisions in FY 2017 to facilitate an early close-out in advance of NSF's move to new headquarters in Alexandria. The FY 2017 result reflects this delay in decline processing.

Goal Change History
In FY 2015, this target was raised from 70 percent to 75 percent to be more in line with the historical trend of achievement at or above this level. The exception of FY 2014, in which NSF exceeded the 70 percent target by a historically low margin, was likely due to Foundation-wide delays in proposal processing after the lapse in funding authority in October 2013.

Goal 7: Foster a Culture of Inclusion

Lead Organization: Office of Diversity and Inclusion (ODI), Office of the Director.

Goal Statement
Foster a culture of inclusion through change management efforts resulting in change leadership and accountability.[4]

Measure, Milestone, or Deliverable

FY	Target	Result
2017	By September 30, 2017, ODI will conduct the New IQ process with three additional organizational units. NSF will improve the three units' New IQ Self-Survey Scores by seven percent above established baseline.	No targets achieved.
Trend Information		
2016	1. By September 30, 2016, ODI will conduct the new IQ process with two NSF organizational units. 2. Improve the two NSF organizational units' New IQ Self-Survey Scores by five percent above established baseline.	No targets achieved
2015	Attain six of six essential elements of a model EEO agency, perform two compliance desk reviews under antidiscrimination laws.	Not Achieved (4/6 elements, 2 desk reviews)
2014	Attain six of six essential elements of a model EEO agency, perform two compliance desk reviews under antidiscrimination laws.	Not Achieved (5/6 elements, 0 desk reviews)
2013	Attain five of six essential elements of a model EEO agency.	Achieved
2012	Attain four of six essential elements of a model EEO agency.	Achieved

Discussion
Fostering inclusive work environments and realizing the full potential of the workforce's diversity requires agencies to employ effective management practices. The Office of Personnel Management (OPM), in partnership with the Department of Veterans Affairs, developed the New Inclusion Quotient (New IQ) in FY 2013 to measure and drive inclusive intelligence in the federal workplace. Inclusive intelligence is defined as intentional, deliberate, and proactive acts that ensure that people feel they belong and are uniquely valued.

OPM has recently developed a process to supplement use of the New IQ by using change management tools to help agencies support diversity and inclusion more fully. The expected outcome of the process is that the leaders will improve the employee engagement levels of their employees, resulting in an increase in the overall New IQ scores and corresponding FEVS scores over time. NSF recognizes that having a workforce comprised of a mix of permanent and temporary rotator staff requires targeted efforts. In addition, NSF's workforce is challenged on another inclusion front with the administrative and scientific staffs' feelings about uniqueness and belongingness. NSF anticipates that implementing the New IQ process in several of

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[4] NSF has had a performance goal relating to diversity and inclusion since FY 2011. Former goals were largely focused on NSF's efforts to attain "Model EEO Agency" status. For information on earlier versions of this goal, including full goal language, refer to the FY 2015 Performance Report in FY 2017 NSF Budget Request (www.nsf.gov/about/budget/fy2017/pdf/56_fy2017.pdf)

NSF's organizational units will initiate a set of behavior changes that can become habits throughout the Foundation.

Explanation of Unmet Goal

NSF's plan to implement the New IQ in FY 2017 was delayed due to potential distractions related to the relocation to Alexandria. In FY 2018, results from the 2017 FEVS will be used as the initial pulse survey for participating units. NSF is also implementing the Workforce Inclusiveness Assessment (WIA) in FY 2018, a survey instrument that will provide a deeper dive into the culture of the agency. Data from the WIA will be used to implement additional interventions and initiatives to supplement behavioral change, which should increase sustained change within the organization.

Goal 8: Evaluate NSF Investments

Lead Organization: Office of Integrative Activities.

Goal Statement
Enable consistent evaluation of the impact of NSF investments with a high degree of rigor and independence.

Measure, Milestone, or Deliverable

FY	Target	Result
2017	By September 30, 2017, NSF will have developed seven additional evaluation frameworks. The Evaluation and Assessment Capability will work with at least seven programs (one in each directorate) to develop evaluation frameworks to be included in program management plans.	Achieved
Trend Information		
2016	By September 30, 2016, NSF will have developed three illustrative models of evaluation frameworks in the following three areas: 1. investments in the development of U.S. science and engineering human capital, 2. investments in established NSF-wide priorities, and 3. long-term strategic investments.	All targets achieved
2015 (new goal)	1. By September 2015, the Evaluation and Assessment Capability will have developed evaluation quality principles and disseminated them to all directorates. 2. These quality principles will be followed by all new evaluation projects across the agency. 3. NSF will have incorporated logic models/theory of change in the language that describes the rationale for all new programs.	No targets achieved

Discussion
The Evaluation and Assessment Capability (EAC), housed in the Office of Integrative Activities, provides NSF with the independent capacity to operate from a basis of evidence in program and policy decisions. The EAC has three multi-year goals: (1) encourage a culture of evidence-based planning and policy-making; (2) encourage increased rigor, independence, and consistency in all evaluations and assessments; and (3) develop and implement a coordinated evaluation framework.

As of the end of FY 2017, EAC has evaluation contracts underway involving all of the seven directorates (see below). Each of these seven new contract statements of work has outlined an evaluation framework. The evaluations are of cross-directorate programs, which entails some directorates being involved in more than one contract and evaluation framework. Each directorate is involved in at least one contracted study.

Program	BIO	CISE	EHR	ENG	GEO	MPS	SBE	OIA
NSF INCLUDES	o	o	X	o	o	o	o	o
Secure and Trustworthy Cyberspace		X	o	o		o	o	
Broadening Participation portfolio	o	o	o	o	o	o	o	X
EPSCoR	o	o	o	o	o	o	o	X
Centers for Chemical Innovation						X		
GeoEd			o		X			
INFEWS		o	o	X	X	o	o	o

X = lead directorate/office, o = participating directorate/office

Goal 9: Increase the Percentage of Panelists Participating in Merit Review Virtually

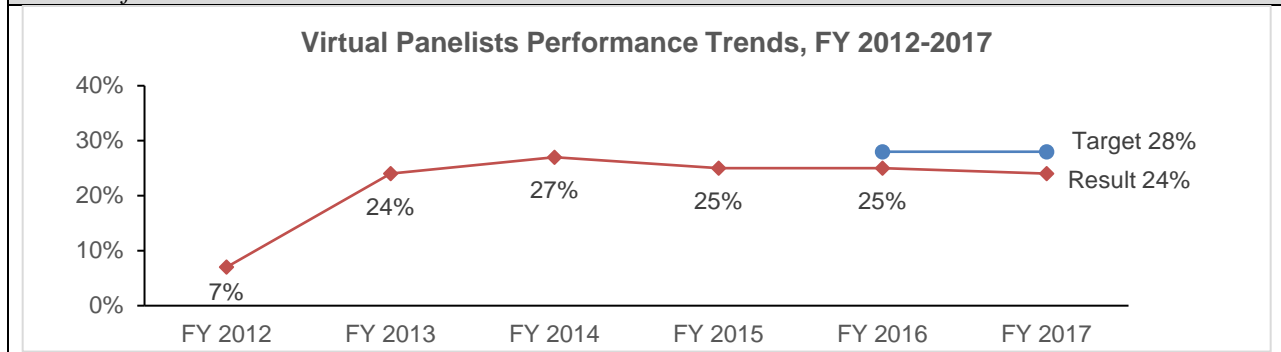Lead Organization: Office of Integrative Activities, Office of the Director.

Goal Statement
Increase the percentage of proposal review panelists that participate virtually while maintaining the quality of the merit review process.

Measure, Milestone, or Deliverable

FY	Target	Result
2017	By September 30, 2017, at least 28 percent of merit review panelists will participate virtually.	Not achieved. Result = 24 percent.
Trend Information		

Virtual Panelists Performance Trends, FY 2012-2017

Discussion
NSF makes extensive use of panels of reviewers to evaluate proposals, holding around 1900 panels annually. Review panels provide ample opportunity to test new methods and practices. One such practice, the use of virtual meeting technology to supplement or replace in-person panels,[5] was piloted at NSF from the early 2010s under the assumption that face-to-face panels impose a significant time burden on reviewers. NSF has had a performance goal relating to virtual panel usage since FY 2012.[6] Usage of virtual panelists peaked in FYs 2013 and 2014 due to several factors: a response to reductions in travel budgets; development of training materials; and management's encouragement to utilize virtual panels as a viable reviewer participation mechanism.

Explanation of Unmet Goal
The 28 percent target was a "stretch" level and not in line with projections for likely FY 2017 virtual panelist usage. Setting a stretch goal did not play a role in driving performance in this area.

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[5] The term "virtual panelist" refers to a panel reviewer who does not travel to a common location but instead participates via teleconference, videoconference, or an online meeting technology.
[6] For four years, the goal tracked a pilot project that measured the number of "wholly virtual" panels, i.e. panels that used only virtual panelists. For more information about earlier versions of this goal, refer to the FY 2015 Annual Performance Report in the FY 2017 NSF Budget Request (www.nsf.gov/about/budget/fy2017/pdf/56_fy2017.pdf).