

U N I T E D S T A T E S  
National Science Foundation

A large, stylized gear graphic in shades of blue and orange. The letters 'NSF' are prominently displayed in a light blue, serif font, centered within a dark blue circular area that forms the core of the gear. The gear's teeth extend outwards, creating a complex, symmetrical pattern.

**FY 2016**

**Agency Financial Report**



## THE NSF STATUTORY MISSION

To promote the progress of science; to advance the national health, prosperity, and welfare;  
and to secure the national defense; and for other purposes.

—*From The National Science Foundation Act of 1950 (P.L. 81-507)*



## THE NSF VISION

A Nation that creates and exploits new concepts in science and engineering  
and provides global leadership in research and education.

—*From “Investing in Science, Engineering, and Education for the Nation’s Future”  
NSF Strategic Plan for 2014-2018*



## About This Report

For fiscal year (FY) 2016, the National Science Foundation (NSF) is producing three reports to provide financial management and program performance information to demonstrate accountability to our stakeholders and the American public. These reports are produced in accordance with the Office of Management and Budget (OMB) Circular A-136, *Financial Reporting Requirements*, and meet the requirements of the CFO Act, as amended by the Government Management Reform Act of 1994 (GMRA), the Federal Managers' Financial Integrity Act of 1982 (FMFIA), the Reports Consolidation Act of 2000, and the Government Performance and Results Modernization Act of 2010. All three reports are available on NSF's website as they are completed.<sup>1</sup>

- This report, the **Agency Financial Report (AFR)**, focuses on financial management and accountability. It includes the results of NSF's annual financial statement audit, management's assurance statement, the NSF Inspector General's (IG) memorandum on the agency's FY 2017 management challenges, as well as management's report on the progress made on the management challenges identified by the IG for FY 2016. The AFR also includes a brief discussion of the agency's performance management framework. This FY 2016 AFR is being published in January 2017 due to a delay in the financial statement audit.
- The **Annual Performance Report (APR)** provides information on the progress NSF has made toward achieving its goals and objectives as described in the agency's strategic plan and Annual Performance Plan, including the strategic objectives, performance goals, and Agency Priority Goals. The **APR** will be included in NSF's *FY 2018 Budget Request to Congress*.
- NSF's **Performance and Financial Highlights** report summarizes key financial and performance information from the **AFR** and **APR**. This will be available on NSF's website when the *FY 2018 Budget Request to Congress* is published.

For copies of these reports, please send a request to [accountability@nsf.gov](mailto:accountability@nsf.gov). We welcome your suggestions on how we can make these reports more informative.

NSF by the Numbers	
<b>\$7.5 billion</b>	FY 2016 Appropriations (does not include mandatory accounts)
<b>1,883</b>	Colleges, universities, and other institutions receiving NSF funding in FY 2016
<b>49,300</b>	Proposals evaluated in FY 2016 through a competitive merit review process
<b>11,900</b>	Competitive awards funded in FY 2016
<b>225,000</b>	Proposal reviews conducted in FY 2016
<b>362,000</b>	Estimated number of people NSF supported directly in FY 2016 (researchers, postdoctoral fellows, trainees, teachers, and students)
<b>53,800</b>	Students supported by NSF Graduate Research Fellowships since 1952

<sup>1</sup> <https://www.nsf.gov/about/performance/>

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# NATIONAL SCIENCE FOUNDATION

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## A MESSAGE FROM THE DIRECTOR



Credit: NSF/Stephen Voss

The National Science Foundation (NSF) is pleased to present its *Agency Financial Report* for Fiscal Year (FY) 2016. NSF's mission is to promote the progress of science, to advance the national health, prosperity, and welfare, and to secure the national defense. For nearly seven decades, NSF has stayed true to its mission by playing a critical role in establishing U.S. leadership in science and engineering fields, fostering innovations that drive the economy and supporting the best tools to address threats, whether natural or manmade. In addition, NSF has supported efforts to find and train new talent and improve science education at every level.

Often, the long-term returns on NSF investments lead to new technologies, new understandings of our world and new insights into the human condition. These discoveries keep our nation at the forefront of the world's science and engineering enterprise. FY 2016 provided an opportunity to witness the effects of NSF investment: In February, we announced that researchers at the Laser Interferometer Gravitational-Wave Observatory (LIGO) detected gravitational waves coming from colliding black holes 1.3 billion lightyears away. This discovery, made possible by decades of NSF support, has opened up a new way to observe and understand our universe.

NSF maintains its commitment to funding curiosity-driven, potentially transformative science. With funding received from NSF in FY 2016, engineers are exploring and modeling new water technologies and systems for water treatment, distribution, reuse, and recovery to address the growing demand for water. Neuroscientists and bioengineers funded by NSF are researching cutting-edge technologies to better understand the brain — innovations that could lead to solutions that replace or compensate for lost function. And NSF-supported researchers are working to understand and be prepared for extreme events, such as tornados, floods, earthquakes, and landslides.

NSF directly supported approximately 362,000 researchers, graduate and undergraduate students, postdoctoral fellows, trainees, and K-12 teachers and students in FY 2016. Collectively, NSF-funded researchers have won more than 223 Nobel Prizes for their work in the fields of physics, chemistry, physiology and medicine, and economics, including six Nobel laureates in 2016. In addition, among the 2016 MacArthur Fellows, seven fellows were supported by NSF funding at some point in their careers.

In September 2016, the agency issued the first awards for NSF INCLUDES (Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science). NSF INCLUDES is a national initiative that seeks to improve access to STEM education and career pathways at the national scale, making them more widely inclusive of underrepresented and underserved populations. Over the next decade, NSF will expand the program, with the goal of developing a science and engineering workforce that reflects the diversity of U.S. society.

In FY 2016, NSF funded fundamental research and education across all fields of science and engineering, reaching all 50 states, the District of Columbia, and 3 U.S. territories through grants to nearly 1,900 colleges, universities, and other institutions. NSF received over 49,000 competitive requests for funding and made about 12,000 new funding awards. If you would like more information on NSF's performance management process and the complete results of our FY 2016 annual goals under the Government Performance and Results (GPRA) Modernization Act of 2010, I invite you to read NSF's *Annual Performance Report*, which will be released with NSF's *FY 2018 Budget Request to Congress*. In keeping with government-wide requirements, NSF's GPRA data are subject to a rigorous verification and validation review by an independent, external management consultant based on guidance from the U.S. Government Accountability Office.

With the publication of the FY 2016 Agency Financial Report, I am pleased to report that NSF received its 19th consecutive unmodified opinion from an independent audit of its financial statements. The Independent Auditors' Report identified no material weaknesses. In addition, NSF provides reasonable assurance that the agency is in compliance with the Federal Managers' Financial Integrity Act, and that internal control over financial reporting is operating effectively to produce reliable financial reporting.

In March 2016, I marked my second anniversary since being sworn in as NSF director. During this very active and productive time, I have observed that we at NSF never lose sight of our responsibility to be good stewards of the funding entrusted to us. We remain committed to maintaining the highest standards of accountability and transparency, so we can continue to engage the scientific imaginations of hundreds of thousands of scientists, engineers, researchers, educators, and students as we support the wonder of research and the drive for solutions that lead to tomorrow's transformative discoveries.

Thank you for your interest in the National Science Foundation, where discoveries begin.

/s/

**FRANCE A. CORDOVA**

Date: January 17, 2017

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**NSE**

**Management's Discussion  
and Analysis**

**Chapter 1**



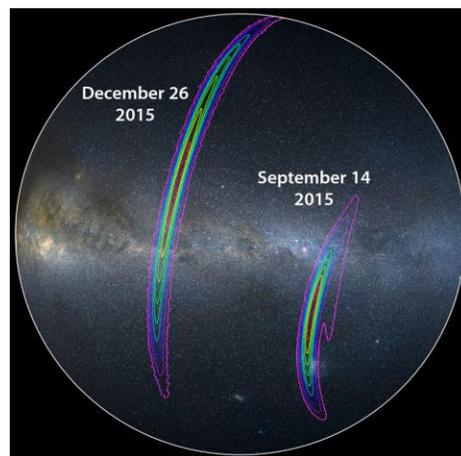
## Agency Overview

### Mission and Vision

The National Science Foundation was established in 1950 “to promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense; and for other purposes.”<sup>1</sup> NSF is the only federal agency responsible for funding nonmedical research in all fields of science, engineering, education, and technology.

For almost seven decades, NSF investments in discovery and learning have helped strengthen our Nation’s security, grow our economy, and maintain our world leadership in innovation. NSF has embraced the challenge of ensuring that scientific discovery and technological breakthroughs continue to expand the boundaries of human knowledge, and its investments have enabled innovations and technologies that address important societal challenges. These discoveries have led us to the internet and solar panels, three-dimensional (3-D) printing, and life-saving drugs. Through research awards approved in FY 2016, NSF-supported scientists are learning how to turn specific chemicals in the brain on and off. This understanding could lead to new methods for diagnosing and treating chronic pain, drug addiction, and neurological diseases. Scientists at the NSF-funded Harvard Materials Research Science and Engineering Center are designing fabrics to improve bullet-proof vests for U.S. troops, while others work to create fibers that can support new nerve tissue as it grows. Engineering researchers funded by NSF have used advances in nanotechnology and imaging techniques to develop a sensor system that detects damage to bridges, dams, and roadways before it is visible. Other researchers were involved in developing computer models to address the complexity, competing objectives, and uncertainty facing municipal government planners who are trying to meet increasing water demand in the southwest, while using less energy and improving water quality. Through the Small Business Innovation Research (SBIR) program, NSF supports research and early-stage development of innovative, high-risk products, processes, and services, such as development of a retinal implant to restore vision to people with age-related macular degeneration. Not all scientific discoveries have an obvious, near-term technological application. Sustained NSF investment in

**Gravitational waves detected from a second pair of colliding black holes.** In December 2015, almost 3 months after the initial confirmation of the existence of gravitational waves in the universe, the NSF-funded Laser Interferometer Gravitational-Wave Observatory (LIGO) captured a second set of waves from another black hole merger 1.4 billion light years away. For the first time, researchers confirmed that one of the black holes was spinning, indicating that the black hole experienced some dynamic process before the merger. NSF was the initial funder of the LIGO project 40 years ago, and its continued commitment to LIGO’s high-risk, high-reward research now makes possible an entirely new way to observe some of the most energetic events in our universe. This new astrophysical information is changing the way we understand the universe.



Mapping the approximate locations of LIGO detections on a sky map of the southern hemisphere. Credit: Axel Mellinger, LIGO.

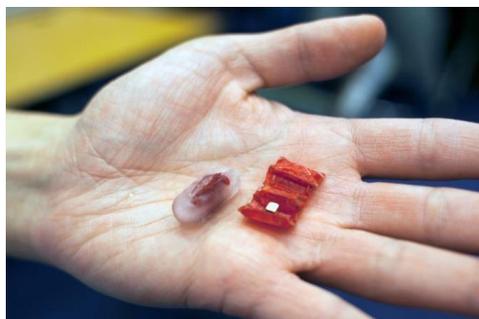
<sup>1</sup> National Science Foundation Act of 1950 (P.L. 81–507)

basic research, however, provides a steady pipeline of new ideas and techniques that, together with a highly trained science and engineering (S&E) workforce,<sup>2</sup> contribute to the health of the Nation's innovation ecosystem. NSF's mission affirms its commitment, through investment in these discoveries, to advancing the frontiers of S&E, ensuring the sustained vigor of both fundamental research and leveraging the Nation's innovation ecosystem to maintain global leadership in the 21st century.

NSF's vision is of a Nation that capitalizes on new concepts in science and engineering and provides global leadership in advancing research and education. NSF's core values articulate the essential qualities that staff are encouraged to embody in support of the agency's mission. Among these core values are a dedication to scientific excellence, learning, stewardship, inclusiveness, and accountability. NSF strives to excel as a federal agency by investing in priorities that address important national challenges while promoting economic growth, innovation, and new scientific advancements. NSF's Strategic Plan, *Investing in Science, Engineering, and Education for the Nation's Future*,<sup>3</sup> identifies three interrelated strategic goals to achieving the agency's mission: (1) transform the frontiers of science and engineering, (2) stimulate innovation and address societal needs through research and education, and (3) excel as a federal science agency. These strategic goals represent a roadmap for NSF's success. A detailed discussion of NSF's Strategic Plan can be found in the Performance section, beginning on page MD&A-11.

NSF is the funding source for 24 percent of all the federally supported basic scientific research conducted by America's colleges and universities, and this share increases to nearly 60 percent when medical research supported by the National Institutes of Health is excluded.<sup>4</sup> NSF promotes scientific progress and advances scientific frontiers by making awards and managing award portfolios of the highest quality. NSF awards reflect national priorities, keep U.S. researchers and research institutions at the forefront of innovation, and distinguish the United States as a leader in the rapidly changing global landscape of scientific research and discovery. In doing so, NSF pursues transformational work, new fields of scientific inquiry, and new theoretical paradigms. Increasingly, NSF awards are made where scientific disciplines converge, which reflects the increasingly interdisciplinary nature of modern science and engineering.

**Foldable robots for the clinic.** Retrieving a tiny button battery from a child's stomach is challenging, yet every year 3,500 button batteries are swallowed in the U.S. If left in the body, ingested batteries can burn the digestive track. To give doctors an option other than surgery, NSF-funded researchers at the Massachusetts Institute of Technology (MIT) have developed a tiny foldable robot the size of a small pill. Once swallowed, the robot unfolds and moves toward its target via external magnetic field. Besides foreign object retrieval, similar devices can patch wounds and deliver medicine. After completing their mission, the robots dissolve. The researchers plan to redesign the robot, adding sensors so that it can control itself rather than relying on external manipulation.



NSF-funded researchers have developed an origami robot that folds into an ingestible capsule. Credit: Melanie Gonick, MIT.

<sup>2</sup> For more information on the state of the Nation's S&E workforce, see *Revisiting the STEM Workforce: A Companion to Science and Engineering Indicators 2014*: [https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsb201510](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsb201510)

<sup>3</sup> NSF's Strategic Plan: [https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf14043](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf14043)

<sup>4</sup> NSF, National Center for Science and Engineering Statistics. *Survey of Federal Funds for Research and Development Fiscal Years 2014–16*. <https://ncesdata.nsf.gov/fedfunds/2014/>

A cornerstone of NSF investment in the development of a world-class workforce is the Graduate Research Fellowship Program, which has funded nearly 53,800 Graduate Research Fellows since 1952. The ranks of NSF fellows include numerous individuals who have made transformative breakthroughs in science and engineering research. Many of them have become leaders in their chosen careers—over 450 have become members of the National Academies of Sciences or Engineering, and 40<sup>5</sup> have been honored as Nobel laureates. 223 Nobel Prize winners have received NSF support at some point in their careers. These investments are a critical means by which NSF identifies, nurtures, and invests in scientific potential.

For nearly seven decades, NSF has supported basic research and education across all fields of science and engineering. NSF's investments seamlessly connect research and education to support the development of a world-class scientific workforce that can engage fully and contribute imaginatively in the 21st century, as leaders increasingly rely on technology to meet challenges, identify possibilities, and leverage opportunities. NSF's sustained support cultivates scientists and engineers who are able to transcend the laboratory and contribute to the 21st century S&E enterprise at the leading edge of scientific discovery. The scientific discoveries of today, in turn, become the foundation of our Nation's future—contributing to the Nation's health, prosperity, and well-being while inspiring new and more diverse generations of Americans to explore the scientific frontiers of tomorrow.

## Following the Money

NSF is funded primarily through congressional appropriations to six accounts: Research and Related Activities (R&RA), Education and Human Resources (EHR), Major Research Equipment and Facilities Construction (MREFC), Agency Operations and Award Management (AOAM), National Science Board (NSB), and Office of Inspector General (OIG). Appropriations in these six accounts in FY 2016 totaled \$7,463 million,<sup>6</sup> an increase of \$119 million, or almost 2 percent, over the FY 2015 appropriations level of \$7,344 million. R&RA, EHR, and MREFC appropriations fund the agency's programmatic activities and accounted for 95 percent of NSF's total appropriations in FY 2016. Figure 1.1 provides details on NSF's FY 2016 appropriations.

**Early detection of dyslexia.** Between 10 percent and 17 percent of the U.S. population suffers from dyslexia. With early detection and quick intervention, however, researchers can more effectively help and treat dyslexic children. In studying the brain activity of children as they read, an NSF-funded researcher at New York's Binghamton University has discovered a way to predict early on which children will have reading disabilities such as dyslexia. This earlier detection allows caregivers to intervene at a crucial stage and design treatment plans to help children become successful readers. The researcher is currently developing a screening test able to identify a reading problem a full 2 years before it emerges, leaving time for effective intervention.

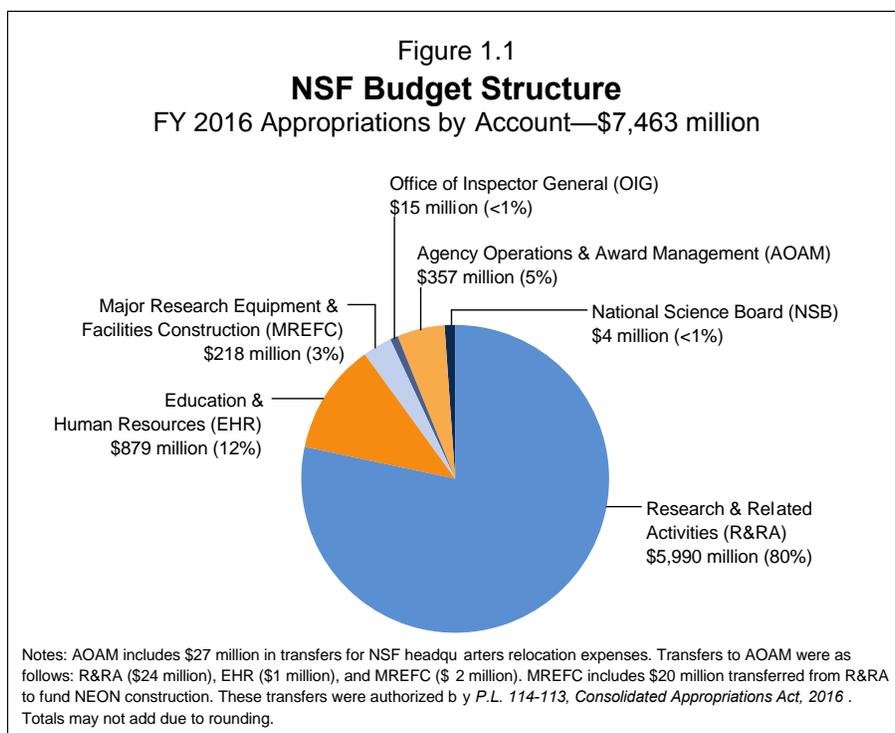
The same brain research may also have applications in security and identification verification, as researchers study whether brain signatures can act as a brain-based biometric.



Credit: Sarah Laszlo, Binghamton University.

<sup>5</sup> 43 Nobel laureates were awarded the NSF Graduate Research Fellowship; 40 were fellows.

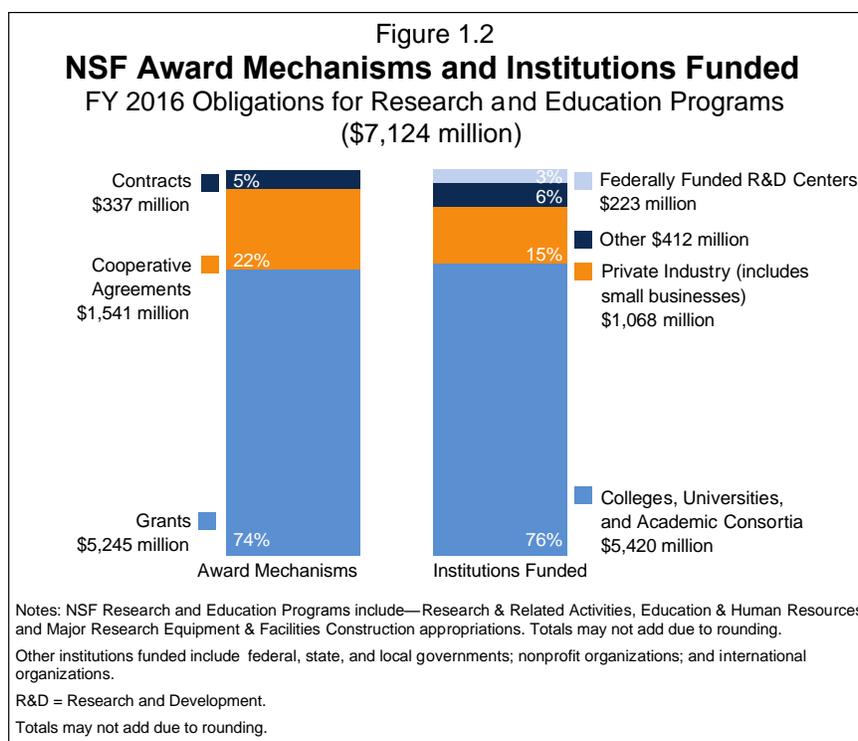
<sup>6</sup> FY 2016 appropriations of \$7,463 million plus Donations (\$24.4 million) plus H1-B Nonimmigrant Petitioner Receipts (\$139.3 million) equal Appropriations (Discretionary and Mandatory) of \$7,627 million, as shown in the Statement of Budgetary Resources.



- R&RA, which supports basic research and education activities at the frontiers of science and engineering, including high-risk and transformative research, accounted for 80 percent of FY 2016 funding. The FY 2016 R&RA funding level of \$5,990 million was \$56 million, approximately 1 percent, above the FY 2015 appropriation of \$5,934 million.
- EHR, which supports activities that ensure a diverse, competitive, and globally engaged U.S. science, technology, engineering, and mathematics (STEM) workforce and a scientifically literate citizenry is NSF's second largest appropriation, accounting for about 12 percent of the agency's budget. EHR's FY 2016 funding level of \$879 million was \$13 million, approximately 2 percent, above the FY 2015 EHR appropriation of \$866 million.
- The MREFC appropriation supports the construction of unique national research platforms and major research equipment that enable cutting-edge research. This account was 3 percent of the agency's total appropriations in FY 2016. The FY 2016 MREFC funding level of \$218 million increased almost \$18 million, or 9 percent, over the prior year appropriation of \$201 million. This increase reflects the transfer of \$20 million in R&RA funds to provide additional support for the National Ecological Observatory Network (NEON) construction project.
- FY 2016 AOAM funding, \$357 million, supports NSF's administrative and management activities. AOAM was approximately 5 percent of NSF's total FY 2016 appropriations. AOAM increased \$32 million, 10 percent, from the FY 2015 level of \$325 million. This includes \$27 million from the R&RA, EHR, and MREFC accounts to support the upcoming relocation of NSF's headquarters to Alexandria, Virginia.
- Separate appropriations support the activities of the OIG and the NSB; each accounted for less than 1 percent of NSF's total FY 2016 appropriations. The FY 2016 OIG appropriation of \$15.1 million increased \$730,000, 5 percent, over the prior year appropriation of \$14.4 million. NSB received an appropriation of \$4.4 million in FY 2016, equal to the previous year's funding level.

- In FY 2016, 90 percent of research funding was allocated based on competitive merit review.<sup>7</sup> Over 34,000 members of the science and engineering community participated in the merit review process as panelists and proposal reviewers.<sup>8</sup> Awards were made to 1,883 institutions in 50 states, the District of Columbia, and 3 U.S. territories. These institutions employ America's leading scientists, engineers, and educators; and they train the leading innovators of tomorrow. In FY 2016, over 362,000 people were directly involved in NSF programs and activities, receiving salaries, stipends, participant support, and other types of direct involvement. Beyond these figures, NSF programs indirectly impact millions of people, reaching K-12 students and teachers, the general public, and researchers through activities including workshops; informal science activities such as museums, television, videos, and journals; outreach efforts; and dissemination of innovative curricula and teaching methods.

In FY 2016, NSF funded 11,893 new awards, mostly to academic institutions. As shown in Figure 1.2, 76 percent of support for research and education programs (\$5,420 million) was to colleges, universities, and academic consortia. Private industry, including small businesses, accounted for 15 percent (\$1,068 million), and support to Federally Funded Research and Development Centers (FFRDCs) accounted for 3 percent (\$223 million). Other recipients (\$412 million) included federal, state, and local governments; nonprofit organizations; and international organizations. A small number of awards fund research in collaboration with other countries, which adds value to the U.S. scientific enterprise and maintains U.S. leadership in the global scientific enterprise.



As shown in Figure 1.2, NSF's award funding was primarily through the use of grants and cooperative agreements. Grants can be funded either as standard awards, in which funding for the full duration of the

<sup>7</sup> NSF does not require external merit review for certain kinds of proposals, including contracts and awards to FFRDCs, proposals for international travel grants and some conferences, symposia, and workshops.

<sup>8</sup> For more information about NSF's merit review process, see [https://www.nsf.gov/bfa/dias/policy/merit\\_review/](https://www.nsf.gov/bfa/dias/policy/merit_review/) and *Report to the National Science Board on the National Science Foundation's Merit Review Process, FY 2015* (NSB-2016-41) at <https://www.nsf.gov/publications/ods/results.jsp?TextQuery=nsb201641>.

project is provided in a single fiscal year, or as continuing awards, in which funding for a multiyear project is provided in increments. Cooperative agreements are used when the project requires substantial agency involvement during the project performance period (e.g., research centers, multi-use facilities). Contracts (procurement instruments) are used to acquire products, services, and studies (e.g., program evaluations) required primarily for NSF or other government use.

## Organizational Structure

NSF is an independent federal agency headed by a Director who is appointed by the President and confirmed by the U.S. Senate.<sup>9</sup> The Director and the 24-member National Science Board (NSB) jointly pursue the goals and function of NSF, including the duty to “recommend and encourage the pursuit of national policies for the promotion of research and education in science and engineering.”<sup>10</sup> The NSB identifies issues critical to NSF’s future and helps chart the strategic direction of NSF’s budget and programs. The Board also serves as an independent body of advisors to both the President and the Congress on policy matters related to S&E and education in S&E. NSB members are appointed by the President and are prominent contributors to the S&E research and education community.<sup>11</sup> NSF’s Director is a member *ex officio* of the Board. The Director and the other NSB members serve 6-year terms.

The NSF workforce includes nearly 1,400 permanent staff.<sup>12</sup> NSF also regularly recruits visiting scientists, engineers, and educators as rotators who work at NSF for up to 4 years.<sup>13</sup> Rotators bring fresh perspectives from across the country and across all fields of S&E supported by the Foundation, helping explore new directions for research in science, engineering, and education, including emerging interdisciplinary fields. As shown in Figure 1.3, NSF’s organizational structure aligns with the major fields of S&E.<sup>14</sup>

In addition to the agency’s headquarters located in Arlington, Virginia, NSF maintains offices in Brussels, Belgium, Tokyo, Japan, and Beijing, China, to facilitate its international activities and an office in Christchurch, New Zealand, to support the U.S. Antarctic Program (USAP). NSF is scheduled to relocate its headquarters from Arlington to Alexandria, Virginia, in 2017.

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<sup>9</sup> The Director’s biography is available at [www.nsf.gov/news/speeches/cordova/cordova\\_bio.jsp](http://www.nsf.gov/news/speeches/cordova/cordova_bio.jsp).

<sup>10</sup> 42 U.S. Code 1862(d): <https://www.law.cornell.edu/uscode/text/42/1862>

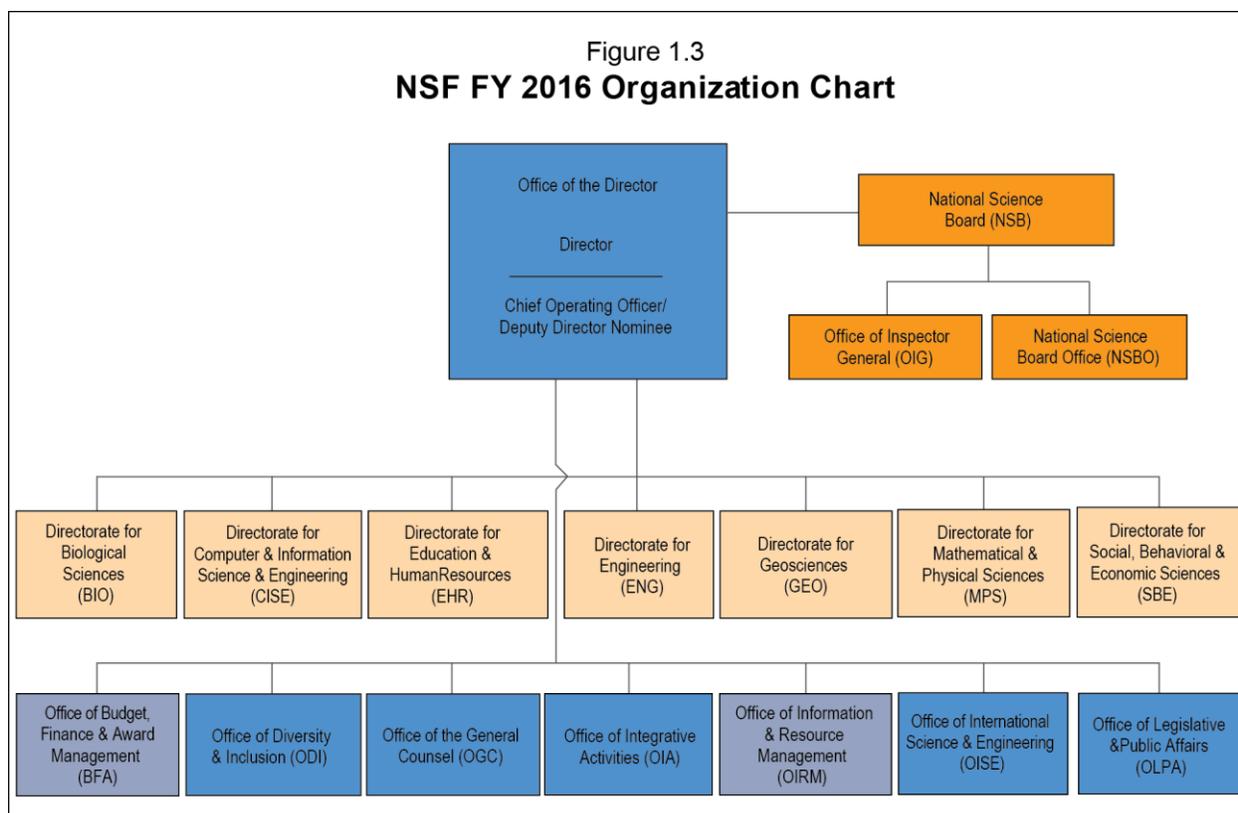
<sup>11</sup> A list of NSB members is available at <https://www.nsf.gov/nsb/members/>.

<sup>12</sup> Full-time equivalents (FTE).

<sup>13</sup> As of September 30, 2016, temporary appointments included 183 under the Intergovernmental Personnel Act (IPA) Mobility Program.

<sup>14</sup> NSF’s organization chart is available at: [https://www.nsf.gov/staff/organizational\\_chart.pdf](https://www.nsf.gov/staff/organizational_chart.pdf).

Figure 1.3  
NSF FY 2016 Organization Chart



## Management Challenges

In October 2015, the OIG identified seven major management and performance challenges for the agency for FY 2016: (1) establishing accountability over large cooperative agreements, (2) management of NSF's business operations, (3) management of the Intergovernmental Personnel Act (IPA) program, (4) moving NSF headquarters to a new building, (5) management of the USAP, (6) improving grant administration, and (7) to encourage the ethical conduct of research.<sup>15</sup>

Management's report on the significant activities undertaken in FY 2016 to address these challenges is located in *Appendix 3B: Management Challenges—NSF Response* of this Agency Financial Report (AFR). The report also discusses activities planned for FY 2017 and beyond. Some of these significant actions and planned next steps to address the challenges are highlighted below:

### *Establishing Accountability over Large Cooperative Agreements*

NSF has been continuously enhancing its pre- and post-award oversight of large facilities cooperative agreements since June 2014. These enhancements are included in the latest revision of the Large Facilities Manual (LFM)<sup>16</sup> and internal Standard Operating Guidance. To build on these improvements, in FY 2016, the agency carefully analyzed the December 2015 report and recommendations of the National Academy of Public Administration (NAPA).<sup>17</sup> NSF agrees with the spirit of all the recommendations, has accommodated many of them, and will continue addressing the remainder of the NAPA recommendations in FY 2017. In FY 2016, NSF took actions to bolster research infrastructure oversight, enhance project

<sup>15</sup> The NSF Inspector General's memorandum on Management Challenges for NSF in FY 2016 is in NSF's *FY 2015 Agency Financial Report* Appendix 3A, <https://www.nsf.gov/publications/ods/results.jsp?TextQuery=nsf16002>

<sup>16</sup> Large Facilities Manual: [https://www.nsf.gov/bfa/lfo/docs/LargeFacilitiesManual2016Final\\_Draft\\_12.23.2016.pdf](https://www.nsf.gov/bfa/lfo/docs/LargeFacilitiesManual2016Final_Draft_12.23.2016.pdf)

<sup>17</sup> *National Science Foundation: Use of Cooperative Agreements to Support Large Scale Investment in Research* [http://napawash.org/images/reports/2015/NSF\\_Phase\\_2\\_Comprehensive\\_Report.pdf](http://napawash.org/images/reports/2015/NSF_Phase_2_Comprehensive_Report.pdf).

management expertise, and ensure that NSF's large research infrastructure policy and procedures are followed. For example, the Foundation: (1) hired additional staff in the Large Facilities Office, (2) developed certification and training for NSF staff engaged in large facilities oversight, and (3) drafted internal control testing and other oversight mechanisms. To ensure reasonable costs for large facility projects, NSF rolled out internal NSF operating guidance on the obligation and allocation of budget contingency; further improved management controls by implementing contract mechanisms to support independent cost estimate reviews, per U.S. Government Accountability Office (GAO) practices and procedures; and developed a tool for large facility award recipients that will support awardees in audit readiness. In March 2016, NSF strengthened management of NEON, completing the process for selecting a new managing organization for the NEON project, Battelle Memorial Institute. The turnaround of the NEON project reflects NSF's quick action to restore confidence in the oversight of a major scientific facility and to ensure sound financial and technical oversight in bringing the construction portion of the project to completion. Going forward, NSF plans to develop operating guidance in such areas as: (1) Earned Value Management System verification/validation reviews; and (2) implementing training, certification, and core competency standards for NSF staff engaged in large facilities oversight.

#### ***Management of NSF's Business Operations***

- *Improper payments*—NSF resolved the FY 2015 audit report finding of noncompliance with the Improper Payments Elimination and Recovery Act (IPERA) reporting requirements. In addition, NSF submitted a corrective action plan (CAP) to address the audit findings. In August 2016, the OIG reviewed the CAP and found it responsive to OIG recommendations. To further assess the agency's risk of improper payments, NSF completed a policy and procedure document for future IPERA risk assessments. NSF will complete future IPERA risk assessments on a 3-year cycle and report results in FY 2018.
- *Information & Information Technology (IT) resources*—NSF has been proactive in reviewing security controls and identifying areas to strengthen the program, including the appropriate allocation of USAP resources for IT security. The agency will continue to address identified IT security weaknesses through program funding.
- *Transparency & accountability*—NSF is well-positioned to successfully implement the Digital Accountability and Transparency (DATA) Act requirements to publish financial management, procurement, and financial assistance data. NSF has successfully submitted test files, revised reporting based on final technical guidance from Treasury. If financial system patches cannot be implemented on time, NSF has developed a contingency plan to still meet the DATA Act deadline by May 2017.
- *Government records*—In November 2015, NSF submitted a CAP to address a GAO report finding that agencies needed to take action to meet the requirements of a National Archives and Records Administration's directive. The directive required agencies to reform policies and practices relating to records management and to provide a framework for the management of electronic records. NSF deployed a permanent, electronic grant records system in February 2016. In the near future, NSF will formalize plans to manage other types of records and ensure execution of a comprehensive plan to manage permanent records electronically.

#### ***Management of the IPA Program***

Through the IPA program, NSF provides the opportunity for scientists, engineers, and educators to rotate into the agency as temporary Program Directors, advisors, and leaders. NSF's IPA Steering Committee was established in April 2016 to oversee the ongoing implementation of the program. This summer, the steering committee submitted reports to the NSF Director providing recommendations on managing IPA costs and developing an integrated workforce framework. The committee also worked on developing strategic principles for managing the IPA program. In the upcoming year the committee will address IPA

policies, establish a framework for oversight of the program, and coordinate the development of budget guidelines for the IPA program.

### ***Moving NSF Headquarters to a New Building***

In FY 2016, the NSF Relocation Office made significant progress in reducing risk related to scheduling delays, union negotiations, and records management. In August 2017, NSF will begin to relocate staff from Arlington to Alexandria, Virginia.

### ***Management of the USAP***

NSF continued progress on the 2012 Blue Ribbon Panel (BRP) recommendations.<sup>18</sup> In FY 2016, the agency addressed major infrastructure upgrades for McMurdo Station through continued design effort to: (1) prepare for the Antarctic Infrastructure Modernization for Science (AIMS) project's preliminary design review; (2) upgrade McMurdo lodging, Vehicle/Equipment Operations Center, and Information Technology and Communication Primary Operations Center; and (3) replace the Palmer Pier. In the coming year, NSF expects to complete planning and design efforts for many of these projects, as well as prepare for the next phase in the AIMS project, and continue to take steps to ensure the overall health and safety of USAP participants.

### ***Improving Grant Administration***

NSF employs a multi-pronged approach to accountable grants administration: (1) a suite of policy and procedural documents that incorporate federal regulations and agency-specific requirements, (2) IT system business rules to enforce policies and procedures, and (3) a risk-based approach to financial and administrative monitoring. NSF continues to expand and upgrade mechanisms for communicating policies, procedures, and business practices to staff and external stakeholder communities. Activities in FY 2016 focused on ensuring transparency and accountability, streamlining written guidance for administering grants, and enhancing oversight of pre- and post-award activities. In FY 2017, NSF will continue its implementation of monitoring and spending controls; keep refining guidance and leveraging outreach opportunities; and assess and manage risk, as appropriate.

**Early-career astronomers detect new worlds.** Two early-career researchers added two more exoplanets to the trove of nearly 3,000 exoplanets now known to exist. A first-year graduate student from the University of Arizona supported by NSF's Graduate Research Fellowship Program (GRFP) detected—and directly imaged—a planet in a multi-star system 340 light years from Earth. Estimated to be 16 million years old, the exoplanet is among the youngest discovered. Another GRFP-supported graduate student leading a team at Caltech also detected *the* youngest-known, fully formed exoplanet, aged between 5 million and 10 million years old. Both exoplanet discovery teams included additional members currently and formerly supported by NSF's GRFP. The discoveries of these and other exoplanets help scientists better understand the life cycles of planetary systems, including our own.



Artist's impression of a planet in a triple-star system discovered by a University of Arizona team. Credit: L. Calçada, ESO.

<sup>18</sup> U.S. Antarctic Program Blue Ribbon Panel Report: [https://www.nsf.gov/geo/plr/usap\\_special\\_review/usap\\_brp/rpt/index.jsp](https://www.nsf.gov/geo/plr/usap_special_review/usap_brp/rpt/index.jsp).

### ***To Encourage the Ethical Conduct of Research***

NSF recognizes the importance of ethical conduct of research and requires each institution that submits a proposal to certify it has a plan to provide appropriate training and oversight in the ethical conduct of research to all undergraduates, graduate students, and postdoctoral researchers involved in NSF-supported

**Ancient monkey fossil provides insights into biological history of the Americas.** In Panama, researchers funded by NSF's Partnerships in International Research and Education program unearthed a 21 million-year-old monkey fossil that upends conventional thinking about when and how species dispersed from South America to North America. Scientists previously thought species used a 4 million-year-old land bridge, called the Isthmus of Panama, to move between continents. The discovery of the ancient fossil (closely related to living South American monkeys) on the North American landmass, however, suggests the species moved northward long before the land bridge formed—nearly 17 million years earlier. The fossil was found during the expansion of the Panama Canal, which exposed fossil-bearing rock strata for the first time.



Photograph of the upper molar of 21 million-year-old *Panamacebus*, the first-ever fossil evidence for monkeys recovered from the North American landmass. Credit: Aldo Rincon, Florida Museum of Natural History.

research. Further, NSF has taken concrete steps, including funding the major relaunch of the Online Ethics Center website in February 2016, to enhance awareness of ethical conduct of research issues by supporting the development of tools and resources that enhance the ability of research institutions to cultivate cultures of academic and research integrity. As in previous years, in FY 2016, NSF's Cultivating Cultures for Ethical STEM (CCE STEM) invested in innovative approaches to foster ethical STEM research in all of the fields of S&E that NSF supports, including within interdisciplinary, inter-institutional, and international contexts. NSF will continue to fund CCE STEM research projects that use basic research to identify what constitutes responsible or irresponsible, just or unjust scientific practices and sociotechnical systems, and how to best instill students with this knowledge. In FY 2017, NSF will issue an NSF Dear Colleague Letter emphasizing the importance of the responsible and ethical conduct of research. The agency will continue to take steps to support and share research that provides answers and best practices for ethical STEM communities.

## Performance

This discussion of NSF's FY 2016 performance management activities focuses on the agency's efforts related to the Government Performance and Results Act of 1993 (GPRA) and the GPRA Modernization Act of 2010<sup>19</sup> and on the agency's management metrics.

In FY 2016, NSF took steps toward developing an enterprise risk management (ERM) framework to identify, assess, respond, and report on risks. NSF's ERM process will provide valuable, enterprise-wide information to assist leadership and managers to make sound decisions, alleviate threats, and identify opportunities to accomplish NSF's mission and objectives. NSF plans to implement ERM by taking incremental steps, leveraging existing resources, and building on its current risk management practices. The agency's aim is to integrate ERM within its key organizational processes such as strategic planning, budgeting, and performance management.

### FY 2016 Strategic Framework

NSF is subject to GPRA and the GPRA Modernization Act of 2010, as well as related performance reporting guidance issued by the Office of Management and Budget (OMB).<sup>20</sup> NSF's Strategic Plan, *Investing in Science, Engineering, and Education for the Nation's Future*,<sup>21</sup> lays out the following strategic goals:

- The first mission-focused goal, *Transform the Frontiers of Science and Engineering*, derives from the first part of NSF's mission, "to promote the progress of science" in order to expand and explore the frontiers of human knowledge; to enhance the ability of the Nation to meet the challenges it faces; and to create new paradigms and capabilities for scientific, technological, and (consequently) economic leadership in an increasingly fast-paced, competitive world.
- The second mission-focused goal, *Stimulate Innovation and Address Societal Needs through Research and Education*, flows from the latter part of the NSF mission statement—"to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." Through targeted solicitations and core programs, NSF is able to focus the attention of the broader science and engineering community on fundamental aspects of high-priority national challenges.
- The management-focused goal, *Excel as a Federal Science Agency*, directs NSF to integrate its mission, vision, and core values to efficiently and effectively execute its activities, and to provide the flexibility and agility required to meet the quickly evolving challenges associated with the first two strategic goals.

These three strategic goals are addressed through seven specific objectives. Objectives are intended to be comprehensive of agency program activities. Progress toward these objectives is monitored through annual performance goals (seven goals in FY 2016) and Strategic Reviews (see next section).

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<sup>19</sup> GPRA: <https://www.whitehouse.gov/omb/mgmt-gpra/index-gpra>.

<sup>20</sup> OMB Circular A-11, *Preparation, Submission, and Execution of the Budget*, Part 6: [https://www.whitehouse.gov/omb/circulars\\_a11\\_current\\_year\\_a11\\_toc](https://www.whitehouse.gov/omb/circulars_a11_current_year_a11_toc).

<sup>21</sup> NSF Strategic Plan: [https://www.nsf.gov/about/performance/strategic\\_plan.jsp](https://www.nsf.gov/about/performance/strategic_plan.jsp).

**NSF 2014–2018 Strategic Goals**

Strategic Goals	Strategic Objectives
G1: Transform the Frontiers of Science and Engineering	O1: Invest in fundamental research to ensure significant continuing advances across science, engineering, and education. O2: Integrate education and research to support development of a diverse STEM workforce with cutting-edge capabilities. O3: Provide world-class research infrastructure to enable major scientific advances.
G2: Stimulate Innovation and Address Societal Needs through Research and Education	O1: Strengthen the links between fundamental research and societal needs through investments and partnerships. O2: Build the capacity of the Nation to address societal challenges using a suite of formal, informal, and broadly available STEM educational mechanisms.
G3: Excel as a Federal Science Agency	O1: Build an increasingly diverse, engaged, and high-performing workforce by fostering excellence in recruitment, training, leadership, and management of human capital. O2: Use effective methods and innovative solutions to achieve excellence in accomplishing the agency's mission.

In addition, NSF set two Agency Priority Goals for FY 2016–FY 2017 to monitor progress in specific areas in where near-term focus can impact the Nation. In FY 2016, NSF continued its practice of having agency leaders conduct quarterly data-driven performance reviews for each of the Agency Priority Goals. NSF also participates actively in Cross-Agency Priority Goals relevant to its mission.

**NSF FY 2016–FY 2017 Priority Goals**

Type of Goal	Goal Header	Goal Statement
Agency Priority Goal	Improve Graduate Student Preparedness	Improve STEM graduate student preparedness for entering the workforce. 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 themselves for a range of careers.
	Invest Strategically in Public Participation in STEM Research	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). By September 30, 2017 NSF will implement mechanisms to expand and deepen the engagement of the public in STEM research.
Cross-Agency Priority Goals	STEM Education	Improve science, technology, engineering and mathematics (STEM) education by implementing the federal STEM Education 5-Year Strategic Plan, announced in May 2013, specifically: <ul style="list-style-type: none"> <li>• Improve STEM instruction.</li> <li>• Increase and sustain youth and public engagement in STEM.</li> <li>• Enhance STEM experience of undergraduate students.</li> <li>• Better serve groups historically under-represented in STEM fields.</li> <li>• Design graduate education for tomorrow's STEM workforce.</li> <li>• Build new models for leveraging assets and expertise.</li> <li>• Build and use evidence-based approaches.</li> </ul>
	Lab-to-Market	Increase the economic impact of federally funded research and development by accelerating and improving the transfer of new technologies from the laboratory to the commercial marketplace.

## Strategic Objectives and Strategic Reviews

In the spring of 2016, NSF conducted its third set of Strategic Reviews to address the requirement of the GPRA Modernization Act of 2010, Section 1116(f). OMB Circular A-11 (Section 270.2) specifies that: “Annually, agency leaders should review progress on each of the agency’s strategic objectives established by the agency Strategic Plans and updated annually in the Annual Performance Plan. These reviews should inform strategic decision-making, budget formulation, and near-term agency actions, as well as preparation of the Annual Performance Plan and Annual Performance Report.” NSF accomplished the Strategic Reviews by conducting a strategic and focused crosscutting analysis using the results of existing assessment processes, evaluations, and reports as well as other sources of evidence. The following provides information on the focus of the Strategic Reviews in FY 2016.

**High flyer targets hurricanes.** It wasn’t quite Uber, but NSF’s Gulfstream-V (GV) aircraft gave a lift to a crew of hurricane hunters from the National Oceanic and Atmospheric Administration (NOAA) during the peak of hurricane season in September 2016. The ride-share resulted from a partnership between NSF and NOAA and meant that hurricane forecasting continued uninterrupted during this critical time of year. As Hurricane Lester approached Hawaii, the GV flew into the storm three times, its range and climb allowing the crew to stay airborne longer and soar higher than they could have with NOAA’s Gulfstream-IV, which was offline for unscheduled maintenance. On each mission, the GV deployed dropsondes, sensors that float down through the clouds collecting details such as wind speed, temperature, and pressure. This information was processed onboard and transmitted to the World Meteorological Organization’s Global Telecommunications System for immediate inclusion in hurricane forecast models. The GV’s detailed measurements improved the accuracy of real-time forecasts.



The NSF/NCAR Gulfstream V readies for takeoff on a mission to study a tropical storm. Credit: Carlye Calvin, UCAR.

*G1/O1: Invest in fundamental research to ensure significant continuing advances across science, engineering, and education.* The G1/O1 Strategic Review investigated NSF’s investment in the **science of broadening participation**, which is defined as fundamental social science and education research to identify and understand the factors that foster or hinder participation, retention, and success of members of underrepresented groups in STEM fields.

*G1/O2: Integrate education and research to support development of a diverse STEM workforce with cutting-edge capabilities.* The G1/O2 Strategic Review examined how NSF can improve measurement of its investments in **graduate education** in light of current trends in the diversity of career pathways of STEM graduate students.

*G1/O3: Provide world-class research infrastructure to enable major scientific advances.*

*G3/O1: Build an increasingly diverse, engaged, and high-performing workforce by fostering excellence in recruitment, training, leadership, and management of human capital.*

And, *G3/O2: Use effective methods and innovative solutions to achieve excellence in accomplishing the agency’s mission.* The combined G1/O3, G3/O1, and G3/O2 Strategic Review focused on two recommendations from

the report by the NAPA pertaining to the NSF staff responsible for oversight of major facilities. NSF and NSB commissioned NAPA to assess NSF’s use of cooperative agreements to provide effective financial and other support for large-scale **infrastructure** investment in science and technology.<sup>22</sup>

<sup>22</sup> National Science Foundation: *Use of Cooperative Agreements to Support Large Scale Investment in Research* [http://napawash.org/images/reports/2015/NSF\\_Phase\\_2\\_Comprehensive\\_Report.pdf](http://napawash.org/images/reports/2015/NSF_Phase_2_Comprehensive_Report.pdf).

*G2/O1: Strengthen the links between fundamental research and societal needs through investments and partnerships; G2/O2: Build the capacity of the Nation to address societal challenges using a suite of formal, informal, and broadly available STEM educational mechanisms.* The combined G2/O1 and G2/O2 Strategic Review investigated the broader impacts criterion of NSF's merit review process. Defined as, "the potential for the proposed activity to benefit society or advance desired societal outcomes," the broader impacts criterion is the mechanism through which the merit review process communicates the importance of societal benefit to its potential awardees.

More information, including information about the specific "Opportunities for Action or Improvement" recommended by the Strategic Reviews, will be published with NSF's *FY 2018 Budget Request to Congress*.

## **FY 2016 Progress toward Achievement of Goals**

NSF's FY 2016 Annual Performance Report (APR)<sup>23</sup> will provide a complete discussion of the Foundation's performance measures, including descriptions of the metrics, methodologies, results, and trends, along with a list of relevant external reviews. The FY 2016 APR will also provide more information about NSF's GPRA verification and validation review.

In FY 2016, NSF tracked progress toward its three strategic goals through seven annual performance goals and three Agency Priority Goals. A description of these goals is below:

### ***Mission-Oriented Goals***

Three performance goals supported all objectives under the two mission-oriented strategic goals: (1) *Transform the Frontiers of Science and Engineering* and (2) *Stimulate Innovation and Address Societal Needs through Research and Education*.

The FY 2016 performance goals in this area were:

- Ensure key FY 2016 NSF-wide program investments are implemented and on track.
- Ensure program integrity and responsible stewardship of major research facilities and infrastructure.
- Enable consistent evaluation of the impact of NSF investments with a high degree of rigor and independence.

### ***Management Goals***

In FY 2016, NSF had four performance goals to support the management-oriented strategic goal, *Excel as a Federal Science Agency*, focused on customer service and human resources development. The FY 2016 performance goals in this area were:

- Foster a culture of inclusion through change management effort resulting in change leadership and accountability.
- Use evidence-based reviews to guide management investments.
- Inform applicants whether their proposals have been declined or recommended for funding within 182 days, or 6 months, of deadline, target, or receipt date, whichever is later.
- Increase the percentage of proposal review panelists that participate virtually while maintaining the quality of the merit review process.

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<sup>23</sup> *FY 2016 Agency Performance Report* will be included in the *FY 2018 Budget Request to Congress*: <https://www.nsf.gov/about/budget/>.

**Agency Priority Goals and Cross-Agency Priority Goals**

In FY 2016, NSF tracked progress toward two Agency Priority Goals:

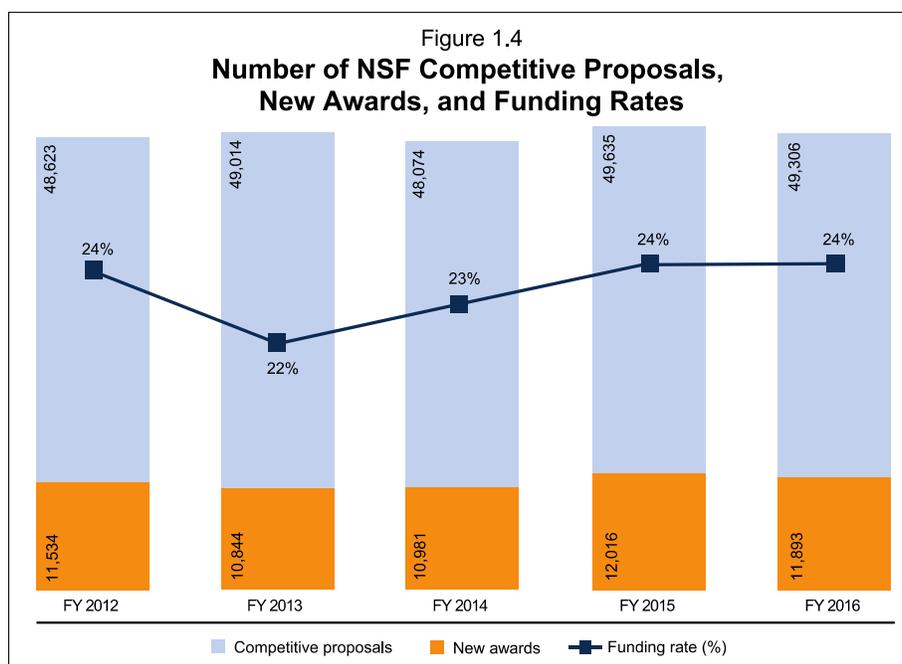
- Improve STEM graduate student preparedness for entering the workforce.
- Build the capacity of the Nation to solve research challenges and improve learning by investing strategically in crowdsourcing and other forms of public participation in STEM research.

For current information about Agency and Cross-Agency Priority Goals, please see the Performance.gov website.<sup>24</sup>

**Proposal Workload and Management Trends**

NSF continuously monitors key portfolio, proposal workload, and financial measures to understand short- and long-term trends and to help inform management decisions. For an analysis of the long-term trends in competitive proposals, awards, funding rate, and other portfolio metrics, see the *Report to the National Science Board on the National Science Foundation's Merit Review Process, Fiscal Year 2015*.<sup>25</sup>

Overall, the FY 2016 portfolio indicators of competitive proposals acted upon, new awards, and funding rates are relatively stable between FY 2015 and FY 2016, as shown in Figure 1.4.



<sup>24</sup> Performance.gov website: <https://www.performance.gov/>

<sup>25</sup> *Report to the National Science Board on the National Science Foundation's Merit Review Process, Fiscal Year 2015* (NSB-2016-41) at <https://www.nsf.gov/publications/ods/results.jsp?TextQuery=nsb201641>.

Table 1.1 provides 5 years of data on NSF's portfolio, proposal workload, and financial indicators.

**Table 1.1—Proposal Workload and Management Trends**

Measure		FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	Percent Change (FY 2016 FY 2015)	Average (FY 2012 FY 2015)
Portfolio	Competitive proposal actions	48,623	49,014	48,074	49,635	49,306	- 0.7%	48,837
	Competitive award actions	11,534	10,844	10,981	12,016	11,893	- 1.0%	11,344
	Average annual award size (competitive awards)	\$169,217	\$169,107	\$180,507	\$164,526	\$176,243	7.1%	170,839
	Funding rate	24%	22%	23%	24%	24%	no change	23%
Proposal Workload	Number of employees FTE, usage	1,415	1,414	1,390	1,374	1,398	1.7%	1,398
	Number of active awards*	56,432	55,542	53,546	53,967	54,439	0.9%	54,872
	Proposal reviews conducted	235,654	233,116	225,847	231,450	225,017	- 2.8%	231,517
Financial	Number of grant payments	28,016	27,649	27,978	22,860	22,926	0.3%	26,626
	Award expenses incurred but not reported at 9/30 (\$ in millions)**	\$1,769	\$344	\$250	\$398	\$413	3.8%	\$690
Notes: * Active awards include all active awards regardless of whether funds were received during the fiscal year. ** FY 2016 number reflects an accrual, and all other years reflect actuals.								

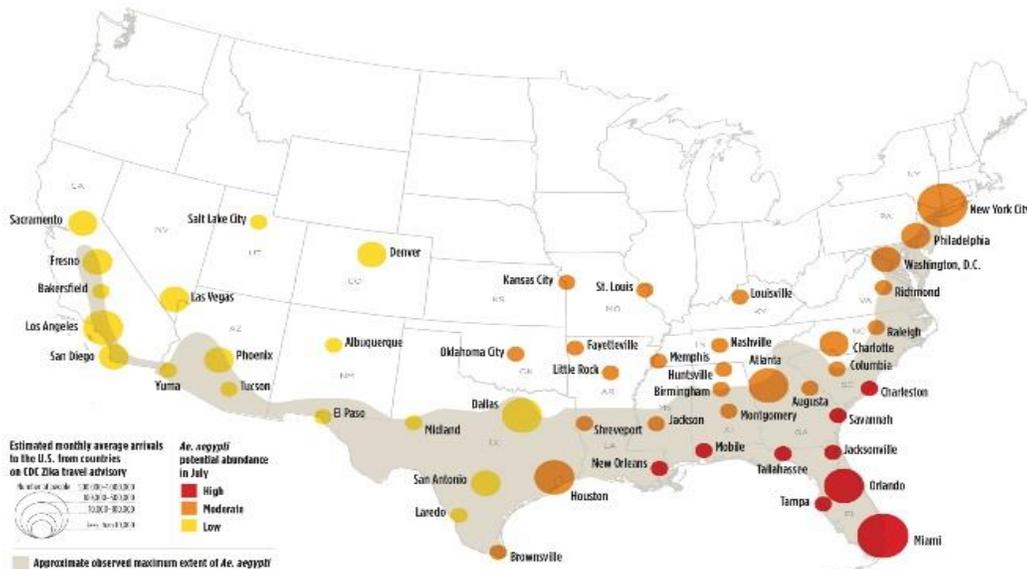
- Between FY 2015 and FY 2016, the number of competitive proposal actions was stable and in excess of 49,000.
- The number of new awards in both FY 2015 and FY 2016 was close to 12,000.
- The overall funding rate in FY 2016 stayed level with FY 2015, 24 percent. Funding rates differ by directorate and are presented in the agency's annual budget request to Congress.
- The average annual award size of competitive awards increased 7 percent—from \$164,526 in FY 2015 to \$176,243 in FY 2016. As shown in Table 1.1, award size varies by year. The FY 2016 average annual award size is higher than all but one of the preceding 4 years, \$170,839.
- There was an almost 2-percent increase in the number of employees between FY 2015 and FY 2016, from 1,374 to 1,398. The FTE level in FY 2016, however, was equal to the 4-year average.
- The number of active awards increased about 1 percent in FY 2016, from 53,967 in FY 2015 to 54,439 in FY 2016. The number of active awards in FY 2016 is close to the average over the preceding 4 years.

During FY 2016, NSF completed its third full year with grantees using the Award Cash Management Service (ACM\$) for all payment activity. In the ACM\$ environment, all NSF awardee institutions are required to submit payment requests at the award level. Award expenses are posted to the NSF financial

system at the time of the payment request. In FY 2016, NSF awardees submitted approximately 583,000 award-level disbursement and expense transactions, an increase of about 27,000 transactions, or 5 percent, from 2015. To further expand payment activity in ACM\$, starting in June 2016, all new SBIR/Small Business Technology Transfer (STTR) awardees began to utilize ACM\$ for their payments. At year-end close, 181 SBIR/STTR companies had gained access to ACM\$. This will significantly reduce the burden of manual invoicing and any potential for error or missed payments by NSF staff.

ACM\$ has significantly improved the timeliness of grant financial data. In prior years, as of September 30, NSF awardee institutions using quarterly expense reporting processes had approximately \$1.7 billion in award expenses that they had incurred but not yet reported to NSF. Under ACM\$, the amount of incurred but not yet reported award expenses has decreased to under \$415 million for each of the last 4 years.

**Predicting potential Zika outbreaks in U.S. cities.** A study led by the NSF-funded National Center for Atmospheric Research (NCAR) provided data to the scientific and public health communities suggesting which areas in the U.S. were at highest risk for Zika outbreaks during the summer of 2016. After examining multiple factors such as summer weather conditions, travel patterns, socio-economic status, and mosquito biology, the researchers concluded that cities in southern Florida and impoverished areas in southern Texas could be hotspots for local virus transmission. Anticipating the timing and location of outbreaks, public health officials could prepare a response plan, potentially reducing an outbreak's impact. This work lays a foundation for forecasting, handling, and possibly preventing future outbreaks of Zika and other serious diseases.



Researchers determined which cities were most likely to face an increased risk of Zika outbreaks during summer 2016. *Credit: NCAR.*

## Financial Discussion and Analysis

NSF is committed to fostering a strong internal control environment and efficient financial operations that support the agency's mission; provide accurate, transparent, and timely financial information; and comply with applicable laws and regulations. In keeping with its record of achievement in financial management, NSF works to continuously improve financial and business processes. Some areas of focus in FY 2016 are highlighted below:

### ***Digital Accountability and Transparency (DATA) Act***

NSF continued preparations for implementing the DATA Act. The DATA Act directs federal agencies to standardize and publish a wide variety of reports and data compilations related to spending: financial management, payments, budget actions, procurement, and assistance. Building on NSF's government-wide leadership in federal financial assistance management, the agency is well-positioned to successfully implement the DATA Act by the government-wide deadline. NSF is actively taking steps to mitigate risks or challenges and is employing multiple implementation approaches to ensure timely compliance.

### ***Grants Oversight and New Efficiency (GONE) Act***

In FY 2016, NSF determined that it has ready access to the required data, conducted a preliminary analysis of expired awards meeting reporting requirements of the Act, and reviewed its automated and manual processes for closeout. The agency is on track to fulfill GONE Act reporting requirements next year in the FY 2017 AFR.

### ***IPERA Reporting Requirements***

NSF resolved the instance of noncompliance with the IPERA reporting requirements, identified in the FY 2015 audit report. In December 2015, the agency completed a qualitative risk assessment of improper payments. The OIG performed an inspection of NSF's assessment and determined that the agency was in compliance. Further, NSF and the OIG agreed on making significant improvements to the agency's risk assessment process. NSF plans to continually assess its controls over improper payments to evaluate their effectiveness. For more details see *Appendix 2: Improper Payments Elimination and Recovery Act Reporting Details*.

### ***Monitoring of Construction-Type Cooperative Agreements***

During FY 2016, NSF implemented strengthened controls and increased collaboration with its OIG on monitoring and oversight of construction type agreements. In addition, the agency completed testing and validation of its enhanced policies and procedures on awarded funds. As noted below, the Independent Auditor's Report for FY 2016 has indicated that monitoring construction-type cooperative agreements is no longer considered a significant deficiency. NSF will continue to evaluate its controls over construction-type agreements as part its on-going internal control program.

In accordance with the Chief Financial Officers Act of 1990 and the Government Management Reform Act of 1994, NSF prepares financial statements in conformity with U.S. generally accepted accounting principles (GAAP) for federal entities. The financial statements present NSF's detailed financial information relative to its mission and the stewardship of those resources entrusted to the agency. It also provides readers with an understanding of the resources that NSF has available, the cost of its programs, and the status of resources at the end of the fiscal year. NSF's financial statements have undergone an independent audit to ensure that they are free from material misstatement and can be used to assess NSF's financial status and related financial activity for the year ending September 30, 2016.

NSF received an unmodified audit opinion on its financial statements, and no material weaknesses were identified in the internal control program for financial reporting. The significant deficiency related to

monitoring of construction-type cooperative agreements that had been identified in previous years' audit reports was resolved. In addition, NSF was found compliant with the Improper Payments Elimination and Recovery Act. A new significant deficiency related to information technology access controls and monitoring processes was identified. The Independent Auditor's Report begins on page Financials-5. Management's response follows the audit report.

**Understanding the Financial Statements**

The following discussion of our financial condition and results of operations should be read together with the financial statements and the accompanying notes.

NSF's FY 2016 financial statements and notes are presented in accordance with OMB Circular A-136, *Financial Reporting Requirements*. NSF's current year financial statements and notes are presented in a comparative format. The Stewardship Investment schedule presents information over the last 5 years. Table 1.2 summarizes the changes in NSF's financial position in FY 2016.

**Table 1.2—Changes in NSF's Financial Position in FY 2016 (Dollars in Thousands)**

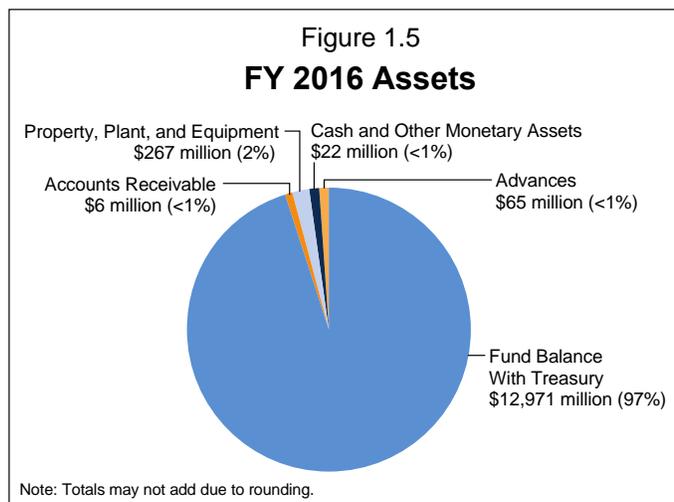
Net Financial Condition	FY 2016	FY 2015	Increase/(Decrease)	% Change
Assets	\$13,330,617	\$12,724,668	\$605,949	4.8%
Liabilities	\$608,725	\$518,809	\$89,916	17.3%
Net Position	\$12,721,892	\$12,205,859	\$516,033	4.2%
Net Cost	\$7,046,347	\$6,980,344	\$66,003	0.9%

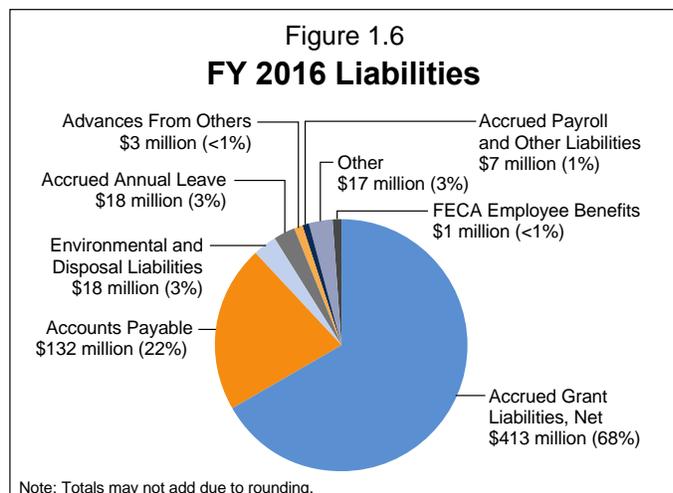
**Balance Sheet**

The Balance Sheet presents the total amounts available for use by NSF (assets) against the amounts owed (liabilities) and amounts that comprise the difference (net position). NSF's total assets are largely composed of *Fund Balance with Treasury*. A significant balance also exists in the *General Property, Plant, and Equipment* account.

In FY 2016, Total Assets (Figure 1.5) increased 4.8 percent from FY 2015. The bulk of the change occurred in the *Fund Balance with Treasury* account, which increased by \$652.6 million in FY 2016. NSF is authorized to use *Fund Balance with Treasury* to make expenditures and pay amounts due through the disbursement authority of the Department of Treasury. The *Fund Balance with Treasury* is increased through appropriations and collections and decreased by expenditures and rescissions.

In FY 2016, Total Liabilities (Figure 1.6) increased 17.3 percent from FY 2015. This change was primarily related to a \$71.8 million increase in *Accrued Grant Liabilities, Net* in FY 2016. *Accrued Grant Liabilities, Net* is estimated annually by utilizing a linear regression model based on the statistical correlation of NSF grantees' historical unliquidated obligations and expenses incurred but not reported. The majority of the FY 2016 change was due to a decrease of grantee advances and an increase in unliquidated obligations for grantees, resulting in a higher *Accrued Grant Liabilities, Net* as compared to FY 2015.





**Statement of Net Cost**

The Statement of Net Cost presents the annual cost of operating NSF programs. The net cost of operations of each NSF program equals the program's gross cost less any offsetting revenue. Intragovernmental earned revenues are recognized when related program or administrative expenses are incurred. *Earned revenue* is deducted from the full cost of the programs to arrive at the *Net Cost of Operation*.

Approximately 95 percent of all current year NSF Net Costs of Operations incurred were directly related to the support of R&RA, EHR, MREFC programs; and Donations and

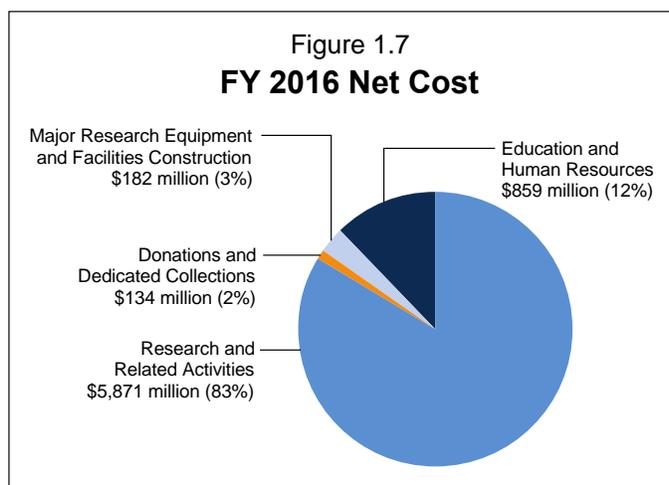
Dedicated Collections. Additional costs were incurred for indirect general operation activities (e.g., salaries, training, and activities related to the advancement of NSF information systems technology) and activities of the NSB and the OIG. These costs were allocated to R&RA, EHR, MREFC, and Donations and Dedicated Collections and account for 5 percent of the total current year Net Cost of Operations (Figure 1.7). These administrative and management activities are focused on supporting the agency's program goals.

**Statement of Changes in Net Position**

The Statement of Changes in Net Position presents the agency's cumulative net results of operation and unexpended appropriations for the fiscal year. NSF's Net Position increased by 4.2 percent, or \$516.0 million, in FY 2016.

**Statement of Budgetary Resources**

This statement provides information on how budgetary resources were made available to NSF for the year and the status of those budgetary resources at year end. For FY 2016, *Total Budgetary Resources* increased \$12.6 million from the FY 2015 level. *Budgetary Resources—Appropriations* for the R&RA, EHR, and MREFC accounts were \$5,989.7 million, \$879.0 million, and \$218.3 million, respectively. The combined *Budgetary Resources—Appropriations* in FY 2016 for the NSB, OIG, and AOAM accounts totaled \$376.5 million. NSF also received funding via warrant from the H-1B Nonimmigrant Petitioner Account (H-1B) in the amount of \$139.3 million, and via donations from foreign governments, private companies, academic institutions, nonprofit foundations, and individuals in the amount of \$24.4 million. In FY 2016, the *Budgetary Resources—Appropriations* line was also affected by H-1B sequestration in the amount of \$6.8 million.



**Stewardship Investments**

NSF-funded investments yield long-term benefits to the general public. NSF investments in research and education produce quantifiable outputs, including the number of awards made and the number of researchers, students, and teachers supported or involved in the pursuit of science and engineering research and education. NSF incurs stewardship costs as part of its longstanding commitment to invest in learning and discovery. In FYs 2016 and 2015, these costs amounted to \$371.2 million and \$329.7 million, respectively.

## Limitations of the Financial Statements

In accordance with the guidance provided in OMB Circular A-136, NSF discloses the following limitations of the agency's FY 2016 financial statements, which appear in chapter 2, *Financials*, of this AFR. The principal financial statements have been prepared to report the financial position and results of operations of NSF, pursuant to the requirements of 31 U.S.C. 3515(b). While the statements have been prepared from NSF books and records in accordance with GAAP for federal entities and the format prescribed by OMB, the statements are in addition to the financial reports used to monitor and control budgetary resources, which are prepared from the same books and records. The statements should be read with the realization that they are for a component of the U.S. Government, a sovereign entity.

## Other Financial Reporting Information

### *Debt Collection Improvement Act of 1996*

Net Accounts Receivable totaled \$5.8 million at September 30, 2016. Of that amount, \$4.3 million is due from other federal agencies. The remaining \$1.5 million is due from the public. NSF fully participates in the Department of the Treasury Cross-Servicing Program. In accordance with the Debt Collection Improvement Act, as amended by the DATA Act, this program allows NSF to refer debts that are delinquent more than 120 days to the Department of the Treasury for appropriate action to collect those accounts. In accordance with M-04-10, *Memorandum on Debt Collection Improvement Act Requirements*, NSF writes off delinquent debt more than 2 years old. Additionally, NSF seeks Department of Justice concurrence for action items over \$100.0 thousand.

### *Cash Management Improvement Act of 1990*

In FY 2016, NSF had no awards covered under Cash Management Improvement Act Treasury-State Agreements. The timeliness of NSF's payments to grantees through its payment systems makes the timeliness of payment issue under the Act essentially not applicable to the agency. No interest payments were made in FY 2016.

### *Federal Civil Penalties Inflation Adjustment Act of 1990*

The Federal Civil Penalties Inflation Adjustment Act Improvements Act of 2015 (the 2015 Act) (Sec. 701 of Public Law 114-74)(2015 Act) further amended the Federal Civil Penalties Inflation Adjustment Act of 1990 (Public Law 104-410), to improve the effectiveness of civil monetary penalties and to maintain their deterrent effect. The 2015 Act requires agencies to: (1) adjust the level of civil monetary penalties with an initial "catch-up" adjustment through an interim final rulemaking and (2) make subsequent annual adjustments for inflation. Inflation adjustments are to be based on the percent change in the Consumer Price Index for all Urban Consumers (CPI-U) for the month of October preceding the date of the adjustment, relative to the October CPI-U in the year of the previous adjustment.

The only civil monetary penalties within NSF's jurisdiction are those authorized by the Antarctic Conservation Act of 1978, 16 U.S.C. 2401, et seq., and the Program Fraud Civil Remedies Act of 1986, 31 U.S.C. 3801, et seq. The initial catch-up adjustment is reflected in Table 1.3.

**Table 1.3—FY 2016 Civil Monetary Penalty Adjustment for Inflation**

Penalty	Authority	Date of Previous Adjustment	Date of Current Adjustment	Current Penalty Level
Knowing violations	Antarctic Conservation Act of 1978, as amended	2002	2016	\$27,500
Not knowing violations	Antarctic Conservation Act of 1978, as amended	2002	2016	\$16,250
Violations	Program Fraud Civil Remedies Act of 1986	1986	2016	\$10,781

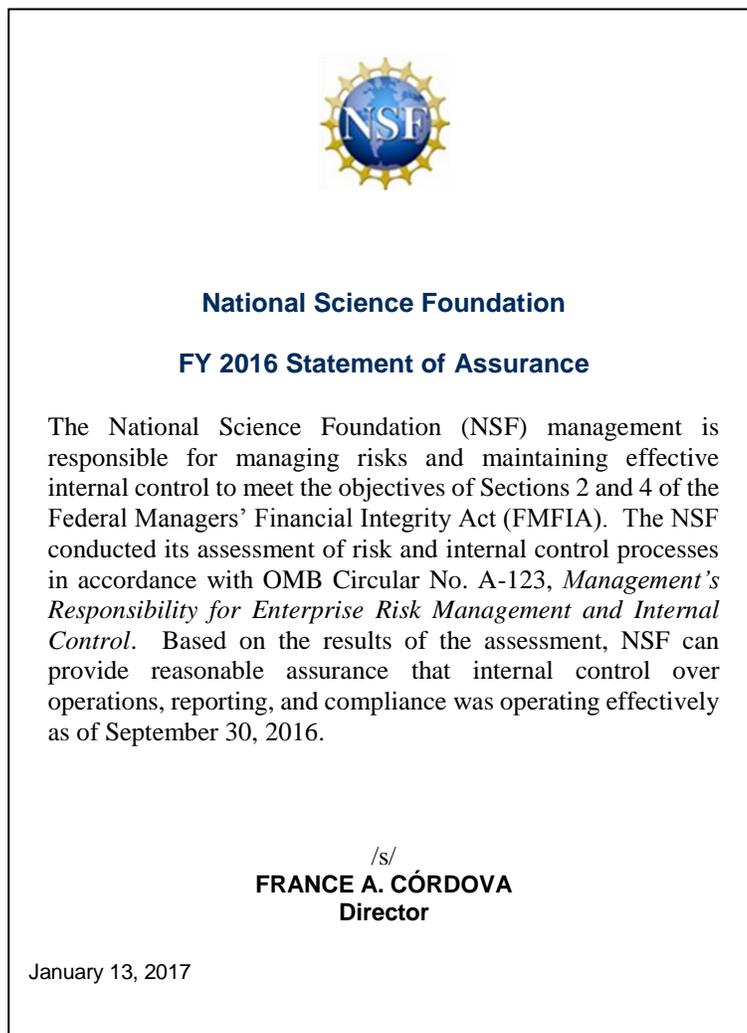
## Systems, Controls, and Legal Compliance

### Management Assurances

The Federal Managers' Financial Integrity Act (FMFIA)<sup>26</sup> requires that agencies conduct evaluations of their systems of internal control and provide reasonable assurance annually to the President and the Congress on the adequacy of those systems. Internal control is an integral component of an organization's management that provides reasonable assurance of effective and efficient operations, reliable financial reporting, and compliance with laws and regulations.

The FMFIA assurance statement provides management's assessment of the efficacy of the organization's internal control to support effective and efficient programmatic operations, reliable financial reporting, and compliance with applicable laws and regulations (FMFIA§2) and whether financial management systems conform to financial systems requirements (FMFIA§4).

The FY 2016 unmodified Statement of Assurance is the culmination of the efforts of NSF management's assessment of the design, implementation, and operating effectiveness of its system of internal control. For FY 2016, NSF's internal control assessment provides reasonable assurance that the objectives of the FMFIA and the Federal Financial Management Improvement Act (FFMIA) were achieved and also concludes that the internal control processes over financial reporting are effective.



### Highlights from NSF's FY 2016 Internal Control Quality Assurance Program

NSF evaluated its systems of internal control in accordance with FMFIA and OMB Circular A-123 *Management's Responsibility for Enterprise Risk Management and Internal Control*.<sup>27</sup> Circular A-123 established an assessment process based on GAO *Standards for Internal Control in the Federal Government* (known as the Green Book).<sup>28</sup> The Green Book approaches internal control through a hierarchical structure of five components of internal control (control environment, risk assessment, control activities, information and communication, and reporting) supported by 17 required principles of internal control.

<sup>26</sup> FMFIA: [https://www.whitehouse.gov/omb/financial\\_fmfi1982](https://www.whitehouse.gov/omb/financial_fmfi1982)

<sup>27</sup> OMB Circular A-123: <https://www.whitehouse.gov/sites/default/files/omb/memoranda/2016/m-16-17.pdf>

<sup>28</sup> GAO *Standards for Internal Control in the Federal Government*: <http://www.gao.gov/products/GAO-14-704G>

The internal control review process supports NSF's strategic goal to *Excel as a Federal Science Agency*. Excelling as a federal science agency is essential to achieving and carrying out NSF's mission and accomplishing its other strategic goals: (1) transform the frontiers of science and engineering and (2) stimulate innovation and address societal needs through research and education.

In conducting its assessment of internal control over agency operations, reporting, and compliance with applicable laws and regulations the Internal Control Quality Assurance (ICQA) program team performed the following general steps:

1. Updated process documentation (narratives and flow diagrams) for each key business process. For FY 2016, process documentation continued to focus on activities supported by the Oracle core financial management system (iTRAK) and added large facility oversight as an assessable business process.
2. Conducted tests of all transactions selected in the samples and determined if the controls were designed adequately and operating effectively.
3. Selected samples based on the frequency of performance of the control from the universe of NSF controls performed during FY 2016. Sample size was determined using the GAO *Financial Audit Manual, Volume 1* (July 2008).
4. Conducted an entity-level control review to assess both the design and the operating effectiveness of key controls. The review was based on the GAO Green Book's five components and 17 principles. The review focused on the establishment of entity-level and activity-level objectives, risk identification and analysis, and related control activities.
5. Prepared a final report that details the results of testing and assisted NSF in meeting the reporting requirements for its FY 2016 Statement of Assurance.

In addition to completing the internal control reviews, the NSF ICQA program team assisted NSF in developing an ERM framework. Looking ahead, in FY 2017, the team plans to provide ERM training, facilitated workshops, and assistance to leaders and managers in developing plans for an incremental implementation process. NSF's goal is to integrate ERM within its key organizational processes such as strategic planning, budgeting, and performance management.

#### ***Internal Control over Financial Reporting—OMB Circular A-123, Appendix A***

NSF's FY 2016 review for Internal Control over Financial Reporting consisted of evaluating five business processes for the period July 1, 2015, through June 30, 2016. The process areas were: Grants Management, Pay and Benefits, Financial Reporting, Large Facility Oversight, and Procure to Pay.

The ICQA team noted the following improvements in FY 2016:

1. iTRAK, NSF's primary business accounting system, completed its second year of operations. The system and associated processes continue to mature in terms of the overall system implementation lifecycle.
2. Business continuity operations included successfully testing recovery of iTRAK, the NSF network, and critical business systems.

Based on the results of the assessment, NSF provides reasonable assurance that its internal control over financial reporting is operating effectively and no material weaknesses were identified.

***Improving the Management of Government Charge Card Programs—OMB Circular A-123, Appendix B***

In FY 2016, NSF conducted a review of its charge card programs for compliance with selected guiding policies and procedures within the Charge Card Program Management Plan and the NSF Travel Card Program.

With the maturation of NSF's core financial system, iTRAK, NSF implemented additional controls that further strengthened purchase card processes, to include:

1. Purchase and vehicle card supporting documentation: In order for purchase and vehicle card transactions to be submitted for approval by the approving official, supporting documentation must be uploaded into the iTRAK system.
2. Budget Object Class (BOC) code: A feature requires the user to change the default BOC code on the card transaction to an appropriate BOC code for purchase card and vehicle card transactions, ensuring that NSF can track expenses accurately.

Based on the results of the assessment, NSF provides reasonable assurance that internal control processes related to the Government Charge Card Programs are operating effectively, and no material weaknesses were identified.

***Requirements for Effective Estimation and Remediation of Improper Payments—OMB Circular A-123, Appendix C***

NSF completed a qualitative risk assessment of FY 2015 improper payments. The risk assessment determined the NSF did not have significant susceptibility to improper payments for NSF grants, contracts, charge cards, or payroll payments.

During FY 2016, the NSF OIG completed a review of NSF's compliance with the IPERA and issued an inspection report in May 2016 concluding that NSF was compliant with IPERA reporting requirements for FY 2015. For details about the IPERA risk assessment and related OIG inspection report, please see *Appendix 2: IPERA Reporting Details* of this AFR.

***Compliance with the Federal Financial Management Improvement Act of 1996—OMB Circular A-123, Appendix D***

NSF is required by Appendix D of OMB Circular A-123, *Compliance with the Federal Financial Management Improvement Act of 1996*, to implement and maintain financial management systems that substantially comply with Federal Financial Management System Requirements, federal accounting standards, and the United States Standard General Ledger (USSGL) at the transaction level.

In FY 2016, NSF conducted a review of iTRAK using the Appendix D FFMIA System Compliance Determination tool. Based on the results of the review, NSF has determined that iTRAK was in compliance with FFMIA during FY 2016.

NSF has established a comprehensive IT Security Program that is consistent with Federal Information Security Modernization Act of 2014 and industry best practices. NSF's IT controls are effective in maintaining a secure IT environment. The agency's IT environment is supported by a suite of comprehensive policies and procedures that incorporate federal mandates and guidance in all domains. Numerous controls are implemented to protect agency financial information and information resources. Continuous monitoring verifies effective IT security controls are in place throughout the year.

In FY 2016, NSF became one of a few agencies to operate its financial system in the “cloud” through an agency “Authority to Operate.” More details are available in the next section, *Financial System Strategy and Framework*.

***Other Federal Reporting and Disclosures***

*Anti-Deficiency Act (ADA)*: NSF is not aware of any ADA violations that are required to be reported for the year ended September 30, 2016.

*Pay and Allowance System for Civilian Employees, provided primarily in Chapters 31–50 of Title 5, U.S.C.*: The Department of the Interior, Interior Business Center (IBC) Federal Personnel/Payroll System (FPPS) is a Shared Service Provider and performs many of NSF’s payroll functions. IBC FPPS’s internal control is annually reviewed by auditors under the Statement on Standards for Attestation Engagements (SSAE 16). IBC FPPS’s controls are found to be suitably designed and operating effectively. This conclusion is based partly on transactional testing.

Internally, NSF performed testing on its pay and benefits internal control processes during the annual review to identify any deficiencies that could result in a material misstatement on the agency’s financial statements. There were no significant deficiencies noted for FY 2016.

*Prompt Payment Act*: While the Prompt Payment Act still mandates interest penalties on payments over 30 days, under OMB Memorandum 16-07, *Reporting of Accelerated Payment to Small Business Subcontractors*, NSF is accelerating payments to all contractors within 15 days of a proper invoice being received. This acceleration allows small business contractors to be paid as quickly as possible. Fourth quarter reporting, as of September 30, 2016, was 90 percent.

*Government Charge Card Abuse Prevention Act of 2012, Pub. L. 112 – 194*: The act requires that agencies insure that appropriate policies and controls are in place or that corrective actions have been taken to mitigate the risk of fraud and inappropriate charge card practices. NSF provides reasonable assurance that internal controls related to the Government Charge Card Programs are operating effectively, and no material weaknesses were identified. Additional information is provided above in *Improving the Management of Government Charge Card Programs—OMB Circular A-123, Appendix B*, page MD&A-24.

*Provisions Governing Claims of the U.S. Government (31 U.S.C. 3711–3720E) (Including the Debt Collection Improvement Act of 1996)*: The Debt Collection Improvement Act is addressed on page MD&A-21.

*Federal Information Security Modernization Act Management Act of 2014*: This topic is addressed above in subsection *Compliance with the Federal Financial Management Improvement Act of 1996—OMB Circular A-123, Appendix D*, page MD&A-24.

*Single Audit Act of 1984, Pub L. No. 98-502, and the Single Audit Act Amendments of 1996, P.L. 104-156. (A-136, section II.2.8)*: The Single Audit Act requires financial statement audits of non-federal entities receiving or administering grant awards with federal expenditures exceeding \$750,000 during its fiscal year. Federal agency internal control standards determine whether award expenditures are in compliance with laws and regulations. NSF, as are other federal agencies, is required to review the audit reports of recipients of its funding to determine whether necessary corrective actions are adequate and implemented in response to audit report findings and recommendations. NSF utilizes guidance from the *OMB Uniform*

*Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards (Uniform Guidance)*<sup>29</sup> and *Audit Follow-up*<sup>30</sup> as a basis for its audit resolution and follow-up activities.

During the period from July 1, 2015, through June 30, 2016, NSF resolved 207 single audit reports. The internal control review team assessed a random sample of 30 of these reports, reviewing supporting documentation, NSF Management Decision Letters, and evidence of grantee-implemented corrective actions.

NSF has fully implemented the Uniform Guidance and continues to ensure that NSF policies and procedures fully align with its requirements. NSF continually assesses the effects of changes in policies and practices (e.g., increase in single-audit thresholds, risk management, streamlining of federal requirements, timeliness) that have potential impact on stewardship over NSF investments. Under a major restructuring of its organizational unit contributing to pre- and post-award oversight, NSF has initiated efforts to strengthen audit resolution and other oversight functions through the deepening of subject matter expertise and more effective utilization of staff resources. In addition, NSF continues its formal, on-going dialogue with the OIG to address issues affecting audit resolution such as new methodologies, as well as application and interpretation of NSF policies and procedures.

In FY 2016, at the invitation of the OMB Council on Financial Assistance Reform (COFAR), NSF continued as an active member of the interagency Uniform Guidance Work Group to develop Frequently Asked Questions needed to clarify federal requirements set forth in the Uniform Guidance. In addition, NSF coordinated interagency development and clearance of Research Terms and Conditions, which completes federal implementation of the Uniform Guidance.

## **Financial System Strategy and Framework**

### ***Financial System Strategy***

The goals for NSF's core financial system, iTRAK, align with NSF's strategic goals—to further scientific and organizational excellence and accountability for the public benefit. iTRAK ensures that transactions are posted in accordance with the U.S. Standard General Ledger at the transaction level; maintains accounting data to permit reporting in accordance with GAAP as prescribed by the Federal Accounting Standards Advisory Board; enforces strict funds control across the budgeting and spending functions to prevent ADA violations; and enables strong access control and definition of “responsibilities” to support segregation of duties control. iTRAK complies with OMB Memorandum M-10-26, *Immediate Review of Financial Systems IT Projects*, OMB Memorandum M-13-08, *Improving Financial Systems through Shared Services*, and OMB Circular A-123, *Appendix D*.

NSF completed its second successful year of iTRAK operations on September 30, 2016. During this second year of operations, NSF continued its focus on (1) maturing iTRAK system and business processes to improve operational efficiencies, (2) training users in targeted areas to improve user skills, and (3) providing financial data to the agency's data warehouse to enable users to combine financial and programmatic data for more informed decision-making. As iTRAK continues to mature, NSF will continue to expand its analytical capabilities towards a more mature and performance driven system to better support NSF's mission.

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<sup>29</sup> Uniform Guidance (2 CFR 200): <http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=fd67dcb2fb543c275053150a6352be38&mc=true&n=pt2.1.200&r=PART&ty=HTML>

<sup>30</sup> Audit Follow-up (OMB Circular A-50): [https://www.whitehouse.gov/omb/circulars\\_a050](https://www.whitehouse.gov/omb/circulars_a050)

NSF also focused on several federal mandates in FY 2016: Details on activities related to these mandates are as follows:

- FedRAMP (Federal Risk and Authorization Management Program) Compliance  
In June 2016, Accenture obtained FedRAMP certification of its Federal Cloud Enterprise Resource Planning solution, making NSF one of a few agencies to operate its financial system in the “cloud” through an agency “Authority to Operate.” This certification was accomplished through NSF’s collaboration with the General Services Administration’s (GSA’s) FedRAMP Project Management Office and its shared service provider, Accenture Federal Services, over a 4-month period to meet all of the federal security requirements to operate iTRAK in Accenture’s “cloud” environment
- DATA Act Compliance  
NSF is on track to meet the deadline to implement the requirements of the DATA Act by May 2017. To date, we developed an implementation plan that has been reviewed by OMB and Treasury, conducted several tests with OMB to identify data quality issues of our financial data, and validated file transmission to Treasury.
- Electronic Invoicing  
OMB M-15-19, *Improving Government Efficiency and Saving Taxpayer Dollars through Electronic Invoicing*, requires agencies to implement electronic invoicing by September 30, 2018. NSF is in the planning phase of this initiative and is currently evaluating solution options. NSF plans to begin implementation in the second quarter of FY 2017.

Competing priorities coupled with limited resources continue to be key challenges facing the Foundation. Senior leadership will continue to work with internal and external stakeholders to agree on the order of priorities while managing risk.

#### ***Financial Management System Framework***

NSF’s financial management system framework (Figure 1.8) focuses on the Foundation’s financial management systems, standard business processes, data, and information architecture to ensure reliable, timely, and consistent financial information that enables effective management of NSF resources and delivery of mission critical products and services.

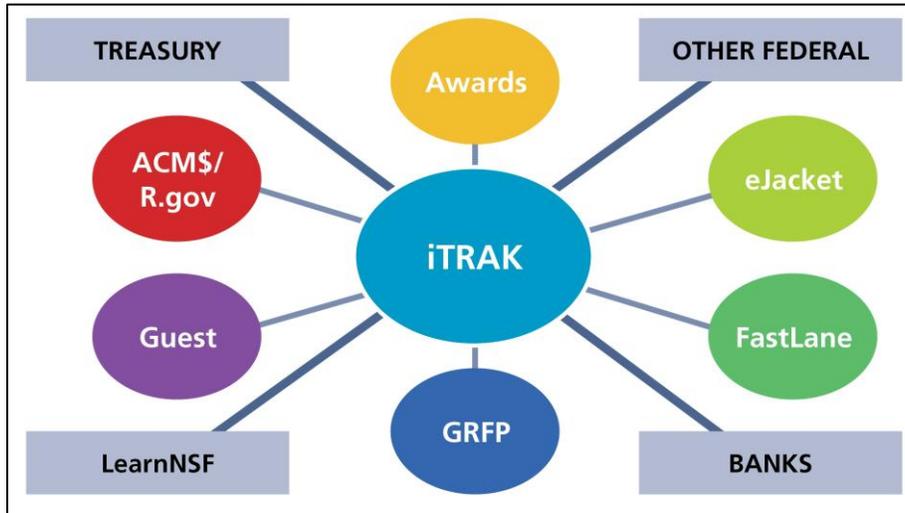
NSF’s core financial system, iTRAK, interfaces with NSF’s awards, grants management, and business process systems including:

- Award Cash Management Service (ACMS)
- Award Management and Award Letter System (“Awards”)
- eJacket, NSF’s internal awards processing system
- Research.gov and FastLane, NSF’s online websites through which researchers, research administrators and their organizations, and reviewers interact with NSF
- Graduate Research Fellowship Program System (GRFP)
- Guest Travel and Reimbursement System

iTRAK also interfaces with external systems operated by the U.S. Department of the Treasury; JPMorgan Chase Bank; and LearnNSF, the Foundation’s training system, and other federal systems such as the Federal Personnel Payroll System (FPPS), eTravel/Concur, and GSA’s System for Award Management (SAM).

Future iTRAK phases include electronic invoicing; compliance with the DATA Act; an Internal Revenue Service audit; and integration of an Acquisition Module, a Fixed Asset Module, and a Budget Formulation Module.

**Figure 1.8—NSF Financial Management System Framework**



The logo for the National Stock Exchange (NSE) is centered in the upper half of the page. It features the letters 'NSE' in a bold, serif font, set within a circular emblem. The emblem is surrounded by a gear-like pattern of interlocking teeth. The background is a dark blue gradient.

**NSE**

**Financials**

**Chapter 2**





## A MESSAGE FROM THE CHIEF FINANCIAL OFFICER



*Credit: Sandy Schaeffer*

I am pleased to present NSF's FY 2016 Agency Financial Report (AFR). The AFR is being published in January, rather than November, to accommodate a delay in the financial statement audit. This delay was due to a bid protest on the Office of the Inspector General's financial statement audit contract. The transition to the new independent audit firm commenced in July 2016, NSF met its financial reporting requirement (though unaudited) by November 15, and the financial statement audit was completed in mid-January 2017.

NSF received its 19<sup>th</sup> consecutive unmodified audit opinion on our FY 2016 financial statements, with no material weaknesses in internal control over financial reporting. The audit opinion affirms the agency's financial statements for the year ending September 30, 2016 were presented fairly in all material respects and in accordance with U.S. generally accepted accounting principles. The Independent Auditors' Report indicates that the longstanding significant deficiency related to monitoring of construction-type cooperative agreements is resolved, and NSF was found compliant with the Improper Payments Elimination and Recovery Act. The report identifies a new significant deficiency related to our information technology access controls and monitoring processes. We have taken immediate action to address the risks raised by this finding.

Several important management accomplishments in FY 2016 highlight NSF's continued government-wide leadership in stewardship and federal financial management.

- NSF took swift action to enhance our current risk management processes to reflect revised Office of Management and Budget Circular A-123 guidance. Our newly-deployed enterprise risk management (ERM) framework will not only be fully integrated into the agency's existing senior management structure, but will be aligned with key NSF business processes. ERM is an important tool in providing valuable, enterprise-wide information to ensure accomplishment of NSF's mission and objectives. Therefore, NSF's implementation is being coordinated with our strategic planning and strategic reviews processes, as well as with our internal control program.
- NSF made substantial progress to further strengthen controls over the management of large facility projects, and, as noted above, the Independent Auditors' Report indicates that there is no longer a significant deficiency related to the monitoring of construction-type cooperative agreements. The finding is indicative of the comprehensive policies, procedures, training, and oversight that have been strengthened and honed in the last few years. In December 2015, the National Academy of Public Administration (NAPA) issued its report on NSF's use of cooperative agreements to support large scale investment in research infrastructure. The report affirmed support for NSF's use of cooperative agreements, and it included recommendations to improve internal management of business practices that will enhance oversight and project success. As of September 30, 2016, NSF had already implemented most of the NAPA recommendations and will continue its efforts to implement all the

recommendations in some form in FY 2017. (For the significant FY 2016 accomplishments in this area, please see *FY 2016 Progress Report on OIG Management Challenges*, Appendices-22).

- NSF continued its role as a recognized leader in interagency efforts to improve government-wide grants administration. On behalf of the National Science and Technology Council's (NSTC) Committee on Science (CoS), NSF coordinated the interagency development and clearance of Research Terms & Conditions under the *Uniform Guidance*, which will be fully implemented in FY 2017. We also led the development of a standard format for use in reporting on research and research-related awards for NSTC/CoS. Finally, we are proud to have been the first agency to post a record in the new Federal Awardee Performance and Integrity Information System, designed to ensure federal awards are issued to reliable and qualified recipients. NSF worked diligently in interagency groups, such as the Financial Assistance Committee on E-Government, resulting in a quick and efficient implementation of this important stewardship activity.
- With the goal of reducing administrative burden on the research community and NSF staff while, concurrently, ensuring fair and consistent treatment of submitted proposals, NSF expanded automated system checks to ensure proposal submission requirements are met—such as submission deadlines, biographical sketches, and the inclusion of current/pending support files for senior personnel.
- NSF also achieved a number of financial management successes in FY 2016. We continued to refine reporting and business processes during our second year of operations of iTRAK, NSF's financial system. More significantly, iTRAK met stringent GSA FedRAMP security requirements for the system and cloud-based hosting environment and received an authority to operate designation. NSF is one of the few agencies authorized to use the "cloud" for its financial system operations putting us in the forefront of federal financial systems.

FY 2017 will continue to pose challenges and opportunities for NSF including the facilitation of a successful Presidential transition, the implementation of the DATA Act, and the relocation of NSF's headquarters to Alexandria, Virginia. Throughout FY 2017, NSF will continue to ensure accountable reporting, transparency, and stewardship of taxpayer funds. As always, I welcome your feedback on how we can make this report more informative to our stakeholders and our readers.

/s/

**MARTHA A. RUBENSTEIN**

January 17, 2017



National Science Foundation • Office of Inspector General  
4201 Wilson Boulevard, Arlington, Virginia 22230

**TO:** Dr. France Córdoba  
Director, National Science Foundation

Dr. Maria T. Zuber  
Chair, National Science Board

**FROM:** Allison Lerner   
Inspector General, National Science Foundation

**DATE:** January 13, 2017

**SUBJECT:** Audit of the National Science Foundation's  
Fiscal Years 2016 and 2015 Financial Statements

This memorandum transmits Kearney and Company's (Kearney) audit report on the financial statements of the National Science Foundation (NSF) for FY 2016, which include FY 2015 comparative information.

### Results of Independent Audit

The *Chief Financial Officer's (CFO) Act of 1990* (P.L. 101-576), as amended, requires NSF's Inspector General or an independent external auditor, as determined by the Inspector General, to audit NSF's financial statements. Under a contract we monitored, Kearney and Company (Kearney), an independent public accounting firm, performed the audit of NSF's FY 2016 financial statements. The contract required that the audit be performed in accordance with the *Government Auditing Standards* issued by the Comptroller General of the United States and Office of Management and Budget (OMB) Bulletin 15-02, *Audit Requirements for Federal Financial Statements*.

Kearney issued an unmodified opinion on NSF's financial statements. In its Report on Internal Control over Financial Reporting, Kearney did not report any material weaknesses in internal control; however, it did report one significant deficiency in internal control, which relates to NSF's Information Technology control environment. This issue is described in detail in the Schedule of Findings. Kearney reported no instances of noncompliance with the *Improper Payments Elimination and Recovery Act* (IPERA) that are required to be reported in accordance with *Government Auditing Standards* and OMB Bulletin 15-02. Kearney also reported that there were no other instances of noncompliance with certain provisions of laws, regulations, contracts, and grant agreements that it tested, including those relating to the financial management systems requirements of the *Federal Financial Management Improvement Act of 1996* (FFMIA). Another

firm under contract with us performed the audit of NSF's FY 2015 financial statements, and issued its report dated November 13, 2015.

NSF's response, dated January 13, 2017, follows Kearney's report.

### **Evaluation of Kearney's Audit Performance**

To fulfill our responsibilities under the *CFO Act of 1990*, as amended, and other related Federal financial management requirements, we reviewed Kearney's approach and planning of the audit; evaluated the qualifications and independence of Kearney and its staff; monitored the progress of the audit at key points; coordinated periodic meetings with NSF management to discuss audit progress, findings, and recommendations; reviewed Kearney's audit report to ensure compliance with *Government Auditing Standards* and OMB Bulletin No. 15-02; and coordinated issuance of the audit report.

Kearney is responsible for the attached Independent Auditor's Report, dated January 13, 2017, which includes the following:

- Opinion on the Financial Statements;
- Report on Internal Control over Financial Reporting; and
- Report on Compliance with Laws, Regulations, Contracts, and Grant Agreements.

We do not express any opinion on NSF's financial statements, or conclusions on the effectiveness of internal control, or on compliance with laws, regulations, contracts, and grant agreements.

Kearney's Independent Auditor's Report, is meant only to be distributed and read as part of the Agency Financial Report (AFR) document. Also, Kearney's Independent Auditor's Report is not a stand-alone document because it refers to the AFR contents and should not be circulated to anyone other than those receiving this transmittal.

In accordance with OMB Circular A-50, *Audit Followup*, please provide a written corrective action plan within 60 days for the recommendations in the Audit Report. This corrective action plan should detail specific actions and milestone dates. We are available to work with your staff during the next 60 days to ensure the submission of a mutually agreeable corrective action plan.

Consistent with our responsibilities under the *Inspector General Empowerment Act of 2016*, we are providing copies of this report to the appropriate congressional committees with oversight and appropriation responsibilities over NSF. In addition, we will post a copy on our public website.

We appreciate the courtesies and cooperation NSF extended to Kearney and the OIG staff during the audit. If you or your staff have any questions, please contact me or Mark Bell, Assistant Inspector General for Audits, at 703-292-2985.

Attachment

## INDEPENDENT AUDITOR'S REPORT

To the Director and Inspector General of the National Science Foundation

### Report on the Financial Statements

We have audited the accompanying financial statements of the National Science Foundation (NSF), which comprise the balance sheet as of September 30, 2016, the related statements of net cost and changes in net position, and the combined statement of budgetary resources (hereinafter referred to as the "financial statements") for the year then ended, as well as the related notes to the financial statements.

### Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

### Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America; the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States; and Office of Management and Budget (OMB) Bulletin No. 15-02, *Audit Requirements for Federal Financial Statements*. Those standards and OMB Bulletin No. 15-02 require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

## **Opinion**

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of NSF as of September 30, 2016, as well as its net cost of operations, changes in net position, and budgetary resources for the year then ended, in accordance with accounting principles generally accepted in the United States of America.

## **Other Matters**

### *Fiscal Year 2015 Financial Statements Audited by a Predecessor Auditor*

NSF's consolidated financial statements for fiscal year (FY) 2015, as of and for the year ended September 30, 2015, were audited by a predecessor auditor whose report, dated November 13, 2015, expressed an unmodified opinion on those consolidated financial statements.

We were not engaged to audit, review, or apply any procedures on the FY 2015 consolidated financial statements. Accordingly, we do not express an opinion or any other form of assurance on the FY 2015 financial statements as a whole.

### *Required Supplementary Information*

Accounting principles generally accepted in the United States of America require that the Management's Discussion and Analysis, Required Supplementary Stewardship Information, and Required Supplementary Information as named in the Agency Financial Report (hereinafter referred to as the "required supplementary information") be presented to supplement the financial statements. Such information, although not a part of the financial statements, is required by OMB and the Federal Accounting Standards Advisory Board (FASAB), who consider it to be an essential part of financial reporting for placing the financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing it for consistency with management's responses to our inquiries, the financial statements, and other knowledge we obtained during our audit of the financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

*Other Information*

Our audit was conducted for the purpose of forming an opinion on the financial statements taken as a whole. The information in the NSF Mission and Vision Statement, About This Report, Message from the Director, the Message from the Chief Financial Officer, Other Information, and the Appendices, as listed in the Table of Contents of NSF's Agency Financial Report, is presented for purposes of additional analysis and is not a required part of the financial statements. Such information has not been subjected to the auditing procedures applied in the audit of the financial statements and, accordingly, we do not express an opinion or provide any assurance on the information.

**Other Reporting Required by *Government Auditing Standards***

In accordance with *Government Auditing Standards* and OMB Bulletin No. 15-02, we have also issued reports, dated January 13, 2017, on our consideration of NSF's internal control over financial reporting and on our tests of NSF's compliance with provisions of applicable laws, regulations, contracts, and grant agreements, as well as other matters for the year ended September 30, 2016. The purpose of those reports is to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on internal control over financial reporting or on compliance and other matters. Those reports are an integral part of an audit performed in accordance with *Government Auditing Standards* and OMB Bulletin No. 15-02 and should be considered in assessing the results of our audit.



Alexandria, Virginia  
January 13, 2017

**INDEPENDENT AUDITOR'S REPORT ON INTERNAL CONTROL OVER  
FINANCIAL REPORTING**

To the Director and Inspector General of the National Science Foundation

We have audited the financial statements of the National Science Foundation (NSF) as of and for the year ended September 30, 2016, and we have issued our report thereon dated January 13, 2017. We conducted our audit in accordance with auditing standards generally accepted in the United States of America; the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States; and Office of Management and Budget (OMB) Bulletin No. 15-02, *Audit Requirements for Federal Financial Statements*.

**Internal Control over Financial Reporting**

In planning and performing our audit of the financial statements, we considered NSF's internal control over financial reporting (internal control) to determine the audit procedures that are appropriate in the circumstances for the purpose of expressing an opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of NSF's internal control. Accordingly, we do not express an opinion on the effectiveness of NSF's internal control. We limited our internal control testing to those controls necessary to achieve the objectives described in OMB Bulletin No. 15-02. We did not test all internal controls relevant to operating objectives as broadly defined by the Federal Managers' Financial Integrity Act of 1982 (FMFIA), such as those controls relevant to ensuring efficient operations.

A deficiency in internal control exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent or detect and correct misstatements on a timely basis. A material weakness is a deficiency, or combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented or detected and corrected on a timely basis. A significant deficiency is a deficiency, or combination of deficiencies, in internal control that is less severe than a material weakness yet important enough to merit attention by those charged with governance.

Our consideration of internal control was for the limited purpose described in the first paragraph and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies; therefore, material weaknesses or significant deficiencies may exist that were not identified. Given these limitations, during our audit, we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified. We did identify a certain deficiency in internal control, described in the accompanying Schedule of Findings, that we consider to be a significant deficiency.



We noted certain additional matters involving internal control over financial reporting that we will report to NSF's management in a separate letter.

### **NSF's Response to Findings**

NSF's response to the findings identified in our audit is described in a separate memorandum attached to this report. NSF's response was not subjected to the auditing procedures applied in our audit of the financial statements; accordingly, we do not express an opinion on it.

### **Purpose of this Report**

The purpose of this report is solely to describe the scope of our testing of internal control and the results of that testing, and not to provide an opinion on the effectiveness of NSF's internal control. This report is an integral part of an audit performed in accordance with *Government Auditing Standards* and OMB Bulletin No. 15-02 in considering the entity's internal control. Accordingly, this communication is not suitable for any other purpose.

A handwritten signature in blue ink that reads "Kearney &amp; Company". The signature is written in a cursive, flowing style.

Alexandria, Virginia  
January 13, 2017

## Schedule of Findings

### Significant Deficiency

#### I. Information Technology Control Environment

Information technology (IT) relies on a foundation of interconnected information systems that use various methodologies and service providers to protect the confidentiality, integrity, and availability of data that is needed to accomplish an organization's mission. In addition, information systems serve as the basis for the financial reporting process. The National Institute of Standards and Technology (NIST) prescribes various types of controls to ensure the confidentiality, integrity, and availability of data. We identified several deficiencies within NSF's access controls process across the three financial systems we tested in Fiscal Year (FY) 2016. We considered the resulting combination of weaknesses in the IT control environment severe enough to be a significant deficiency within the scope of our financial statement audit. Specifically, we found:

- NSF did not properly authorize and recertify access at the application layer for two financial feeder systems. Failure to formally authorize new users and to review their access periodically increases the risk that users may have access beyond their business needs, which could result in unauthorized transactions being initiated in the financial systems.
- NSF did not properly monitor privileged<sup>1</sup> users' actions within the operating system and database layers for its core financial system and one of its feeder systems. Without specifically defining and reviewing the critical events for privileged users, NSF increases the risk that unauthorized changes to data, audit log settings, and configurations could go undetected and affect the integrity of financial transactions.

Without an effective access control program, NSF is vulnerable to weaknesses that increase the risk that sensitive financial information could be accessed by unauthorized individuals or that financial transactions could be altered, either accidentally or intentionally, and remain undetected. These access control weaknesses could compromise NSF's ability to report financial data accurately.

#### Recommendations:

We recommend that NSF take the following actions to correct the deficiencies identified:

1. Document and implement a process to authorize and recertify user access within the two affected financial feeder systems.
2. Perform and document a risk-based assessment of critical actions that are financially relevant within its core financial system and the affected feeder system that should be logged, aggregated, reviewed, and followed-up upon for privileged users.

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<sup>1</sup> Privileged users are database and operating system administrators.

3. Implement independent logging and monitoring process based on the completed risk assessment.

**Status of Prior-Year Findings**

One issue was noted relating to internal control over financial reporting in the *Independent Auditors' Report* on the National Science Foundation's (NSF) fiscal year (FY) 2015 financial statements. The table below presents a summary of the current-year status of the issue.

**Status of Prior-Year Findings**

<b>Control Deficiency</b>	<b>FY 2015 Status</b>	<b>FY 2016 Status</b>
Monitoring of Construction Type Cooperative Agreements	Significant Deficiency	No longer considered a significant deficiency.

\* \* \* \* \*

# **Attachment I – National Science Foundation’s Management Response**



**OFFICE OF BUDGET, FINANCE & AWARD MANAGEMENT**

**MEMORANDUM**

Date: January 13, 2017

To: Allison Lerner, Inspector General

From: Martha A. Rubenstein, Chief Financial Officer *Marty*

Subject: Management's Response to Independent Auditor's Report for Fiscal Year (FY) 2016

Thank you for the opportunity to comment on the Independent Public Auditor's Report on the National Science Foundation's (NSF) fiscal year (FY) 2016 financial statements. FY 2016 was a year that brought unprecedented challenges and therefore required unprecedented collaboration, so I am very proud that NSF received its 19<sup>th</sup> consecutive unmodified audit opinion on its financial statements and continued its record of no material weaknesses in internal control over financial reporting. During FY 2016 NSF reached two major milestones. First, the longstanding significant deficiency on monitoring of construction-type cooperative agreements was resolved and second, NSF was found compliant with the Improper Payments Elimination and Recovery Act.

The Auditors did, however, identify a new significant deficiency related to our information technology access controls and monitoring processes. We are taking this determination very seriously, and we have taken immediate actions to address the risks raised. We do not agree, however, that the aggregation of individual operational and documentation issues from disparate systems constitutes a deficiency significant enough to merit a reportable condition in financial reporting oversight. We nevertheless will take corrective actions to address these findings (and are doing so now).

Based on our initial assessment we found no instances of unauthorized use of NSF systems or changes to NSF data. In addition, we have no evidence that suggests NSF data was at risk of malicious intent. While we agreed with the control deficiencies identified, we assessed the risk of the control deficiencies to NSF's financial statements and systems as low.

I appreciate the NSF's staff dedication and resolve in dealing with the audit delay while meeting our ongoing operational responsibilities and sustaining improvements in NSF business processes

and internal control environment. I also want to thank your staff and your audit contractor for their collaboration and professionalism during the course of the audit. If you have any questions or require additional information concerning our response, please contact Mike Wetklow, Deputy Chief Financial Officer and Division Director for Financial Management at [mwetklow@nsf.gov](mailto:mwetklow@nsf.gov).

# **Attachment II – Kearney’s Rebuttal of National Science Foundation’s Management Response Disagreement**



Kearney & Company, P.C. (referred to as “Kearney,” “we,” and “our” in this document) appreciates the thorough and thoughtful responses to the audit report provided by the National Science Foundation’s (NSF) management. NSF agreed with the control deficiencies identified and has “taken immediate actions to address the risks raised.” We commend NSF for quickly taking actions to mitigate the risks identified and improve internal controls.

NSF does not agree with our appraisal of the level of severity of the issues that compose the significant deficiency. Based on an initial assessment, NSF officials found “no instances of unauthorized use of NSF systems or changes to NSF” and “no evidence that suggest NSF data was at risk of malicious intent.” While we appreciate the results of NSF’s assessment, we note that known errors or malicious intent are not necessary elements in a significant deficiency. A significant deficiency may exist due to the possibility that the controls will fail to prevent, or detect and correct, a misstatement. The combination of inadequate access controls and inadequate user monitoring may allow an unauthorized user to access the systems and make changes that go undetected. Kearney maintains that the combined issues identified result in a significant deficiency.

\* \* \* \* \*

**INDEPENDENT AUDITOR'S REPORT ON COMPLIANCE WITH LAWS,  
REGULATIONS, CONTRACTS, AND GRANT AGREEMENTS**

To the Director and Inspector General of the National Science Foundation

We have audited the financial statements of the National Science Foundation (NSF) as of and for the year ended September 30, 2016, and we have issued our report thereon dated January 13, 2017. We conducted our audit in accordance with auditing standards generally accepted in the United States of America; the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States; and Office of Management and Budget (OMB) Bulletin No. 15-02, *Audit Requirements for Federal Financial Statements*.

**Compliance and Other Matters**

As part of obtaining reasonable assurance about whether NSF's financial statements are free from material misstatement, we performed tests of its compliance with provisions of applicable laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the determination of financial statement amounts, as well as provisions referred to in Section 803(a) of the Federal Financial Management Improvement Act of 1996 (FFMIA).

We limited our tests of compliance to these provisions and did not test compliance with all laws, regulations, contracts, and grant agreements applicable to NSF. Providing an opinion on compliance with those provisions was not an objective of our audit; accordingly, we do not express such an opinion. The results of our tests, exclusive of those referred to in the FFMIA, disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards* and OMB Bulletin No. 15-02.

The results of our tests of compliance with FFMIA disclosed no instances in which NSF's financial management systems did not comply substantially with the Federal financial management system's requirements, applicable Federal accounting standards, or application of the United States Standard General Ledger at the transaction level.



### **Purpose of this Report**

The purpose of this report is solely to describe the scope of our testing of compliance and the results of that testing, and, therefore, does not express an opinion on the effectiveness of the entity's compliance. This report is an integral part of an audit performed in accordance with *Government Auditing Standards* and OMB Bulletin No. 15-02 in considering the entity's compliance. Accordingly, this communication is not suitable for any other purpose.

A handwritten signature in blue ink that reads "Kearney &amp; Company". The signature is written in a cursive, flowing style.

Alexandria, Virginia  
January 13, 2017



### Status of Prior-Year Findings

One issue was noted relating to non-compliance with the Improper Payments Elimination and Recovery Act of 2010 (IPERA) in the *Independent Auditors' Report* on the National Science Foundation's (NSF) fiscal year (FY) 2015 financial statements. The table below presents a summary of the current-year status of the issue.

### Status of Prior-Year Findings

Non-Compliance Issue	FY 2015 Status	FY 2016 Status
Non-Compliance with the Improper Payments Elimination and Recovery Act of 2010 (IPERA) Reporting Requirements in Fiscal Year 2014 Agency Financial Report	Non-Compliance	No longer considered a non-compliance issue

\* \* \* \* \*



# National Science Foundation

## **Financial Statements**

As of and for the Fiscal Years ended  
September 30, 2016 and 2015

**National Science Foundation**  
**Balance Sheet**  
**As of September 30, 2016 and 2015**  
**(Amounts in Thousands)**

<b>Assets</b>	<b><u>2016</u></b>	<b><u>2015</u></b>
Intragovernmental Assets		
Fund Balance With Treasury (Note 2)	\$ 12,971,429	\$ 12,318,849
Accounts Receivable	4,316	9,667
Advances	64,682	62,273
Total Intragovernmental Assets	<u>13,040,427</u>	<u>12,390,789</u>
Cash and Other Monetary Assets (Note 2)	21,951	50,520
Accounts Receivable, Net	1,513	1,909
General Property, Plant and Equipment, Net (Note 3)	266,726	281,450
<b>Total Assets</b>	<b><u>\$ 13,330,617</u></b>	<b><u>\$ 12,724,668</u></b>
<b>Liabilities</b>		
Intragovernmental Liabilities		
Advances From Others	\$ 3,039	\$ 10,096
Other Intragovernmental Liabilities	16,671	6,707
Total Intragovernmental Liabilities	<u>19,710</u>	<u>16,803</u>
Accounts Payable	131,613	118,198
FECA Employee Benefits	1,171	1,215
Environmental and Disposal Liabilities (Note 6)	18,247	18,247
Accrued Grant Liabilities, Net	412,639	340,877
Accrued Payroll and Other Liabilities	7,333	6,087
Accrued Annual Leave	18,012	17,382
<b>Total Liabilities</b>	<b><u>\$ 608,725</u></b>	<b><u>\$ 518,809</u></b>
<b>Net Position</b>		
Unexpended Appropriations - Other Funds	\$ 11,923,203	\$ 11,427,234
Cumulative Results of Operations - Other Funds	289,469	308,703
Cumulative Results of Operations - Dedicated Collections (Note 7)	509,220	469,922
<b>Total Net Position</b>	<b><u>12,721,892</u></b>	<b><u>12,205,859</u></b>
<b>Total Liabilities and Net Position</b>	<b><u>\$ 13,330,617</u></b>	<b><u>\$ 12,724,668</u></b>

*The accompanying notes are an integral part of these statements.*

**National Science Foundation**  
**Statement of Net Cost**  
**For the Years Ended September 30, 2016 and 2015**  
**(Amounts in Thousands)**

<b>Program Costs (Note 8)</b>	<b><u>2016</u></b>	<b><u>2015</u></b>
Research and Related Activities		
Gross Costs	\$ 5,979,543	\$ 5,905,726
Less: Earned Revenues	<u>(108,177)</u>	<u>(129,829)</u>
<b>Net Research and Related Activities</b>	<b><u>5,871,366</u></b>	<b><u>5,775,897</u></b>
 Education and Human Resources		
Gross Costs	\$ 861,295	\$ 842,079
Less: Earned Revenues	<u>(2,514)</u>	<u>(6,320)</u>
<b>Net Education and Human Resources</b>	<b><u>858,781</u></b>	<b><u>835,759</u></b>
 Major Research Equipment and Facilities Construction		
Gross Costs	\$ 182,474	\$ 264,161
Less: Earned Revenues	<u>-</u>	<u>-</u>
<b>Net Major Research Equipment and Facilities Construction</b>	<b><u>182,474</u></b>	<b><u>264,161</u></b>
 Donations and Dedicated Collections		
Gross Costs	\$ 133,726	\$ 104,527
Less: Earned Revenues	<u>-</u>	<u>-</u>
<b>Net Donations and Dedicated Collections</b>	<b><u>133,726</u></b>	<b><u>104,527</u></b>
 <b>Net Cost of Operations (Notes 8 and 14)</b>	<b><u>\$ 7,046,347</u></b>	<b><u>\$ 6,980,344</u></b>

*The accompanying notes are an integral part of these statements.*

**National Science Foundation**  
**Statement of Changes in Net Position**  
**For the Year Ended September 30, 2016**  
**(Amounts in Thousands)**

	<b>2016</b>		
	<b>Funds From</b>	<b>All Other</b>	<b>Total</b>
	<b>Dedicated Collections</b>		
<b>Cumulative Results of Operations</b>			
<b>Beginning Balances (Note 7)</b>	\$ 469,922	308,703	778,625
<b>Budgetary Financing Sources</b>			
Appropriations Used	-	6,897,524	6,897,524
Non-exchange Revenue	-	26	26
Donations	-	24,416	24,416
Appropriated Funds from Dedicated Collections			
Transferred In / (Out) (Note 7)	139,293	-	139,293
<b>Other Financing Sources</b>			
Imputed Financing From Costs Absorbed By Others	-	9,020	9,020
Other	-	(3,868)	(3,868)
<b>Total Financing Sources</b>	<b>139,293</b>	<b>6,927,118</b>	<b>7,066,411</b>
<b>Net Cost of Operations (Notes 7 and 8)</b>	<b>(99,995)</b>	<b>(6,946,352)</b>	<b>(7,046,347)</b>
<b>Cumulative Results of Operations (Note 7)</b>	<b>\$ 509,220</b>	<b>289,469</b>	<b>798,689</b>
 <b>Unexpended Appropriations</b>			
<b>Beginning Balances</b>	\$ -	<b>11,427,234</b>	<b>11,427,234</b>
<b>Budgetary Financing Sources</b>			
Appropriations Received	-	7,463,485	7,463,485
Cancelled Authority Adjustments	-	(69,992)	(69,992)
Appropriations Used	-	(6,897,524)	(6,897,524)
<b>Total Budgetary Financing Sources</b>	<b>-</b>	<b>495,969</b>	<b>495,969</b>
<b>Total Unexpended Appropriations</b>	<b>\$ -</b>	<b>11,923,203</b>	<b>11,923,203</b>
 <b>Net Position</b>	 <b>\$ 509,220</b>	 <b>12,212,672</b>	 <b>12,721,892</b>

*The accompanying notes are an integral part of these statements.*

**National Science Foundation**  
**Statement of Changes in Net Position**  
**For the Year Ended September 30, 2015**  
**(Amounts in Thousands)**

	<u>2015</u>		
	<u>Funds From</u> <u>Dedicated Collections</u>	<u>All Other</u>	<u>Total</u>
<b>Cumulative Results of Operations</b>			
<b>Beginning Balances (Note 7)</b>	\$ 404,199	289,423	693,622
<b>Budgetary Financing Sources</b>			
Appropriations Used	-	6,880,952	6,880,952
Non-exchange Revenue	-	78	78
Donations	-	34,787	34,787
Appropriated Funds from Dedicated Collections			
Transferred In / (Out) (Note 7)	142,999	-	142,999
<b>Other Financing Sources</b>			
Imputed Financing From Costs Absorbed By Others	-	9,133	9,133
Other	-	(2,602)	(2,602)
<b>Total Financing Sources</b>	<b>142,999</b>	<b>6,922,348</b>	<b>7,065,347</b>
<b>Net Cost of Operations (Notes 7 and 8)</b>	<b>(77,276)</b>	<b>(6,903,068)</b>	<b>- (6,980,344)</b>
<b>Cumulative Results of Operations (Note 7)</b>	<b>\$ 469,922</b>	<b>308,703</b>	<b>778,625</b>
<b>Unexpended Appropriations</b>			
<b>Beginning Balances</b>	\$ -	11,057,969	11,057,969
<b>Budgetary Financing Sources</b>			
Appropriations Received	-	7,344,205	7,344,205
Cancelled Authority Adjustments	-	(93,988)	(93,988)
Appropriations Used	-	(6,880,952)	(6,880,952)
<b>Total Budgetary Financing Sources</b>	<b>-</b>	<b>369,265</b>	<b>369,265</b>
<b>Total Unexpended Appropriations</b>	<b>\$ -</b>	<b>11,427,234</b>	<b>11,427,234</b>
<b>Net Position</b>	<b>\$ 469,922</b>	<b>11,735,937</b>	<b>12,205,859</b>

*The accompanying notes are an integral part of these statements.*

**National Science Foundation**  
**Statement of Budgetary Resources**  
**For the Years Ended September 30, 2016 and 2015**  
**(Amounts in Thousands)**

	<u>2016</u>	<u>2015</u>
<b>Budgetary Resources</b>		
Unobligated Balance - Brought Forward, October 1	\$ 394,527	\$ 393,733
Recoveries of Prior Year Unpaid Obligations	105,748	218,337
Other Changes in Unobligated Balance	(67,967)	(90,620)
Unobligated Balance from Prior Year Budget Authority, Net	432,308	521,450
Appropriations	7,627,220	7,522,070
Spending Authority from Offsetting Collections	97,461	100,897
<b>Total Budgetary Resources (Note 12)</b>	<b>\$ 8,156,989</b>	<b>\$ 8,144,417</b>
<b>Status of Budgetary Resources</b>		
New Obligations and Upward Adjustments (Note 9 & 12)	\$ 7,808,724	\$ 7,749,890
Unobligated Balance, End of Year		
Apportioned, Unexpired (Note 2)	160,313	223,723
Unapportioned, Unexpired (Note 2)	28,162	19,620
Unobligated Balance, Unexpired, End of Year	188,475	243,343
Unobligated Balance, Expired, End of Year (Note 2)	159,790	151,184
Total Unobligated Balance, End of Year	348,265	394,527
<b>Total Status of Budgetary Resources</b>	<b>\$ 8,156,989</b>	<b>\$ 8,144,417</b>
<b>Change in Obligated Balance</b>		
Unpaid Obligations		
Unpaid Obligations - Brought Forward, October 1	\$ 12,078,549	\$ 11,544,639
New Obligations and Upward Adjustments (Note 9)	7,808,724	7,749,890
Gross Outlays	(7,041,117)	(6,997,643)
Recoveries of Prior Year Unpaid Obligations	(105,748)	(218,337)
Unpaid Obligations, End of Year	12,740,408	12,078,549
Uncollected Payments		
Uncollected Payments from Federal Sources - Brought Forward, October 1	\$ (103,956)	\$ (122,935)
Change in Uncollected Payments from Federal Sources	8,570	18,979
Uncollected Payments from Federal Sources, End of Year	(95,386)	(103,956)
Memorandum (non-add) Entries		
Obligated Balance, Start of Year	\$ 11,974,593	\$ 11,421,704
Obligated Balance, End of Year (Note 2)	\$ 12,645,022	\$ 11,974,593
<b>Budget Authority and Outlays, Net</b>		
Budget Authority, Gross	\$ 7,724,681	\$ 7,622,967
Actual Offsetting Collections	(108,056)	(123,245)
Change in Uncollected Payments from Federal Sources	8,570	18,979
Recoveries of Prior Year Paid Obligations	2,025	3,369
Budget Authority, Net	<b>\$ 7,627,220</b>	<b>\$ 7,522,070</b>
Gross Outlays	\$ 7,041,117	\$ 6,997,643
Actual Offsetting Collections	(108,056)	(123,245)
Net Outlays	<b>6,933,061</b>	<b>6,874,398</b>
Distributed Offsetting Receipts (Note 12)	(28,648)	(37,834)
Net Agency Outlays	<b>\$ 6,904,413</b>	<b>\$ 6,836,564</b>

*The accompanying notes are an integral part of these statements.*

## Notes to the Principal Financial Statements

### Note 1. Summary of Significant Accounting Policies

#### A. Reporting Entity

The National Science Foundation (NSF or “Foundation”) is an independent federal agency created by the National Science Foundation Act of 1950, as amended (42 U.S.C. 1861-75). Its mission is to promote and advance scientific progress in the United States. NSF initiates and supports scientific research and research fundamental to the engineering process and programs to strengthen the Nation’s science and engineering potential. NSF also supports education programs at all levels in all fields of science and engineering. NSF funds research and education in science and engineering by awarding grants and contracts to educational and research institutions throughout the United States and its territories. NSF, by law, cannot operate research facilities except in the polar regions. NSF enters into relationships through awards, to fund the research operations conducted by grantees.

NSF is led by a presidentially-appointed, Senate confirmed, Director and the 24-member National Science Board (NSB). The NSB members represent a cross section of prominent leaders in science and engineering research and education, and are appointed by the President for 6-year terms. The NSF Director is an *ex officio* member of the Board.

NSF has a total workforce of about 2,100 at its Arlington, VA, headquarters, including approximately 1,400 career employees, 200 rotator scientists from research institutions in temporary positions, 450 contract workers and the staff of the NSB office and the Office of the Inspector General. NSF provides the opportunity for scientists, engineers, and educators to join the Foundation as temporary program directors and advisors. These "rotators" provide input during the merit review process of proposals; provide insight for new directions in the fields of science, engineering, and education; and support cutting-edge interdisciplinary research. Rotators can come to NSF under multiple mechanisms. The largest numbers come on Intergovernmental Personnel Act assignments, or IPAs, who remain employees of their home institutions. NSF facilitates IPA assignments through grants to their institution as a reimbursement in whole or in part for salary and benefits, and that reimbursement is then paid by the institution to their employee. All rotators are subject to criminal conflict of interest statutes (statutes) as well as the Government-wide Standards of Ethical Conduct of Employees of the Executive Branch (regulations) which prohibit them from participating in NSF proposals and awards affecting themselves and their home institutions.

#### B. Basis of Presentation

These financial statements have been prepared to report the financial position and results of operations of NSF as required by the Chief Financial Officers Act of 1990, the Government Management Reform Act of 1994, the Reports Consolidation Act of 2000, and the Office of Management and Budget (OMB) Circular A-136, *Financial Reporting Requirements*. While the statements have been prepared from the books and records of NSF in accordance with United States Generally Accepted Accounting Principles (U.S. GAAP) for federal entities and the formats prescribed by OMB, the statements are in addition to the financial reports used to monitor and control budgetary resources, which are prepared from the same books and records.

#### C. Basis of Accounting

The accompanying financial statements have been prepared in accordance with U.S. GAAP for federal entities using the accrual method of accounting. Under the accrual method, revenues are recognized when earned, and expenses are recognized when a liability is incurred, without regard to receipt or payment of cash. The accompanying financial statements also include budgetary accounting transactions that ensure compliance with legal constraints and controls over the use of federal funds.

#### **D. Revenues and Other Financing Sources**

NSF receives the majority of its funding through appropriations contained in the Commerce, Justice, Science, and Related Agencies Appropriations Act. NSF receives annual, multi-year, and no-year appropriations that may be expended within statutory limits. NSF also receives funding via warrant from a receipt account for dedicated collections that is reported as H-1B Nonimmigrant Petitioner Account (H-1B) funds. Additional amounts are obtained from reimbursements for services provided to other federal agencies as well as from receipts to the NSF Donations Account. Also, NSF receives interest earned on overdue receivables and excess cash advances to grantees. The interest earned on overdue receivables and excess cash advances to grantees is returned to Treasury at the end of each fiscal year.

In FY 2016, The Science Appropriations Act, 2016 under Public Law 114-113, provided funding for each of NSF's appropriations. In addition, the Act provided an administrative provision allowing NSF to transfer up to 5 percent of current year funding between appropriations. Appropriations are recognized as a financing source at the time the related "funded" program or administrative expenditures are incurred. Appropriations are also recognized when used to purchase Property, Plant and Equipment (PP&E). "Unfunded" liabilities result from liabilities not covered by budgetary resources and will be paid when future appropriations are made available for these purposes. Donations are recognized as revenues when funds are received. Revenues from reimbursable agreements are recognized when the services are provided and the related expenditures are incurred. Reimbursable agreements are mainly for grant administrative services provided by NSF on behalf of other federal agencies.

Under the general authority of the Foundation, NSF is authorized to accept and use both U.S. and foreign funds in the NSF Donations Account. In accordance with 42 U.S.C. 1862 Section 3 (a)(3), NSF has authority "to foster the interchange of scientific and engineering information among scientists and engineers in the United States and foreign countries"; and in 42 U.S.C. 1870 Section 11 (f), NSF is authorized to receive and use funds donated by others. Donations may be received from foreign governments, private companies, academic institutions, non-profit foundations, and individuals. These funds must be donated without restriction other than that they be used in furtherance of one or more of the general purposes of the Foundation. Funds are made available for obligations as necessary to support NSF programs.

#### **E. Fund Balance with Treasury and Cash and Other Monetary Assets**

*Fund Balance with Treasury* is composed of appropriated funds that are available to pay current liabilities and finance authorized purchase commitments. *Cash and Other Monetary Assets* include non-appropriated funding sources from donations and undeposited collections. Cash receipts and disbursements are processed by Treasury.

#### **F. Accounts Receivable**

*Accounts Receivable* consist of amounts due from governmental agencies, private organizations, and individuals. Additionally, NSF has the right to conduct audits on awardees to verify billed amounts. These audits may result in monies owed back to NSF. Upon resolution of the amount owed by the awardee to NSF, a receivable is recorded.

NSF establishes an allowance for loss on accounts receivable from non-federal sources that are deemed uncollectible but regards amounts due from other federal agencies as fully collectible. NSF analyzes each account independently to assess collectability and the need for an offsetting allowance or write-off. NSF writes off delinquent debt from non-federal sources that is more than 2 years old.

#### **G. Advances**

*Advances* consist of advances to federal agencies which are issued when agencies are operating under working capital funds or are unable to incur costs on a reimbursable basis. Advances are reduced when documentation supporting expenditures is received and recorded. Additionally, some NSF grantees receive

advanced funds prior to incurring expenses. Payments are only made within the amount of the recorded grant obligation and are intended to cover immediate cash needs. Grant advances are presented net of grant liabilities on NSF's Balance Sheet.

#### **H. General Property, Plant and Equipment**

NSF capitalizes PP&E with costs exceeding \$25.0 thousand and useful lives of 2 or more years; items not meeting these criteria are recorded as operating expenses. NSF currently reports capitalized PP&E at original acquisition cost; assets acquired from the General Services Administration (GSA) excess property schedules are recorded at the value assigned by the donating agency; and assets transferred in from other agencies are valued at the cost recorded by the transferring entity for the asset net of accumulated depreciation or amortization.

The PP&E balance consists of Equipment, Aircrafts and Satellites, Buildings and Structures, Leasehold Improvements, Construction in Progress, Internal Use Software, and Software in Development. These balances are comprised of PP&E maintained "in-house" by NSF to support operations and PP&E under the U.S. Antarctic Program (USAP). The majority of USAP property is under the custodial responsibility of the NSF prime contractor for the program.

Depreciation expense is calculated using the straight-line half-year convention. The economic useful life classifications for capitalized assets are as follows:

#### **Equipment**

5 years	Computers and peripheral equipment, fuel storage tanks, laboratory equipment, and vehicles
7 years	Communications equipment, office furniture and equipment, pumps and compressors
10 or 15 years	Generators, Department of Defense equipment
20 years	Movable buildings (e.g., trailers)

#### **Aircraft and Satellites**

7 years	Aircraft, aircraft conversions, and satellites
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#### **Buildings and Structures**

31.5 years	Buildings and structures placed in service prior to 1994
39 years	Buildings and structures placed in service after 1993

#### **Leases and Leasehold Improvements**

NSF's headquarters are leased through GSA under an occupancy agreement. The cancellation clause within the agreement allows NSF to terminate use with a 120-day notice. NSF is billed by GSA for the leased space as rent based upon estimated lease payments made by GSA plus an administrative fee. Therefore, the cost of headquarters is not capitalized by NSF. All NSF leases are cancellable and/or in effect for a period of no more than 1 year. Leasehold improvements performed by GSA are financed with NSF appropriated funds. Amortization is calculated using the straight-line half-year convention upon transfer from construction in progress.

#### **Construction in Progress**

Costs incurred to construct buildings and structures are accumulated and tracked as construction in progress. At 75 percent completion of construction, an on-site Conditional Occupancy inspection is performed to evaluate for compliance with the approved plans, design, specifications, and changes. Items that pertain to the safety and health of any future occupants of the facility must be corrected before a Conditional Occupancy is granted and the facility occupied. When Conditional

Occupancy is granted, the completed project is transferred from construction in progress to real property or capital equipment and depreciated over the respective useful life of the asset.

### **Internal Use Software**

NSF controls, values, and reports purchased or developed software as tangible property assets, in accordance with the Statement of Federal Financial Accounting Standards (SFFAS) No. 10, *Accounting for Internal Use Software*. NSF identifies software investments as capital property for items that, in the aggregate, cost \$500.0 thousand or more to purchase, develop, enhance, or modify a new or existing NSF system, or configure a government-wide system for NSF needs. Software projects that are not completed at year end and are expected to exceed the capitalization threshold are recorded as software in development. All internal use software meeting the capitalization threshold is amortized over a 5-year period using the straight-line half-year convention.

*Assets Owned by NSF in the Custody of Other Entities:* NSF awards grants, cooperative agreements, and contracts to various organizations, including colleges and universities, non-profit organizations, state and local governments, Federally Funded Research and Development Centers (FFRDCs), and private entities. The funds provided may be used in certain cases to purchase or construct PP&E to be used for operations or research on projects or programs sponsored by NSF. In these instances, NSF funds the acquisition of property, but transfers control of the assets to these entities. NSF's authorizing legislation specifically prohibits the Foundation from operating such property directly.

In practice, NSF's ownership interest in such PP&E is similar to a reversionary interest. To address the accounting and reporting of these assets, specific guidance was sought by NSF and provided by the Federal Accounting Standards Advisory Board (FASAB). This guidance stipulates that NSF should: (i) disclose the value of such PP&E held by others in its financial statements based on information contained in the audited financial statements of these entities (if available); and (ii) report information on costs incurred to acquire the research facilities, equipment, and platforms in the Research and Human Capital Activity costs as required by SFFAS No. 8, *Supplementary Stewardship Reporting*. Very few entities disclose information on NSF-owned property in their audited financial statements. Therefore, NSF has elected to disclose only the number of entities in possession of NSF-owned property. Entities that separately present the book value of NSF-owned property in their audited financial statements and all FFRDCs are listed in Note 4, *General Property, Plant and Equipment in the Custody of Other Entities*, along with the book value of the property held.

### ***I. Advances From Others***

*Advances From Others* consist of amounts obligated and advanced by other federal entities to NSF for grant administration and other services to be furnished under reimbursable agreements.

### ***J. Other Intragovernmental Liabilities***

*Other Intragovernmental Liabilities* consist of federal accounts payable, federal payroll payable, and liabilities for non-entity assets. Federal accounts payable consist of liabilities to federal agencies recognized by NSF related to unbilled revenue reported to NSF by the reciprocating federal agency. Liabilities for federal payroll payable consist of the federal portion of payroll benefits, taxes, and unfunded Federal Employees' Compensation Act (FECA) liabilities. Liabilities for non-entity assets are recorded to offset accounts receivable balances associated with cancelled appropriations.

### ***K. Accounts Payable***

*Accounts Payable* consist of liabilities to commercial vendors, contractors, federal agencies, and disbursements in transit. *Accounts Payable* to federal agencies, commercial vendors, and contractors are expenses for goods and services received but not yet paid for by NSF at the end of the fiscal year. At year end, NSF accrues for the amount of estimated unpaid expenses to vendors for which invoices have not been

received, but goods and services have been delivered and rendered. *Accounts Payable* also consist of disbursements in transit recorded by NSF but not paid by Treasury.

**L. Accrued Grant Liabilities, Net**

*Accrued Grant Liabilities, Net* consist of estimated liabilities to grantees for expenses incurred but not reported (IBNR) by September 30. NSF's grant accrual methodology utilizes a linear regression model based on the statistical correlation between prior year unliquidated obligations and prior year expenses IBNR. NSF utilizes the Award Cash Management Service (ACM\$), a grantee cash request and expenditure reporting system. ACM\$ enables all grantee institutions to request funds at the award level to support project needs.

**M. Accrued Payroll and Other Liabilities**

*Accrued Payroll and Other Liabilities* consist of accrued payroll and undeposited collections. NSF's payroll services are provided by the Department of the Interior's Interior Business Center. Accrued payroll relates to services rendered by NSF employees, for which they have not yet been paid. At year end, NSF accrues the amount of wages and benefits earned, but not yet paid. Undeposited collections are funds received by NSF, but not remitted to Treasury prior to September 30.

**N. Employee Benefits**

A liability is recorded for estimated and actual future payments to be made for workers' compensation pursuant to FECA. The liability consists of the net present value of estimated future payments calculated by the U.S. Department of Labor (DOL) and the actual unreimbursed cost paid by DOL for compensation paid to recipients under FECA. The actual costs incurred are reflected as a liability because NSF will reimburse DOL 2 years after the actual payment of expenses. Future NSF Agency Operations and Award Management (AOAM) appropriations will be used for DOL's estimated reimbursement.

Annual leave is accrued as it is earned, and the accrual is reduced as leave is taken. Each year, the balance in the accrued annual leave account is adjusted to reflect changes. To the extent current and prior-year appropriations are not available to fund annual leave earned but not taken, funding will be obtained from future AOAM appropriations. Sick leave and other types of non-vested leave are expensed as taken.

**O. Net Position**

*Net Position* is the residual difference between assets and liabilities and is composed of unexpended appropriations and cumulative results of operations. *Unexpended Appropriations* represent the amount of undelivered orders and unobligated balances of budget authority. Unobligated balances are the amount of appropriations or other authority remaining after deducting the cumulative obligations from the amount available for obligation. The *Cumulative Results of Operations* represent the net results of NSF's operations since the Foundation's inception.

**P. Retirement Plan**

In FY 2016, approximately 6 percent of NSF employees participated in the Civil Service Retirement System (CSRS), to which NSF matches contributions equal to 7 percent of pay. The majority of NSF employees are covered by the Federal Employees Retirement System (FERS) and Social Security. A primary feature of FERS is the thrift savings plan to which NSF automatically contributes 1 percent of pay. The maximum NSF matching contribution is 5 percent of employee pay, of which 3 percent is fully matched, and 2 percent is matched at 50 percent. NSF also contributes the employer's matching share for Social Security for FERS participants.

Although NSF funds a portion of the benefits under FERS and CSRS relating to its employees and withholds the necessary payroll deductions, the Foundation has no liability for future payments to

employees under these plans, nor does NSF report CSRS, FERS, Social Security assets, or accumulated plan benefits on its financial statements. Reporting such amounts is the responsibility of the Office of Personnel Management (OPM) and the Federal Retirement Thrift Investment Board.

SFFAS No. 5, *Accounting for Liabilities of the Federal Government*, requires employing agencies to recognize the cost of pensions and other retirement benefits during their employees' active years of service. OPM actuaries determine pension cost factors by calculating the value of pension benefits expected to be paid in the future, and provide these factors to the agency for current period expense reporting. Information is also provided by OPM regarding the full cost of health and life insurance benefits.<sup>1</sup>

### **Q. Contingencies and Possible Future Costs**

*Contingencies - Claims and Lawsuits:* NSF is a party to various legal actions and claims brought against it. In the opinion of NSF management and legal counsel, the ultimate resolution of the actions and claims will not materially affect the financial position or operations of the Foundation. NSF recognizes the contingency in the financial statements when claims are expected to result in a material loss (and the payment amounts can be reasonably estimated), whether from NSF's appropriations or the Judgment Fund, administered by the Department of Justice under Section 1304 of Title 31 of the United States Code.

Claims and lawsuits can also be made and filed against awardees of the Foundation by third parties. NSF is not a party to these actions and NSF believes there is no possibility that NSF will be legally required to satisfy such claims. Judgments or settlements of the claims against awardees that impose financial obligation on them may be claimed as costs under the applicable contract, grant, or cooperative agreement and thus may affect the allocation of program funds in future fiscal years. In the event that the claim becomes probable and amounts can be reasonably estimated, the claim will be recognized.

*Contingencies – Unasserted Claims:* For claims and lawsuits that have not been made and filed against the Foundation, NSF management and legal counsel determine, in their opinion, whether resolution of the actions and claims they are aware of will materially affect the Foundation's financial position or operations. NSF recognizes a contingency in the financial statements when unasserted claims are probable of assertion, and if asserted, would be probable of an unfavorable outcome and expected to result in a measurable loss, whether from NSF's appropriations or the Judgment Fund. NSF discloses unasserted claims if the loss is more likely than not to occur, but the materiality of a potential loss cannot be determined.

*Termination Claims:* NSF engages organizations, including FFRDCs, in cooperative agreements and contracts to manage, operate, and maintain research facilities for the benefit of the scientific community. As part of these agreements and contracts, NSF funds on a pay-as-you-go basis certain employee benefit costs (accrued vacation and other employee related liabilities, severance pay and medical insurance), long term leases, and vessel usage and drilling. In some instances, an award decision is made to continue operation of a facility with a different entity performing operation and management duties. In such an occurrence, NSF does not classify the facility as terminated. Claims submitted by the previous managing entity for expenditures not covered by the indirect cost rate included in the initial award are subject to audit and typically paid with existing program funds.

Agreements with FFRDCs include a clause that commits NSF to seek appropriations for termination expenses, if necessary, in the event a facility is terminated. NSF considers termination of these facilities only remotely possible. Should a facility be terminated, NSF is obligated to pay termination expenses for FFRDCs in excess of the limitation of funds set forth in the agreements, including any Post-Retirement Benefit liabilities, only if funds are appropriated for this specific purpose. Nothing in these agreements can

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<sup>1</sup> OPM Benefit Administration website:  
<https://www.opm.gov/retirement-services/publications-forms/benefits-administration-letters/2016/16-101.pdf>

be construed as implying that Congress will appropriate funds to meet the terms of any claims. Termination costs that may be payable to an FFRDC operator cannot be estimated until such time as the facility is terminated.

*Environmental Liabilities:* NSF manages USAP. The Antarctic Conservation Act and its implementing regulations identify the requirements for environmental clean-up in Antarctica. NSF continually monitors USAP in regards to environmental issues. NSF establishes its environmental liability estimates in accordance with the requirements of SFFAS No. 5, *Accounting for Liabilities of the Federal Government*, and as amended by SFFAS No. 12, *Recognition of Contingent Liabilities Arising from Litigation*, and the Federal Financial Accounting and Auditing Technical Release No. 2, *Determining Probable and Reasonably Estimable for Environmental Liabilities in the Federal Government*.

While NSF is not legally liable for environmental clean-up costs in the Antarctic, there are occasions when the NSF Division of Polar Programs chooses to accept responsibility and commit funds toward clean-up efforts of various sites as resources permit. Decisions to commit funds are in no way driven by concerns of probable legal liability for failure to engage in such efforts, but rather a commitment to environmental stewardship of Antarctic natural resources. Environmental clean-up projects started and completed during the year are reflected in NSF's financial statements as expenses for the current fiscal year. An estimated cost would be accrued for approved projects that are anticipated to be performed after the fiscal year end or will take more than 1 fiscal year to complete.

Separate from environmental clean-up costs related to the Antarctic Conservation Act, NSF discloses NSF-owned buildings in the Antarctic that have been identified as having, or expected to have, friable and non-friable asbestos containing material. NSF's estimated cost for asbestos related clean-up is shown on the Balance Sheet as a liability. Additional detail on the estimate methodology is included in Note 6, *Environmental and Disposal Liability*.

#### **R. Use of Estimates**

Management has made certain estimates and assumptions when reporting assets, liabilities, revenues, and expenses, and also in the note disclosures. Estimates underlying the accompanying financial statements include accounting for grants, contracts, accounts payable, payroll, and PP&E. Actual results may differ from these estimates, and the difference will be adjusted for and included in the financial statements of the following fiscal year.

## Note 2. Fund Balance With Treasury

*Fund Balance with Treasury* (FBWT) consisted of the following components as of September 30, 2016 and 2015:

(Amounts in Thousands)	2016			
	Appropriated Funds	Donated Funds	Funds from Dedicated Collections	Total
Obligated	\$ 12,155,149	\$ 36,858	\$ 453,015	\$ 12,645,022
Unobligated Available, Unexpired	75,882	22,268	62,163	160,313
Unobligated Unavailable, Unexpired	14,031	1,666	12,465	28,162
Unobligated Unavailable, Expired	159,790	-	-	159,790
Less: Cash and Other Monetary Assets	(93)	(21,858)	-	(21,951)
Add: Undeposited Collections	93	-	-	93
<b>Total FBWT</b>	<b>\$ 12,404,852</b>	<b>\$ 38,934</b>	<b>\$ 527,643</b>	<b>\$ 12,971,429</b>

(Amounts in Thousands)	2015			
	Appropriated Funds	Donated Funds	Funds from Dedicated Collections	Total
Obligated	\$ 11,571,214	\$ 35,655	\$ 367,724	\$ 11,974,593
Unobligated Available, Unexpired	85,694	27,561	110,468	223,723
Unobligated Unavailable, Unexpired	12,512	1,557	5,551	19,620
Unobligated Unavailable, Expired	151,184	-	-	151,184
Less: Cash and Other Monetary Assets	(249)	(50,271)	-	(50,520)
Add: Undeposited Collections	249	-	-	249
<b>Total FBWT</b>	<b>\$ 11,820,604</b>	<b>\$ 14,502</b>	<b>\$ 483,743</b>	<b>\$ 12,318,849</b>

The NSF Donations Account includes amounts donated to NSF from all sources. Funds in the NSF Donations Account may be used to further one or more of the general purposes of the Foundation. The donated funds are reported as FBWT or as *Cash and Other Monetary Assets*. Donations reported as *Cash and Other Monetary Assets* represent cash held outside of Treasury at commercial banks in interest bearing accounts. These funds are collateralized up to \$37.5 million by the bank, through the Federal Reserve Bank of St. Louis, in accordance with Treasury Financial Manual Volume 1, Chapter 6-9000. *Undeposited Collections* are funds received by NSF, but not remitted to Treasury prior to September 30. *Unobligated Unavailable* balances include recoveries of prior year obligations and other unobligated expired funds that are unavailable for new obligations.

In FY 1999, in accordance with P.L. 105-277, a special fund, H-1B, was established in the general fund of the U.S. Treasury. These funds are considered Funds from Dedicated Collections and are not included in Appropriated Funds. The funds represent fees collected for each petition for nonimmigrant status. Under the law, NSF was prescribed a percentage of these fees for specific programs.

### Note 3. General Property, Plant and Equipment, Net

The components of *General Property, Plant and Equipment, Net* as of September 30, 2016 and 2015 are shown below. As of September 30, 2016, NSF had not identified any asset impairments.

(Amounts in Thousands)	2016		
	Acquisition	Accumulated	Net Book Value
	Cost	Depreciation	
Equipment	\$ 154,365	\$ (137,650)	\$ 16,715
Aircraft and Satellites	115,806	(115,806)	-
Buildings and Structures	319,125	(141,477)	177,648
Leasehold Improvements	11,705	(11,524)	181
Construction in Progress	2,710	-	2,710
Internal Use Software	87,189	(46,313)	40,876
Software in Development	28,596	-	28,596
Total PP&E	<u>\$ 719,496</u>	<u>\$ (452,770)</u>	<u>\$ 266,726</u>

(Amounts in Thousands)	2015		
	Acquisition	Accumulated	Net Book Value
	Cost	Depreciation	
Equipment	\$ 155,764	\$ (133,030)	\$ 22,734
Aircraft and Satellites	138,487	(138,487)	-
Buildings and Structures	319,207	(132,426)	186,781
Leasehold Improvements	11,705	(11,162)	543
Construction in Progress	1,186	-	1,186
Internal Use Software	76,900	(31,372)	45,528
Software in Development	24,678	-	24,678
Total PP&E	<u>\$ 727,927</u>	<u>\$ (446,477)</u>	<u>\$ 281,450</u>

### Note 4. General Property, Plant, and Equipment in the Custody of Other Entities

NSF received a ruling from FASAB on accounting for PP&E owned by NSF but in the custody of and used by others (see Note 1H. *General Property, Plant, and Equipment*). The FASAB guidance requires PP&E in the custody of others be excluded from NSF PP&E as defined in SFFAS No. 6, *Accounting for Property, Plant and Equipment*. NSF is required to disclose the dollar amount of NSF PP&E held by others in the footnotes based on information contained in the most recently issued audited financial statements of the organization holding the assets.

As of September 30, 2016, there were 31 colleges or universities, and 16 commercial entities that held property titled to NSF. With the exception of the entities listed below, none of the colleges, universities or commercial entities reported NSF-owned property separately.

The amount of PP&E owned by NSF but in the custody of an NSF awardee is identified in the table below. In some cases entities operate on a fiscal year end basis other than September 30. If NSF PP&E is not separately stated on the entity's audited financial statements, the entity is not audited, or the disclosed PP&E balances are not audited, the related amounts are annotated as Not Available (N/A) in the table.

(Amounts in Thousands)

<i>Entities with Reported NSF Government Owned Equipment</i>	Amount	Fiscal Year Ending
Association of Universities for Research in Astronomy, Inc. - AURA	N/A	9/30/15
National Radio Astronomy Observatory - AUI	\$503,426	9/30/15
University Corporation for Atmospheric Research - UCAR	\$206,956	9/30/15

## Note 5. Leases

NSF leases its headquarters under an operating lease with GSA. The cancellation clause within the agreement allows NSF to terminate use with a 120-day notice. In FY 2017, NSF will be relocating to new headquarters in Alexandria, VA. The following is a schedule of future minimum lease payments for the current and future headquarters, warehouses, and office space in Denver, Colorado. The current leases are active through FY 2032.

(Amounts in Thousands)

Fiscal Year	Building Operating Lease Amount
2017	31,585
2018	29,735
2019	24,750
2020	24,733
2021	24,784
2022 and After	276,157
Total Minimum Lease Payments	\$ 411,744

In addition to its headquarters, NSF occupies common spaces with other federal agencies overseas through the Department of State's (State) International Cooperative Administrative Support Services (ICASS) system. NSF uses ICASS in Beijing, Brussels, and Tokyo for residential and non-residential space. In FY 2016, the NSF Europe Regional Office relocated from Paris, France to Brussels, Belgium, resulting in the termination of the Paris lease. ICASS is a voluntary cost distribution system and the agreement to receive ICASS services is through an annual Memorandum of Understanding (MOU) between NSF and State. Additionally, NSF leases residential space in Tokyo. As with all NSF leases, this lease is cancellable and/or for a period not more than a year.

## Note 6. Environmental and Disposal Liability

Pursuant to FASAB Technical Bulletin 2006-1, *Recognition and Measurement of Asbestos-Related Cleanup Costs*, federal entities are required to recognize a liability for federal property asbestos cleanup costs. Some NSF owned buildings and structures used to support the USAP have been identified as having, or expected to have, friable and non-friable asbestos containing material.

As required by SFFAS No. 6, *Accounting for Property, Plant and Equipment*, NSF works with the current USAP contractor through the Antarctic Support Contract (ASC) to determine the need for asbestos liability adjustments based on actual asbestos costs incurred on an annual basis. Actual asbestos remediation costs are submitted quarterly by the ASC and the asbestos liability is reduced by the reported amount. No asbestos remediation costs were incurred as of September 30, 2016 and the balance remains \$18.2 million.

## Note 7. Funds from Dedicated Collections

In FY 1999, Title IV of the American Competitiveness and Workforce Improvement Act of 1998 (P.L. 105-277) established the H-1B Nonimmigrant Petitioner Account in the General Fund of the U.S. Treasury. Funding is established from fees collected for alien, nonimmigrant status petitions. The law requires that a prescribed percentage of the funds in the account be made available to NSF for the following activities:

- Computer Science, Engineering, and Mathematics Scholarship (CSEMS)
- Grants for Mathematics, Engineering, or Science Enrichment Courses
- Systemic Reform Activities

The H-1B Nonimmigrant Petitioner fees are available to the Director of NSF until expended. The funds may be used for scholarships to low income students, or to carry out a direct or matching grant program to support private and/or public partnerships in K-12 education. The H-1B fund is set up as a permanent indefinite appropriation by NSF. These funds are described in the Budget of the United States Government (President's Budget). *Funds from Dedicated Collections* are accounted for in a separate Treasury Account Symbol (TAS), and the budgetary resources are recorded as *Appropriated Funds from Dedicated Collections Transferred In / (Out)*. *Funds from Dedicated Collections* are reported in accordance with SFFAS No. 43, *Funds from Dedicated Collections: Amending Statement of Federal Financial Accounting Standards 27, Identifying and Reporting Earmarked Funds*. For the years ended September 30, 2016 and September 30, 2015, NSF was subject to H-1B sequestrations in the amounts of \$6.8 million and \$7.3 million, respectively.

(Amounts in Thousands)	2016	2015
<b>Balance Sheet as of September 30, 2016 and 2015</b>		
Fund Balance With Treasury	\$ 527,643	\$ 483,743
Intragovernmental Advances	313	375
Total Assets	<u>527,956</u>	<u>484,118</u>
Other Intragovernmental Liabilities	-	137
Accounts Payable	3,289	3,241
Accrued Grant Liabilities, Net	15,447	10,818
Total Liabilities	<u>18,736</u>	<u>14,196</u>
Cumulative Results of Operations	509,220	469,922
Total Liabilities and Net Position	<u>\$ 527,956</u>	<u>\$ 484,118</u>
<b>Statement of Net Cost for the Years Ended September 30, 2016 and 2015</b>		
Program Costs	\$ 99,995	\$ 77,276
Net Cost of Operations	<u>\$ 99,995</u>	<u>\$ 77,276</u>
<b>Statement of Changes in Net Position for the Years Ended September 30, 2016 and 2015</b>		
Net Position Beginning of Period	\$ 469,922	\$ 404,199
Appropriated Dedicated Collection Transferred In / Out	139,293	142,999
Net Cost of Operation	<u>(99,995)</u>	<u>(77,276)</u>
Change in Net Position	39,298	65,723
Net Position End of Period	<u>\$ 509,220</u>	<u>\$ 469,922</u>

## Note 8. Statement of Net Cost

The Statement of Net Cost presents NSF's support for research and education awards as a single program with three primary appropriations: Research and Related Activities (R&RA), Education and Human Resources (EHR), and Major Research Equipment and Facilities Construction (MREFC). *Donations and Dedicated Collections* are also presented in the Statement of Net Cost and in the tables below.

In pursuit of its mission, NSF incurs costs in line with the Foundation's strategic plan for 2014-2018: *Investing in Science, Engineering, and Education for the Nation's Future*. The strategic goals outlined in this plan are: "Transform the Frontiers of Science and Engineering", "Stimulate Innovation and Address Societal Needs through Research and Education", and "Excel as a Federal Science Agency". "Transform the Frontiers of Science and Engineering" emphasizes the seamless integration of research and education as well as the close coupling of research infrastructure and discovery. "Stimulate Innovation and Address Societal Needs through Research and Education" points to the tight linkage between NSF programs and societal needs, and highlights the role that new knowledge and creativity play in economic prosperity and society's general welfare. "Excel as a Federal Science Agency" emphasizes the importance to NSF of attaining excellence and inclusion in all operational aspects. Stewardship costs directly reflect the third strategic goal, "Excel as a Federal Science Agency", and are prorated among the Net Cost programs. Stewardship costs include expenditures incurred from the AOAM, NSB, and Office of Inspector General (OIG) appropriations. These appropriations support salaries and benefits of persons employed at NSF; general operating expenses, including support of NSF's information systems technology; staff training, audit and OIG activities; and OPM and DOL benefits costs paid on behalf of NSF.

As of September 30, 2016 and 2015, approximately 95 percent of NSF's expenses amounting to \$6.8 billion, in both fiscal years, were directly related to the "Transform the Frontiers of Science and Engineering" and "Stimulate Innovation and Address Social Needs through Research and Education" strategic outcome goals. As of September 30, 2016 and 2015, costs related to the stewardship activities totaled \$371.2 million and \$329.7 million, respectively.

In accordance with OMB Circular A-136, costs incurred for services provided by other federal entities are reported in the full costs of NSF programs and are separately identified in this note as "Federal." Costs incurred with non-federal entities are identified in this note as "Public." All earned revenues are offsetting collections provided through reimbursable agreements with other federal entities and are retained by NSF. Earned revenues are recognized when the related program or administrative expenses are incurred and are deducted from the full cost of the programs to arrive at the net cost of operating NSF's programs. NSF applies a cost recovery fee on other federal entities consistent with applicable legislation and U.S. Government Accountability Office decisions. NSF recovers the costs incurred in the management, administration, and oversight of activities authorized and/or funded by interagency agreements where NSF is the performing agency.

**Intragovernmental and Public Costs and Earned Revenue by Program**

(Amounts in Thousands)	2016		
	Federal	Public	Total
Research and Related Activities			
Gross Costs	\$ 221,997	\$ 5,757,546	\$ 5,979,543
Less: Earned Revenue	(104,648)	(3,529)	(108,177)
Net Research and Related Activities	<u>117,349</u>	<u>5,754,017</u>	<u>5,871,366</u>
Education and Human Resources			
Gross Costs	\$ 8,587	\$ 852,708	\$ 861,295
Less: Earned Revenue	(2,432)	(82)	(2,514)
Net Education and Human Resources	<u>6,155</u>	<u>852,626</u>	<u>858,781</u>
Major Research Equipment and Facilities Construction			
Gross Costs	\$ -	\$ 182,474	\$ 182,474
Less: Earned Revenue	-	-	-
Net Major Research Equipment and Facilities Construction	<u>-</u>	<u>182,474</u>	<u>182,474</u>
Donations and Dedicated Collections			
Gross Costs	\$ 171	\$ 133,555	\$ 133,726
Less: Earned Revenue	-	-	-
Net Donations and Dedicated Collections	<u>171</u>	<u>133,555</u>	<u>133,726</u>
Net Cost of Operations	<u>\$ 123,675</u>	<u>\$ 6,922,672</u>	<u>\$ 7,046,347</u>

(Amounts in Thousands)	2015		
	Federal	Public	Total
Research and Related Activities			
Gross Costs	\$ 209,657	\$ 5,696,069	\$ 5,905,726
Less: Earned Revenue	(127,447)	(2,382)	(129,829)
Net Research and Related Activities	<u>82,210</u>	<u>5,693,687</u>	<u>5,775,897</u>
Education and Human Resources			
Gross Costs	\$ 6,741	\$ 835,338	\$ 842,079
Less: Earned Revenue	(6,204)	(116)	(6,320)
Net Education and Human Resources	<u>537</u>	<u>835,222</u>	<u>835,759</u>
Major Research Equipment and Facilities Construction			
Gross Costs	\$ -	\$ 264,161	\$ 264,161
Less: Earned Revenue	-	-	-
Net Major Research Equipment and Facilities Construction	<u>-</u>	<u>264,161</u>	<u>264,161</u>
Donations and Dedicated Collections			
Gross Costs	\$ -	\$ 104,527	\$ 104,527
Less: Earned Revenue	-	-	-
Net Donations and Dedicated Collections	<u>-</u>	<u>104,527</u>	<u>104,527</u>
Net Cost of Operations	<u>\$ 82,747</u>	<u>\$ 6,897,597</u>	<u>\$ 6,980,344</u>

**Note 9. Apportionment Categories of Obligations Incurred: Direct vs. Reimbursable Obligations**

OMB Circular A-11, *Preparation, Submission, and Execution of the Budget*, requires direct and reimbursable obligations be reported as Category A, Category B, or Exempt from Apportionment. In fiscal years 2016 and 2015, NSF's SF-133, *Report on Budget Execution and Budgetary Resources*, reported all new obligations and upward adjustments under Category B which is by activity, project, or object.

As of September 30, 2016 and 2015, direct and reimbursable obligations were:

(Amounts in Thousands)	2016	2015
Apportionment Category B		
Direct	\$ 7,714,090	\$ 7,623,853
Reimbursable	94,634	126,037
New Obligations and Upward Adjustments	\$ 7,808,724	\$ 7,749,890

**Note 10. Undelivered Orders at the End of the Period**

In accordance with SFFAS No. 7, *Accounting for Revenue and Other Financing Sources*, the amount of budgetary resources obligated for undelivered orders for the years ended September 30, 2016 and 2015 amounted to \$12.2 billion and \$11.7 billion, respectively.

**Note 11. Permanent Indefinite Appropriations**

NSF maintains permanent indefinite appropriations for R&RA, AOAM and MREFC.

The R&RA appropriation is used for polar research and operations support, and for reimbursement to other federal agencies for operational and science support, and logistical and other related activities for USAP. In FYs 2016 and 2015 the permanent indefinite appropriations for R&RA were \$442.8 million and \$437.8 million, respectively, and are reported as current year transfers from the annual R&RA appropriation.

The AOAM appropriation is used to fund the multi-year effort associated with NSF's upcoming headquarters relocation. In FYs 2016 and 2015, the permanent indefinite appropriations for AOAM were \$30.8 million and \$18.1 million, respectively. The FY 2016 permanent indefinite appropriation was comprised of a \$3.8 million current year transfer from the annual AOAM appropriation and a \$27.0 million transfer from the R&RA, EHR, and MREFC appropriations. The latter transfer was the result of exercising the Administrative Provision described in Note 1D, *Revenue and Other Financing Sources*. In FY 2015, the permanent indefinite appropriation for AOAM was reported as a current year transfer from the annual AOAM appropriation.

The MREFC appropriation supports the procurement and construction of unique national research platforms and major research equipment. In FY 2016, the permanent indefinite appropriation for MREFC was \$198.3 million and is reported net of transfers out as a result of the Administrative Provision. In FY 2015, the permanent indefinite appropriation for MREFC was \$200.8 million.

**Note 12. Explanation of Differences between the Statement of Budgetary Resources and the Budget of the United States Government**

SFFAS No. 7, *Accounting for Revenue and Other Financing Sources and Concepts for Reconciling Budgetary and Financial Accounting*, requires explanations of material differences between amounts reported in the Statement of Budgetary Resources (SBR) and the actual balances published in the

President’s Budget. The FY 2018 President’s Budget will include FY 2016 budget execution information and is scheduled for publication in the spring of 2017.<sup>2</sup>

Balances reported in the FY 2015 SBR and the related President’s Budget are shown in a table below for *Budgetary Resources*, *Obligations Incurred*, *Unobligated Balance - Unavailable*, *Distributed Offsetting Receipts*, and any related differences. The differences reported are due to differing reporting requirements for expired and unexpired appropriations between the Treasury guidance used to prepare the SBR and the OMB guidance used to prepare the President’s Budget. The SBR includes both unexpired and expired appropriations, while the President’s Budget presents only unexpired budgetary resources that are available for new obligations. Additionally, the *Distributed Offsetting Receipts* amount on the SBR includes donations, while the President's Budget does not.

(Amounts in Thousands)	2015			
	Budgetary Resources	Obligations Incurred	Unobligated Balance - Unavailable	Distributed Offsetting Receipts
Combined Statement of Budgetary Resources	\$ 8,144,417	\$ 7,749,890	\$ 170,804	\$ 37,834
Budget of the U.S. Government	\$ 7,921,439	\$ 7,678,096	\$ 19,620	\$ 3,000
Difference	\$ 222,978	\$ 71,794	\$ 151,184	\$ 34,834

### Note 13. Awards to Affiliated Institutions

NSB members may be affiliated with institutions that are eligible to receive grants and awards from NSF. NSF made awards totaling \$848.3 million to Board member affiliated institutions in FY 2016. The Board does not review all NSF award actions; however the following require NSB approval for the NSF Director to take action under delegated authority:

- Proposed awards, requests for proposals (RFPs), and solicitations that meet or exceed a threshold where the average annual award amount is the greater of 1 percent or more of the awarding Directorate's or Office's prior year plan or 0.1 percent or more of the prior year total NSF budget (enacted level);
- New programs where the total annualized awards exceed 3 percent of the awarding Directorate's or Office's prior year current plan, involve sensitive political or policy issues, or will be funded as an ongoing NSF-wide activity; and
- Major construction projects.

The Director’s Review Board (DRB) reviews proposed actions for evaluation adequacy and documentation, and compliance with Foundation policies, procedures, and strategies. Items requiring DRB action include large awards and RFPs that meet or exceed a threshold of 2.5 percent of the prior year Division or Subactivity Plan. In addition, the DRB reviews all items requiring NSB action, as well as NSB information items prior to submission.

NSF may fund awards meeting the above requirements to institutions affiliated with Board members. Federal conflict-of-interest rules prohibit NSB members from participating in matters where they have a conflict of interest or there is an impartiality concern without prior authorization from the Designated Agency Ethics Official (DAEO). Prior to Board meetings, all NSB action items are screened for conflict-of-interest/impartiality concerns by the Office of the General Counsel. Members who have conflicts are either recused from the matter or receive a waiver from the DAEO to participate. In FY 2016, NSB did not approve any awards to Board member affiliated institutions.

<sup>2</sup> OMB website: <https://www.whitehouse.gov/omb>

**Note 14. Reconciliation of Net Cost of Operations to Budget**

(Amounts in Thousands)	2016	2015
<b>Resources Used To Finance Activities</b>		
Budgetary Resources Obligated		
New Obligations and Upward Adjustments	\$ 7,808,724	\$ 7,749,890
Less: Spending Authority from Offsetting Collections and Recoveries	(205,234)	(322,603)
Obligations Net of Offsetting Collections and Recoveries	7,603,490	7,427,287
Less: Distributed Offsetting Receipts	(28,648)	(37,834)
Net Obligations	7,574,842	7,389,453
Other Resources		
Imputed Financing	9,020	9,133
Other Resources	(3,868)	(2,602)
Net Other Resources Used to Finance Activities	5,152	6,531
<b>Total Resources Used to Finance Activities</b>	<b>7,579,994</b>	<b>7,395,984</b>
<b>Resources Used to Finance Items Not Part of the Net Cost of Operations</b>		
Change in Budgetary Resources Obligated for Goods, Services and Benefits Ordered but Not Yet Provided	(577,426)	(445,362)
Resources that Fund Expenses Recognized in Prior Periods	352	(15)
Budgetary Offsetting Collections and Receipts that Do Not Affect Net Cost of Operations	28,648	37,834
Resources that Finance the Acquisition of Assets	(17,088)	(35,835)
<b>Total Resources Used to Finance Items Not Part of the Net Cost of Operations</b>	<b>(565,514)</b>	<b>(443,378)</b>
<b>Total Resources Used to Finance Net Cost of Operations</b>	<b>7,014,480</b>	<b>6,952,606</b>
<b>Components of the Net Cost of Operations that will not Require or Generate Resources in the Current Period</b>		
Components Requiring or Generating Resources in Future Periods		
Other	649	11
<b>Total Components of Net Cost of Operations that will Require or Generate Resources in Future Periods</b>	<b>649</b>	<b>11</b>
Components Not Requiring or Generating Resources		
Depreciation and Amortization	31,754	28,326
Other	(536)	(599)
<b>Total Components of Net Cost of Operations that will not Require or Generate Resources</b>	<b>31,218</b>	<b>27,727</b>
<b>Total Components of Net Cost of Operations that Will Not Require or Generate Resources in the Current Period</b>	<b>31,867</b>	<b>27,738</b>
<b>Net Cost of Operations</b>	<b>\$ 7,046,347</b>	<b>\$ 6,980,344</b>

# **Required Supplementary Stewardship Information**

## **Stewardship Investments**

For the Fiscal Years ended September 30, 2016 and 2015

**Stewardship Investments  
Research and Human Capital  
(Dollars in Thousands)**

**Research and Human Capital Activities**

	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>2012</u>
Basic Research	\$ 5,216,976	\$ 5,202,144	\$ 5,383,795	\$ 5,446,790	\$ 5,590,843
Applied Research	793,519	782,986	726,087	588,261	532,729
Education and Training	775,326	801,678	941,330	861,871	991,543
Non-Investing Activities	371,217	329,685	309,837	327,357	333,712
<b>Total Research &amp; Human Capital Activities</b>	<u>\$ 7,157,038</u>	<u>\$ 7,116,493</u>	<u>\$ 7,361,049</u>	<u>\$ 7,224,279</u>	<u>\$ 7,448,827</u>

**Inputs, Outputs and/or Outcomes**

**Research and Human Capital Activities**

Investments In:

Universities	\$ 5,289,267	\$ 5,201,477	\$ 5,407,717	\$ 5,025,068	\$ 5,445,926
Industry	300,279	365,221	286,916	337,818	280,452
Federal Agencies	178,845	167,018	252,596	208,806	264,846
Small Business	240,759	225,958	224,931	249,443	239,866
Federally Funded R&D Centers	231,977	231,813	234,515	280,032	229,474
Non-Profit Organizations	446,750	451,232	529,482	605,059	523,772
Other	469,161	473,774	424,892	518,053	464,491
	<u>\$ 7,157,038</u>	<u>\$ 7,116,493</u>	<u>\$ 7,361,049</u>	<u>\$ 7,224,279</u>	<u>\$ 7,448,827</u>

Support To:

Scientists	\$ 595,743	\$ 584,865	\$ 550,800	\$ 539,713	\$ 544,452
Postdoctoral Programs	195,874	203,128	190,188	190,564	192,863
Graduate Students	625,059	629,922	586,443	568,548	574,557
	<u>\$ 1,416,676</u>	<u>\$ 1,417,915</u>	<u>\$ 1,327,431</u>	<u>\$ 1,298,825</u>	<u>\$ 1,311,872</u>

**Outputs & Outcomes (Rounded):**

Number of:

Award Actions	21,000	21,000	20,000	20,000	23,000
Senior Researchers	44,000	42,000	41,000	44,000	56,000
Other Professionals	14,000	14,000	17,000	14,000	14,000
Postdoctoral Associates	6,000	6,000	6,000	6,000	6,000
Graduate Students	41,000	42,000	40,000	42,000	42,000
Undergraduate Students	38,000	36,000	34,000	29,000	31,000
K-12 Students	170,000	172,000	130,000	124,000	125,000
K-12 Teachers	44,000	41,000	40,000	40,000	45,000

NSF's mission is to support basic scientific research and research fundamental to the engineering process as well as science and engineering education programs. NSF's Stewardship Investments fall principally into the categories of Research and Human Capital. For expenses incurred under the Research category, the majority of NSF funding is devoted to basic research, with a relatively small share going to applied research. This funding supports both the conduct of research and the necessary supporting infrastructure, including state-of-the-art instrumentation, equipment, computing resources, and multi-user facilities such as digital libraries, observatories, and research vessels and aircraft. Basic research, applied research, and education and training expenses are determined by prorating the program costs of NSF's R&RA, EHR, and MREFC appropriations, donations, and funds from dedicated collections reported on the Statement of Net Cost. The proration uses the basic research, applied research, and education and training percentages of total estimated research and development obligations reported in the FY 2017 Budget Request to Congress. The actual numbers are not available until later in the following fiscal year. Non-Investing activities reflect stewardship costs incurred from the AOAM, NSB, and OIG appropriations.

The data provided for scientists, postdoctoral associates, and graduate students are obtained from NSF's award budget information as recorded at the time the award is made. The number of award actions are actual values from NSF's Enterprise Information System (EIS). The remaining outputs and outcomes are estimates provided annually by the NSF directorates. These estimates are reported in the annual NSF Budget Request to Congress.

NSF's Human Capital investments focus principally on education and training, toward a goal of creating a diverse, internationally competitive, and globally engaged workforce of scientists, engineers and well-prepared citizens. NSF supports activities to improve formal and informal science, mathematics, engineering and technology education at all levels, as well as public science literacy projects that engage people of all ages in life-long learning. The number of K-12 students involved in NSF activities is based on a robust data collection and analysis process. The reported number of K-12 students and teachers in FY 2016 is an estimate and excludes data from the jurisdictions of Mississippi, Nebraska, Puerto Rico, and Tennessee. Reporting from these jurisdictions is expected to be final by December 2016 and will be reflected in the FY 2018 Budget Request to Congress.

## **Required Supplementary Information**

### **Deferred Maintenance and Repairs**

For the Fiscal Years ended September 30, 2016 and 2015

## **Deferred Maintenance and Repairs**

NSF performs condition assessment surveys in accordance with SFFAS No. 42 for capitalized general PP&E to determine if any maintenance and repairs are needed to keep an asset in an acceptable condition or restore an asset to a specific level of performance. NSF considers deferred maintenance and repairs to be any maintenance and repairs that are not performed on schedule, unless it is determined from the condition of the asset that scheduled maintenance does not have to be performed. Deferred maintenance and repairs also include any other type of maintenance or repair that, if not performed, would render the PP&E non-operational. Circumstances such as non-availability of parts or funding are considered reasons for deferring maintenance and repairs.

NSF considered whether any scheduled maintenance or repair necessary to keep fixed assets of the agency in an acceptable condition was deferred at years ended September 30, 2016 and 2015. Assets deemed to be in excellent, good, or fair condition are considered to be in acceptable condition. Assets in poor condition are in unacceptable condition and the deferred maintenance and repairs required to get them to an acceptable condition are reported. NSF determines the condition of an asset in accordance with standards comparable to those used in the private industry. Due to the environment and remote location of Antarctica, all deferred maintenance and repairs on assets in poor condition are considered critical in order to maintain operational status.

In accordance with SFFAS No. 42, NSF discloses the beginning and ending balances for the year ending September 30, 2016. At September 30, 2016 NSF determined that scheduled maintenance or repairs on one item of Antarctic capital equipment in poor condition was not completed and was deferred or delayed for a future period. The dollar amount of deferred maintenance for this item was \$0.6 thousand. The item is heavy, mobile equipment and is considered critical to NSF operations.

At September 30, 2015, NSF determined that scheduled maintenance on one item of Antarctic capital equipment in very poor condition was not completed and was deferred or delayed for a future period. The dollar amount of deferred maintenance for this item was \$2.6 thousand. The item is light, mobile equipment and is considered critical to NSF operations.

## **Required Supplementary Information**

### **Combining Statement of Budgetary Resources by Major Budget Accounts**

In the following tables, NSF budgetary information for the fiscal years ended September 30, 2016 and 2015, as presented in the Statement of Budgetary Resources, is disaggregated for each of NSF's major budget accounts.

The Science Appropriations Act, 2016

2016

(Amounts in Thousands)

	<u>Research and Related Activities</u>	<u>Education and Human Resources</u>	<u>Major Research Equipment</u>	<u>OIG, AOAM, and NSB</u>	<u>Special and Donated</u>	<u>Total</u>
<b>Budgetary Resources</b>						
Unobligated Balance - Brought Forward, October 1	\$ 130,595	36,992	58,058	23,745	145,137	\$ 394,527
Recoveries of Prior Year Unpaid Obligations	70,230	22,004	2,343	6,581	4,590	105,748
Other Changes in Unobligated Balance	(50,217)	(14,567)	-	(3,271)	88	(67,967)
Unobligated Balance from Prior Year Budget Authority, Net	150,608	44,429	60,401	27,055	149,815	432,308
Appropriations	5,989,675	878,970	218,310	376,530	163,735	7,627,220
Spending Authority from Offsetting Collections	87,580	4,395	-	5,486	-	97,461
<b>Total Budgetary Resources</b>	<b>\$ 6,227,863</b>	<b>927,794</b>	<b>278,711</b>	<b>409,071</b>	<b>313,550</b>	<b>\$ 8,156,989</b>
<b>Status of Budgetary Resources</b>						
New Obligations and Upward Adjustments	\$ 6,084,322	889,957	241,499	377,958	214,988	\$ 7,808,724
Unobligated Balance, End of Year						
Apportioned, Unexpired	17,311	5,394	28,538	24,639	84,431	160,313
Unapportioned, Unexpired	3,219	2,023	8,674	115	14,131	28,162
Unobligated Balance, Unexpired, End of Year	20,530	7,417	37,212	24,754	98,562	188,475
Unobligated Balance, Expired, End of Year	123,011	30,420	-	6,359	-	159,790
Total Unobligated Balance, End of Year	143,541	37,837	37,212	31,113	98,562	348,265
<b>Total Status of Budgetary Resources</b>	<b>\$ 6,227,863</b>	<b>927,794</b>	<b>278,711</b>	<b>409,071</b>	<b>313,550</b>	<b>\$ 8,156,989</b>
<b>Change in Obligated Balance</b>						
Unpaid Obligations						
Unpaid Obligations - Brought Forward, October 1, Gross	\$ 9,671,789	1,736,551	174,408	92,422	403,379	\$ 12,078,549
New Obligations and Upward Adjustments	6,084,322	889,957	241,499	377,958	214,988	7,808,724
Gross Outlays	(5,585,066)	(816,626)	(173,268)	(342,253)	(123,904)	(7,041,117)
Recoveries of Prior Year Unpaid Obligations	(70,230)	(22,004)	(2,343)	(6,581)	(4,590)	(105,748)
Unpaid Obligations - End of Year, Gross	10,100,815	1,787,878	240,296	121,546	489,873	12,740,408
Uncollected Payments						
Uncollected Payments from Federal Sources - Brought Forward, October 1	\$ (97,894)	(5,191)	-	(871)	-	\$ (103,956)
Change in Uncollected Payments from Federal Sources	10,149	(2,023)	-	444	-	8,570
Uncollected Payments from Federal Sources, End of Year	(87,745)	(7,214)	-	(427)	-	(95,386)
Memorandum (non-add) Entries						
Obligated Balance - Start of Year	\$ 9,573,895	1,731,360	174,408	91,551	403,379	\$ 11,974,593
Obligated Balance - End of Year	\$ 10,013,070	1,780,664	240,296	121,119	489,873	\$ 12,645,022
<b>Budget Authority and Outlays, Net</b>						
Budget Authority, Gross	\$ 6,077,255	883,365	218,310	382,016	163,735	\$ 7,724,681
Actual Offsetting Collections	(98,572)	(2,924)	-	(6,472)	(88)	(108,056)
Change in Uncollected Customer Payments from Federal Sources	10,149	(2,023)	-	444	-	8,570
Recoveries of Prior Year Paid Obligations	843	552	-	542	88	2,025
Budget Authority, Net	<b>\$ 5,989,675</b>	<b>878,970</b>	<b>218,310</b>	<b>376,530</b>	<b>163,735</b>	<b>\$ 7,627,220</b>
Gross Outlays	\$ 5,585,066	816,626	173,268	342,253	123,904	\$ 7,041,117
Actual Offsetting Collections	(98,572)	(2,924)	-	(6,472)	(88)	(108,056)
Net Outlays	<b>5,486,494</b>	<b>813,702</b>	<b>173,268</b>	<b>335,781</b>	<b>123,816</b>	<b>6,933,061</b>
Distributed Offsetting Receipts	-	-	-	-	(28,648)	(28,648)
Net Agency Outlays	<b>\$ 5,486,494</b>	<b>813,702</b>	<b>173,268</b>	<b>335,781</b>	<b>95,168</b>	<b>\$ 6,904,413</b>

The Science Appropriations Act, 2015

2015  
(Amounts in Thousands)

	<u>Research and Related Activities</u>	<u>Education and Human Resources</u>	<u>Major Research Equipment</u>	<u>OIG, AOAM, and NSB</u>	<u>Special and Donated</u>	<u>Total</u>
<b>Budgetary Resources</b>						
Unobligated Balance - Brought Forward, October 1	\$ 202,480	48,507	390	6,157	136,199	\$ 393,733
Recoveries of Prior Year Unpaid Obligations	174,987	29,285	-	9,197	4,868	218,337
Other Changes in Unobligated Balance	(71,891)	(17,228)	1,668	(3,353)	184	(90,620)
Unobligated Balance from Prior Year Budget Authority, Net	305,576	60,564	2,058	12,001	141,251	521,450
Appropriations	5,933,645	866,000	200,760	343,800	177,865	7,522,070
Spending Authority from Offsetting Collections	90,122	4,793	-	5,982	-	100,897
<b>Total Budgetary Resources</b>	<b>\$ 6,329,343</b>	<b>931,357</b>	<b>202,818</b>	<b>361,783</b>	<b>319,116</b>	<b>\$ 8,144,417</b>
<b>Status of Budgetary Resources</b>						
New Obligations and Upward Adjustments	\$ 6,198,748	894,365	144,760	338,038	173,979	\$ 7,749,890
Unobligated Balance, End of Year						
Apportioned, Unexpired	6,836	3,577	56,390	18,891	138,029	223,723
Unapportioned, Unexpired	8,811	2,033	1,668	-	7,108	19,620
Unobligated Balance, Unexpired, End of Year	15,647	5,610	58,058	18,891	145,137	243,343
Unobligated Balance, Expired, End of Year	114,948	31,382	-	4,854	-	151,184
Total Unobligated Balance, End of Year	130,595	36,992	58,058	23,745	145,137	394,527
<b>Total Status of Budgetary Resources</b>	<b>\$ 6,329,343</b>	<b>931,357</b>	<b>202,818</b>	<b>361,783</b>	<b>319,116</b>	<b>\$ 8,144,417</b>
<b>Change in Obligated Balance</b>						
Unpaid Obligations						
Unpaid Obligations - Brought Forward, October 1, Gross	\$ 9,173,916	1,667,606	287,357	87,747	328,013	\$ 11,544,639
New Obligations and Upward Adjustments	6,198,748	894,365	144,760	338,038	173,979	7,749,890
Gross Outlays	(5,525,888)	(796,135)	(257,709)	(324,166)	(93,745)	(6,997,643)
Recoveries of Prior Year Unpaid Obligations	(174,987)	(29,285)	-	(9,197)	(4,868)	(218,337)
Unpaid Obligations - End of Year, Gross	9,671,789	1,736,551	174,408	92,422	403,379	12,078,549
Uncollected Payments						
Uncollected Payments from Federal Sources - Brought Forward, October 1	\$ (116,508)	(6,195)	-	(232)	-	\$ (122,935)
Change in Uncollected Payments from Federal Sources	18,614	1,004	-	(639)	-	18,979
Uncollected Payments from Federal Sources, End of Year	(97,894)	(5,191)	-	(871)	-	(103,956)
Memorandum (non-add) Entries						
Obligated Balance - Start of Year	\$ 9,057,408	1,661,411	287,357	87,515	328,013	\$ 11,421,704
Obligated Balance - End of Year	\$ 9,573,895	1,731,360	174,408	91,551	403,379	\$ 11,974,593
<b>Budget Authority and Outlays, Net</b>						
Budget Authority, Gross	\$ 6,023,767	870,793	200,760	349,782	177,865	\$ 7,622,967
Actual Offsetting Collections	(110,090)	(5,930)	(1,668)	(5,373)	(184)	(123,245)
Change in Uncollected Customer Payments from Federal Sources	18,614	1,004	-	(639)	-	18,979
Recoveries of Prior Year Paid Obligations	1,354	133	1,668	30	184	3,369
Budget Authority, Net	<b>\$ 5,933,645</b>	<b>866,000</b>	<b>200,760</b>	<b>343,800</b>	<b>177,865</b>	<b>\$ 7,522,070</b>
Gross Outlays	\$ 5,525,888	796,135	257,709	324,166	93,745	\$ 6,997,643
Actual Offsetting Collections	(110,090)	(5,930)	(1,668)	(5,373)	(184)	(123,245)
Net Outlays	<b>5,415,798</b>	<b>790,205</b>	<b>256,041</b>	<b>318,793</b>	<b>93,561</b>	<b>6,874,398</b>
Distributed Offsetting Receipts	-	-	-	-	(37,834)	(37,834)
Net Agency Outlays	<b>\$ 5,415,798</b>	<b>790,205</b>	<b>256,041</b>	<b>318,793</b>	<b>55,727</b>	<b>\$ 6,836,564</b>

## **Other Information**

### **Combined Schedule of Spending**

For the Fiscal Years ended September 30, 2016 and 2015

The Combined Schedule of Spending (SOS) was developed to make information about government spending more accessible and transparent to the public. To help achieve this goal, specific line items found in the Statement of Budgetary Resources (SBR), which relate to government spending, have been simplified and reorganized to help readers better understand accounting terminology. The focus of the SOS is to provide a user-friendly report that answers the following questions:

- 1) **What money is available to spend?** This section ties directly to the SBR and indicates the total resources available less funds that were unobligated or unavailable for spending.
- 2) **How was the money spent/issued?** This section presents total obligations incurred and shows the most significant goods or services purchased, as well as payment types, by appropriation category. The Other line is comprised of miscellaneous management expenses.
- 3) **Who did the money go to?** This section presents total obligations incurred by the type of entity to which the funds were awarded. The presentation is similar to the RSSI Investments in Research and Human Capital Activities section; however, the SOS presents performance organization data for new obligations incurred and the RSSI presents performance organization data for expenditures incurred.
- 4) **How does the SOS compare to the SBR and USASpending.gov?** This section describes the similarities and differences between the SOS, SBR, and the USASpending.gov website.

**National Science Foundation  
Combined Schedule of Spending  
For the Year Ended September 30, 2016  
(Amounts in Thousands)**

	<u>Research and Related Activities</u>	<u>Education and Human Resources</u>	<u>Major Research Equipment</u>	<u>OIG, AOAM and NSB</u>	<u>Special and Donated</u>	<u>Total</u>
<b>What Money is Available to Spend?</b>						
Total Resources	\$ 6,227,863	927,794	278,711	409,071	313,550	8,156,989
Less: Amount Available but Not Agreed to be Spent	(17,311)	(5,394)	(28,538)	(24,639)	(84,431)	(160,313)
Less: Amount Not Available to be Spent (Unexpired)	(3,219)	(2,023)	(8,674)	(115)	(14,131)	(28,162)
Less: Amount Not Available to be Spent (Expired)	(123,011)	(30,420)	-	(6,359)	-	(159,790)
<b>Total Amounts Agreed to be Spent</b>	<b>\$ 6,084,322</b>	<b>889,957</b>	<b>241,499</b>	<b>377,958</b>	<b>214,988</b>	<b>7,808,724</b>
<b>How Was the Money Spent/Issued?</b>						
Compensation and Benefits	\$ 764	121	-	228,823	43	229,751
Travel and Transportation of Persons	15,927	1,399	-	6,307	578	24,211
Contracts	384,091	15,474	329	106,556	(1,196)	505,254
Rent, Communications, and Utilities	1,184	190	-	36,131	6	37,511
Grants, Subsidies and Contributions	5,682,357	872,767	241,170	143	215,532	7,011,969
Other	(1)	6	-	(2)	25	28
<b>Total Amounts Agreed to be Spent</b>	<b>\$ 6,084,322</b>	<b>889,957</b>	<b>241,499</b>	<b>377,958</b>	<b>214,988</b>	<b>7,808,724</b>
<b>Who did the Money go to?</b>						
Universities	\$ 4,833,051	765,985	38,853	21,444	191,341	\$ 5,850,674
Industry	201,407	11,384	329	18,494	(1,206)	\$ 230,408
Federal Agencies	154,427	7,146	-	61,992	260	\$ 223,825
Small Business	219,689	24,933	-	40,164	1,222	\$ 286,008
FFRDC	146,787	2,660	112,970	(2)	12,164	\$ 274,579
Non- Profit	359,696	80,833	89,347	1,608	11,325	\$ 542,809
Other	169,265	(2,984)	-	234,258	(118)	\$ 400,421
<b>Total Amounts Agreed to be Spent</b>	<b>\$ 6,084,322</b>	<b>\$ 889,957</b>	<b>\$ 241,499</b>	<b>\$ 377,958</b>	<b>\$ 214,988</b>	<b>\$ 7,808,724</b>

**National Science Foundation  
Combined Schedule of Spending  
For the Year Ended September 30, 2015  
(Amounts in Thousands)**

	<u>Research and Related Activities</u>	<u>Education and Human Resources</u>	<u>Major Research Equipment</u>	<u>OIG, AOAM and NSB</u>	<u>Special and Donated</u>	<u>Total</u>
<b>What Money is Available to Spend?</b>						
Total Resources	\$ 6,329,343	931,357	202,818	361,783	319,116	8,144,417
Less: Amount Available but Not Agreed to be Spent	(6,836)	(3,577)	(56,390)	(18,891)	(138,029)	(223,723)
Less: Amount Not Available to be Spent (Unexpired)	(8,811)	(2,033)	(1,668)	-	(7,108)	(19,620)
Less: Amount Not Available to be Spent (Expired)	(114,948)	(31,382)	-	(4,854)	-	(151,184)
<b>Total Amounts Agreed to be Spent</b>	<b>\$ 6,198,748</b>	<b>894,365</b>	<b>144,760</b>	<b>338,038</b>	<b>173,979</b>	<b>7,749,890</b>
<b>How Was the Money Spent/Issued?</b>						
Compensation and Benefits	\$ 823	129	-	224,928	19	225,899
Travel and Transportation of Persons	15,694	1,685	-	6,167	314	23,860
Contracts	505,151	26,829	-	70,380	528	602,888
Rent, Communications, and Utilities	723	109	-	36,237	5	37,074
Grants, Subsidies and Contributions	5,676,275	865,598	144,760	159	173,095	6,859,887
Other	82	15	-	167	18	282
<b>Total Amounts Agreed to be Spent</b>	<b>\$ 6,198,748</b>	<b>894,365</b>	<b>144,760</b>	<b>338,038</b>	<b>173,979</b>	<b>7,749,890</b>
<b>Who did the Money go to?</b>						
Universities	\$ 4,873,185	761,891	40,000	13,984	152,441	5,841,501
Industry	259,329	15,304	-	29,874	1,501	306,008
Federal Agencies	139,474	4,808	-	44,803	414	189,499
Small Business	215,516	19,620	-	16,857	2,389	254,382
FFRDC	143,343	316	104,760	-	12,347	260,766
Non- Profit	335,451	91,988	-	1,889	4,249	433,577
Other	232,450	438	-	230,631	638	464,157
<b>Total Amounts Agreed to be Spent</b>	<b>\$ 6,198,748</b>	<b>894,365</b>	<b>144,760</b>	<b>338,038</b>	<b>173,979</b>	<b>7,749,890</b>

## **How Does the SOS Compare to the SBR and USASpending.gov?**

The SOS, SBR, and the USASpending.gov website all serve a purpose to provide transparency to the general public regarding how federal agencies obtain funding and where those funds are spent. These reports display NSF spending information at various levels of detail to provide a wide range of information to the readers. The SBR is prepared using the United States Standard General Ledger (USSGL) trial balance and provides information about how budgetary resources were made available as well as their status at the end of the period. Data reported on the SBR is ultimately reconcilable with data reported in the Budget of the United States Government. The SOS presents total budgetary resources and the total amounts agreed to be spent which equates to fiscal year-to-date obligations reported on the SBR. This schedule provides the reader with detailed agency information that describes the types of activities NSF's resources will be used for and who these resources will be given to. Like the SOS, USASpending.gov<sup>1</sup> also provides agency obligation information on awards and contracts that have been obligated over the past ten fiscal years. Variances between USASpending.gov and SOS data can be attributed to the following:

- USASpending.gov includes obligation information for contracts and grants, only. The SOS includes additional obligation information to include travel, employee salaries and benefits, and rent.
- USASpending.gov includes grant and contract data associated with specific Budget Object Classes. The SOS classifies a larger population of Budget Object Classes as a grant or contract.
- USASpending.gov excludes contracts where the total amount funded does not exceed \$25.0 thousand. The SOS includes all contracts, regardless of dollar value.
- USASpending.gov does not include awards made to other Federal agencies via Outgoing Interagency Agreement (IAA); whereas, the SOS includes these awards.
- The SOS includes accruals and other financial information applicable to, but posted subsequent to September 30, 2016 and 2015. USASpending.gov data is based on financial information that is included in the financial system on September 30.

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<sup>1</sup> USASpending.gov website: <https://www.usaspending.gov/Pages/default.aspx>

## **Other Information**

### **Undisbursed Balances in Expired Grant Accounts**

## Undisbursed Balances in Expired Grant Accounts

In FY 2016, NSF funded research and education in science and engineering through grants and cooperative agreements to 1,883 colleges, universities, and other institutions. NSF grants are funded in one of two ways: 1) the grant may be funded fully at the time of award, called a standard grant, or 2) the grant may be funded incrementally (one year at a time), called a continuing grant. In both cases, all costs on the grant must be incurred by the grantee during the term of the grant period. At NSF, grantees typically have 120 days after the grant expires to complete final drawdowns and expenditures.

The information provided here pertains to the agency’s two grant making appropriation accounts: Research and Related Activities (R&RA) and Education and Human Resources (EHR). The data reported are based on the following definitions:

- An expired grant is a grant award that has reached the grant end date and is eligible for closeout. For NSF, this means grants whose period of performance has expired.
- Undisbursed balances on expired grants represent the unliquidated obligation amounts that remain available for expenditure on an expired grant award before it is closed out.

Once a grant has expired, NSF takes actions to close out the grant both administratively and financially. The financial closeout action takes place 120 days after the award expiration date when the undisbursed balances are de-obligated from the award. Administrative closeout is initiated after financial closeout is completed.

The methodology used to develop undisbursed balances on expired grant awards is consistent with the U.S. Government Accountability Office (GAO) conclusions documented in their April 2012 report, GAO-12-360, *Grants Management: Action Needed to Improve the Timeliness of Grant Closeouts by Federal Agencies*, along with discussion and clarifying information from GAO. The data reported here reflects the amount of undisbursed balances in grant accounts that have reached their end date and are eligible for closeout.

**1. In the preceding three fiscal years, provide the total number of expired grant accounts with undisbursed balances (on the first day for each fiscal year) for the department, agency, or instrumentality and the total amount that has not been obligated to specific grant or project remaining in the accounts.**

The number of expired grants with undisbursed balances for the preceding three fiscal years is provided in Table 2.1. The numbers and balances reflect a point in time before expired awards are closed out during normal processes described above. For FY 2016, there were 5,132 expired grants with undisbursed balances of \$113,215,313. The increase in the number of expired grants between FY 2015 and FY 2016 is attributed primarily to over 850 grants with undisbursed balances under \$25.

**Table 2.1 – Status of Undisbursed Balances in Expired Grants**

	FY 2016 (as of 9/30/16)	FY 2015 (as of 9/30/15)	FY 2014 (as of 9/30/14)
Number of expired grants	5,132	4,406	4,295
Undisbursed balances prior to closeout	\$113,215,313	\$72,275,377	\$72,612,661

**2. Details on future action the department, agency, or instrumentality will take to resolve undisbursed balances in expired grant accounts.**

NSF continually monitors its grant awards throughout their lifecycle following a comprehensive post-award monitoring process. NSF grants are closed based on their period of performance end date. 120 days after the grant period has expired, all unliquidated (or undisbursed) award balances are de-obligated. Having small undisbursed balances at the end of the grant period is a routine occurrence, as not all grantees fully spend all of the funds obligated in the course of their research.

**3. The method that the department, agency or instrumentality uses to track undisbursed balances in expired grant accounts.**

NSF completes financial closeout of expired grant awards on a daily basis using a set of automated and manual activities. Eligibility for closeout for all NSF awards begins 120 days after the award expiration date. The NSF closeout process automatically de-obligates any unliquidated (unspent) award balance, produces an award closeout transaction to flag the award as financially closed, and sends the financial closeout date to NSF's award management system. This initiates final administrative closeout procedures in the award management system.

The expected award closeout date is made available to awardees and staff through the Award Cash Management Service (ACM\$). ACM\$ requires the submission of award level payment amounts and expenditures each time funds are requested by awardees and allows NSF to complete post-award monitoring at the individual award level throughout the lifecycle of the award.

**4. Process for identification of undisbursed balances in expired grant accounts that may be returned to the Treasury of the United States.**

When a grant is closed out, the unliquidated (or undisbursed) balances are de-obligated. The de-obligated grant balances are treated one of three ways:

- If the source appropriation is still active, the balances are recovered by NSF and remain available for valid new obligations until the source appropriation's expiration date.
- If the source appropriation has expired but funds have not yet been canceled, the grant balances are recovered by NSF and remain available for upward adjustments on other existing obligations within the source appropriation.
- If the source appropriation has been canceled, the grant balances are returned to the Treasury.

Prior to September 30, 2016, all undisbursed grant balances in canceling appropriations were de-obligated. These grant balances will be returned to Treasury.

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**INSE**

**Appendices**

**Chapter 3**



## Summary of FY 2016 Financial Statement Audit and Management Assurances

**Table 3.1 - Summary of Financial Statement Audit**

Summary of Financial Statement Audit					
<b>Audit Opinion</b>	Unmodified				
<b>Restatement</b>	No				
<b>Material Weaknesses</b>	<b>Beginning Balance</b>	<b>New</b>	<b>Resolved</b>	<b>Consolidated</b>	<b>Ending Balance</b>
<i>Total Material Weaknesses</i>	0	-	-	-	0

**Table 3.2 - Summary of Management Assurances**

Effectiveness of Internal Control over Financial Reporting (FMFIA § 2)						
<b>Statement of Assurance</b>	Unmodified					
	<b>Beginning Balance</b>	<b>New</b>	<b>Resolved</b>	<b>Consolidated</b>	<b>Reassessed</b>	<b>Ending Balance</b>
<i>Total Material Weaknesses</i>	0	-	-	-	-	0
Effectiveness of Internal Control over Operations (FMFIA § 2)						
<b>Statement of Assurance</b>	Unmodified					
	<b>Beginning Balance</b>	<b>New</b>	<b>Resolved</b>	<b>Consolidated</b>	<b>Reassessed</b>	<b>Ending Balance</b>
<i>Total Material Weaknesses</i>	0	-	-	-	-	0
Conformance with Financial Management System Requirements (FMFIA § 4)						
<b>Statement of Assurance</b>	Systems conform to financial management system requirements					
	<b>Beginning Balance</b>	<b>New</b>	<b>Resolved</b>	<b>Consolidated</b>	<b>Reassessed</b>	<b>Ending Balance</b>
<i>Total Non-Conformances</i>	0	-	-	-	-	0
Compliance with Section 803(a) of the Federal Financial Management Improvement Act (FFMIA)						
	Agency			Auditor		
1. System Requirements	No lack of compliance noted			No lack of compliance noted		
2. Accounting Standards	No lack of compliance noted			No lack of compliance noted		
3. USSGL at Transaction level	No lack of compliance noted			No lack of compliance noted		

## FY 2016 Improper Payments Elimination and Recovery Act Reporting Details

The Improper Payments Information Act of 2002 (IPIA; Pub. L. 107-300), as amended by the Improper Payments Elimination and Recovery Act of 2010 (IPERA; Pub. L. 111-204), and the Improper Payments Elimination and Recovery Improvement Act of 2012 (IPERIA; Pub. L. 112-248), require agencies to annually report information on improper payments to the President and Congress through their annual Performance Accountability Reports (PARs) or AFRs.

### I. Risk Assessment

During December 2015, NSF completed an improper payments risk assessment covering FY 2015. The risk assessment covered grants, contracts, charge cards, and personnel compensation and benefits. The risk assessment used the criteria in Appendix C of OMB Circular No. A-123, *Management's Responsibility for Enterprise Risk Management and Internal Control*, and employed a qualitative approach in determining NSF's level of susceptibility to improper payments. It also considered NSF's financial and internal control processes, monitoring and assessment, human capital, operations and management, volume of payments, and materiality. The risk assessment included the following risk factors:

- Whether the program or activity reviewed is new to the agency.
- The complexity of the program or activity reviewed, particularly with respect to determining correct payment amounts.
- The volume of payments made annually.
- Whether payments or payment eligibility decisions are made outside of the agency, for example, by a state or local government, or a regional federal office.
- Recent major changes in program funding, authorities, practices, or procedures.
- The level, experience, and quality of training for personnel responsible for making program eligibility determinations or certifying that payments are accurate.
- Inherent risks of improper payments due to the nature of agency programs or operations.
- Significant deficiencies in the audit reports of the agency including, but not limited to, the agency Inspector General or the GAO audit report findings, or other relevant management findings that might hinder accurate payment certification.
- Results from prior improper payment work.

The risk assessment did not indicate significant susceptibility to improper payments for NSF grants, contracts, personnel compensation and benefits, or charge card payments.

The NSF OIG completed a review of NSF's compliance with IPERA and issued a report in May 2016. The objective was to review the improper payment reporting in NSF's FY 2015 AFR and accompanying materials, and to determine whether the agency met the OMB criteria for compliance with IPERA. The auditors found that NSF did comply with the IPERA reporting requirements in the FY 2015 AFR. However, the review noted several areas requiring improvement in the IPERA risk assessment process. NSF generally agreed with the recommendations in the report and after considering the recommendations carefully developed a corrective action plan (CAP). The plan was submitted to the OIG in July 2016, and they found it responsive to their recommendations. All eight recommendations from the review report were resolved as of August 2016. As a result of the compliance determination and the development of the CAP, NSF plans to perform a 3-year IPERA qualitative risk assessment cycle; the next full risk assessment will be completed in FY 2018.

As part of the corrective action plan, in September 2016, NSF completed draft policy and procedures for the IPERA risk assessment; and the draft was provided to the OIG for comment. NSF plans to

finalize IPERA risk assessment policy and procedures for implementation during the first quarter of FY 2017. Additionally, during FY 2016, NSF implemented testing of award financial monitoring that provided an estimated unallowable cost range for the grant portfolio. The estimated unallowable costs did not indicate significant risk. NSF will consider the results of the award financial monitoring testing as input for the FY 2018 qualitative IPERA risk assessment.

**II. Statistical Sampling**

Not applicable.

**III. Improper Payment Reporting**

Not applicable.

- a. Not applicable.
- b. Not applicable.
- c. Not applicable.

**Table 3.3 - Improper Payment Reduction Outlook (A-136 Table 1)**

Not applicable.
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- d. Not applicable.
- e. Not applicable.
- f. **High-Priority Programs:** Not applicable.

**IV. Improper Payment Root Cause Categories**

Not applicable.

**Table 3.4 - Improper Payment Root Cause Category Matrix (A-136 Table 2)**

Not applicable.
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**V. Corrective Actions**

Not applicable.

*High-Priority Programs:* Not applicable.

**VI. Internal Control Over Payments**

**Table 3.5 - Example of the Status of Internal Controls (A-136 Table 3)**

Not applicable.
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**VII. Accountability**

Not applicable.

**VIII. Agency Information Systems and Other Infrastructure**

Not applicable.

**IX. Barriers**

Not applicable.

## X. Agency Recapture of Improper Payments Reporting

- a. **Payment Recapture Audits Narrative:** NSF did not conduct payment recapture audits during FY 2016. On September 30, 2015, OMB agreed with NSF's analysis that it would not be cost effective for the agency to conduct a recapture audit program.
- b. **Programs Excluded from the Payment Recapture Audit Program:** In FY 2015, NSF determined that it would not be cost effective to conduct recapture audits of its single grants program and other activities (contracts, charge cards, and payments to employees). In accordance with Circular A-123 Appendix C Part I.D, *Requirements for Effective Estimation and Remediation of Improper Payments*, on September 28, 2015, NSF notified OMB and the NSF Inspector General of this decision and included supporting analysis. OMB agreed with NSF's determination.

The FY 2015 analysis used to determine that a payment recapture audit program was not cost effective leveraged the results of the work performed under IPERA, audits, grant monitoring programs, and internal control reviews. All consistently demonstrated there was not a significant risk of unallowable costs/improper payments within NSF's single grant program and other activities. For FY 2016, NSF reviewed current year results from data sources similar to those used in the 2015 analysis in order to ensure there were no significant changes.

The IPERA risk assessment for FY 2015 was completed in December 2015 and used qualitative factors to assess NSF's singular grant program and other activities. The risk assessment found no significant risk of improper payments. This was consistent with the agency's history of low improper payments. NSF will complete a qualitative risk assessment of improper payments in FY 2018.

The Single Audit Act requires financial statement audits of non-federal entities receiving or administering grant awards with federal expenditures exceeding \$750,000 during its fiscal year. NSF is required to review the audit reports of recipients of its funding to determine whether necessary corrective actions are adequate and implemented in response to audit report findings and recommendations.

NSF has invested significant resources in its grant monitoring program. As a key component of the agency's grant monitoring program, NSF completes advanced monitoring activities that include desk reviews, site visits, and Business Systems Reviews of NSF's large facilities construction and operation. These monitoring activities provide reasonable assurance to the agency that grant recipient institutions managing higher-risk awards possess adequate policies, processes, and systems to properly manage federal awards. As part of the grants monitoring program, NSF tested grant payments for unallowable costs. The testing found that the estimated unallowable costs for grants paid through the Award Cash Management Service (ACM\$) were considerably below the improper payment criteria of 1.5 percent of program outlays and \$10 million of all program activity payments.

The NSF Internal Controls Program annual review included the following business processes: 1) procure-to-pay, 2) pay and benefits, 3) charge cards, 4) financial reporting, 5) grants management, 6) large facility oversight, and 7) information technology. The review examined the design, operating efficiency, and effectiveness of key controls throughout the review areas. NSF issued an unmodified statement of assurance for its internal control processes.

- c. **Payment Recapture Audit Reporting:** NSF did not conduct payment recapture audits during FY 2016.

- d. **Overpayments Recaptured Outside of Payment Recapture Audits:** NSF collected remittances outside of payment recapture audits related to the following: payment reviews or audits; OIG reviews; Single Audit reports; and self-reported overpayments. These are reflected in Table 3.6 “Overpayments Recaptured Outside of Payment Recapture Audits.”
- e. **Payment Recapture Audit Program Targets:** Not applicable.

**Table 3.6 – Overpayments Recaptured Outside of Payment Recapture Audits (A-136 Table 4)**  
(Dollars in Millions)

Overpayments Recaptured Outside of Payment Recapture Audits		
Program or Activity	Amount Identified	Amount Recaptured
Grants	\$8.682	\$8.528
Contracts	\$0.085	\$0.085
Travel	\$0.007	\$0.007
Purchase Cards	\$0.000	\$0.000
Payroll and Other	\$0.178	\$0.090
<b>TOTAL</b>	<b>\$8.952</b>	<b>\$8.710</b>

- f. Not Applicable.
  - 1. Not applicable.

**Table 3.7 - Disposition of Funds Recaptured through Payment Recapture Audits (A-136 Table 5)**

Not applicable.
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- 2. Not applicable.

**Table 3.8 - Aging of Outstanding Overpayments Identified in the Payment Recapture Audits (A-136 Table 6)**

Not applicable
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**XI. Additional Comments**

Not applicable.

**XII. Agency Reduction of Improper Payments with the Do Not Pay Initiative**

NSF actively participates in OMB’s Do Not Pay (DNP) initiative to reduce improper payments through the implementation of pre-award and post-payment activities. For pre-award activities, the agency has incorporated the DNP solution into its pre-award review process for all grants and cooperative agreements. The DNP solution complements NSF’s existing policies and procedures for award management. The agency has integrated the functionality into its award management process. NSF has also automated the reviews and centralized the pre-award verification. This has created efficiency gains by reducing the workload for manual verification.

NSF uses the Department of Treasury to disburse all funds. NSF payments are compliant with the Treasury’s Payment Application Modernization format and are screened against the following data sources: Social Security Death Master File (DMF)-Public and the GSA System for Award Management (SAM) Exclusion Records-Restricted. Any subsequent matches are viewable in the Treasury Do Not Pay Portal for adjudication purposes. No additional data sources are available in the Treasury payment integration process at this time. In FY 2016, over 53,000 payments totaling over \$6.6 billion were screened through the Treasury Do Not pay process (Table 3.9). NSF had one positive match for DMF and no positive match for SAM.

Implementation of the Treasury’s Payment Application Modernization screening process has reduced the number of false positives from over 550 combined in fiscal years 2014 – 2015 to zero in FY 2016. This has produced resource savings for the agency from not having to manually research each false positive using the Do Not Pay online portal.

**Table 3.9 - Results of the Do Not Pay Initiative in Preventing Improper Payments (A-136 Table 7)**  
(Dollars in Millions)

	Number of payments reviewed for possible improper payments	Dollars of payments reviewed for possible improper payments	Number of payments stopped	Dollars of payments stopped	Number of potential improper payments reviewed and determined accurate	Dollars of potential improper payments reviewed and determined accurate
Reviews with the Do Not Pay databases	53,311	\$6,670.89	0	\$0	0	\$0
Reviews with databases not listed in IPERIA as Do Not Pay databases	N/A	N/A	N/A	N/A	N/A	N/A



National Science Foundation • Office of Inspector General  
4201 Wilson Boulevard, Suite II-705, Arlington, Virginia 22230

October 17, 2016

MEMORANDUM

To: Dr. Maria Zuber  
Chair, National Science Board

Dr. France Cordova  
Director, National Science Foundation

From: Allison Lerner *Allison Lerner*  
Inspector General, National Science Foundation

Subject: Management Challenges for NSF in FY 2017

In accordance with the Reports Consolidation Act of 2000, I am submitting our annual statement summarizing what the Office of Inspector General considers to be the most serious management and performance challenges facing the National Science Foundation (NSF). We have compiled this list based on our audit and investigative work, general knowledge of the agency's operations and evaluative reports of others, including the Government Accountability Office and NSF's various advisory committees, contractors, and staff.

We have focused on seven issue areas that reflect fundamental program risk and are likely to require management's attention for years to come. They are:

- Establishing Accountability over Large Cooperative Agreements
- Managing of NSF's Business Operations
- Managing of the IPA Program
- Moving NSF Headquarters to a New Building
- Managing the U.S. Antarctic Program
- Improving Grant Administration
- Encouraging the Ethical Conduct of Research

As you can see, we lead with a challenge focused on large cooperative agreements. The agency has agreed to take some actions in response to our recommendations and those in the National

Academy of Public Administration's December 2015 report to enhance accountability over such agreements; however significant risks remain. For example, our March 2016 alert memo on NSF's oversight of the Daniel K. Inouye Solar Telescope project revealed issues that pose cost and schedule risks including lack of an independent project cost estimate, limited information to support project expenditures, and lack of an incurred cost audit.

Last year we broadened the challenge on managing programs and resources in times of budget austerity to include the significant challenges faced by the "business" side of NSF. We also included a challenges focused on grant administration. Ensuring that payments are proper at the time they are initiated has always been challenging for NSF because grant recipients are generally not required to present supporting documentation in order to receive payments from the agency. As a result, NSF issues approximately \$6 billion annually in grant and cooperative agreement payments relying almost completely on the *recipients* to ensure that only proper payments are requested, and that if improper payments are ever made, they will be identified and corrected by the recipient after the fact.

While our May 2016 report on NSF's compliance with the Improper Payment Elimination Act (IPERA) requirements for FY 2015 concluded that NSF technically complied with IPERA requirements, we identified substantial concerns with the depth, substance, and documentation of the NSF risk assessment.

If you have any questions, or need additional information, please call me at 703-292-7100.

**CHALLENGE: Establishing Accountability over Large Cooperative Agreements**

**Overview:** Since 2010, OIG has issued 28 reports containing more than 80 recommendations related to NSF's use and management of cooperative agreements for the construction and operation of high-dollar, high-risk research facilities. Audits of over \$1.1 billion in proposed costs for three construction projects raised serious questions about the adequacy of the proposed budgets, which led us to examine NSF's cost surveillance throughout the lifecycle of large facility projects.

Accountability weaknesses occurred at multiple facilities and contributed to the decision by the NSF Director and the National Science Board to procure a report by the National Academy of Public Administration (NAPA) focused on NSF'S large cooperative agreements. NAPA determined that NSF should strengthen oversight and monitoring of cooperative agreements to ensure that the billions of Federal funds invested in large facilities are spent properly. The NAPA report included thirteen recommendations, which if implemented by NSF in a timely manner, will significantly improve NSF's ability to ensure accountability over high-dollar, high-risk projects and thus will go a long way toward addressing many of the issues OIG has raised.

**Challenge for the Agency:** NSF's challenges with large facility construction agreements go beyond ensuring that proposed budgets and expenditures are supported. Our extensive audit work focused on construction awards surfaced similar risks for NSF's oversight of operations awards for large facilities. This is important because NSF spends significantly more for operating its facilities than constructing them. For example, NSF requested over \$193 million for fiscal year 2017 to pay for four NSF construction projects. In contrast, NSF's operation and maintenance request for its existing facilities and Federally Funded Research and Development Centers for the same time period was over \$947 million.

NSF's challenge to ensure accountability in large facility cooperative agreements is compounded by the Foundation's emphasis on scientific results at the expense of sound business practices. This issue was noted in the NAPA report, which stated that:

It is clear that, in the past, NSF has prioritized the innovative scientific aspects of large facility construction projects; the agency now needs to apply equal emphasis on increased internal management of the business practices critical to enhanced oversight and project success. In doing so, the Panel believes that NSF and NSB will enhance the agency's ability to fulfill its mission of supporting groundbreaking science.<sup>1</sup>

Proper financial management and oversight can play a crucial role in ensuring that a project achieves intended scientific benefits. It is critical for NSF to have a sound and reliable estimate of project costs and then to ensure that project funds are spent appropriately. Absent such oversight there is a heightened risk that scientific benefits will be lessened. For example, NSF did not become aware of the NEON project's potential \$80 million budget overrun until it was notified of it by NEON. While some of the factors that may have contributed to increased project costs, such as permitting delays, may have been outside of NSF's control, NSF could have

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<sup>1</sup> *National Science Foundation: Use of Cooperative Agreements to Support Large Scale Investment in Research*, National Academy of Public Administration (December 2015), pp. 6-7.

addressed other matters such as unsupported costs in NEON's budget and questionable spending for meals and entertainment activities, among other things, if it had identified them earlier.

The Foundation's ability to monitor a project's progress is enhanced if it has access to quality Earned Value Management (EVM) data. We have recommended that NSF validate the information awardees provide in EVM reports and that NSF require that EVM systems be certified. There were problems with the EVM systems for two of NSF's largest, riskiest construction projects, which could increase the risk of cost overruns and misuse of funds. For example, NSF has not certified the EVM system for \$344 million Daniel K. Inouye Solar Telescope project, and is not validating the EVM data provided by the awardee.

It is imperative that NSF apply the same rigorous attention and scrutiny to its financial management and oversight of its large facility projects that it applies to determining the scientific merit of the projects it decides to fund.

NSF management agreed with all of the NAPA report's recommendations and said that the agency plans to implement them "in some form". The agency has also agreed with a number of OIG recommendations. NSF now faces the challenge of implementing multiple new policy changes based on these recommendations, which will require obtaining an increased amount of data from its awardees. Implementing these new practices will also require sustained management attention, effective communication with the awardee community, clear award terms and conditions, and, most importantly, a culture change in NSF.

The Foundation applies its highest level of attention and scrutiny to determine the scientific merit of the projects it decides to fund. To ensure that these projects deliver the promised scientific benefits to the public, a culture change at NSF is needed that makes sound financial management a priority and ensures that sufficient resources are allocated to ensure that federal funds are spent properly. We remain concerned about NSF's ability to accomplish this change, and about its progress toward improving cost surveillance and implementing these new rules to ensure effective oversight.

### **OIG's Assessment of the Agency's Progress**

NSF has developed new policies and procedures for large facility awards to address some OIG and NAPA recommendations. Examples of NSF's new requirements to strengthen oversight of large facilities include a Cost Proposal Review Document to document NSF's analysis of awardees' proposed costs, an independent cost assessment to validate proposed costs, an incurred cost reporting tool for cooperative agreements over \$100 million, retaining a portion of an awardee's contingency funding, and prohibiting use of management fee for certain activities.

NSF's actions represent important steps toward the goal of increased accountability; however, the agency continues to study how to address other recommendations, such as whether to require certification of Earned Value Management systems.

**CHALLENGE: Management of NSF's Business Operations**

**Overview:** NSF may be a small agency in terms of staff but it spent over \$7 billion in FY 2016 to select and administer productive investments in research and the nation's science infrastructure. Consequently most of NSF's managers and staff are successful science or engineering professionals that are well qualified to help determine the composition of the agency's investments, but vary in terms of their managerial experience and skill.

Selecting and funding great science is the agency's most important job but with responsibility for billions of dollars and a diverse portfolio of projects, NSF leadership cannot afford to overlook the importance of its financial and administrative operations. Effective executives and administrators are as critical to NSF's success as its scientists. The "business" side of NSF faces a set of challenges aimed at improving the organizations' management controls over payments, information security, recordkeeping, and reporting. Simply stated, NSF is challenged to deliver both scientific and organizational excellence.

**Challenge for the Agency:**

*Finding and Eliminating Improper Payments*

Ensuring that payments are proper at the time they're initiated has always been challenging for NSF because grant recipients are generally not required to present supporting documentation in order to receive payments from the agency. As a result, NSF issues approximately \$6 billion annually in grant and cooperative agreement payments relying almost completely on the *recipients* to ensure that only proper payments are requested, and that if improper payments are ever made, they will be identified and corrected by the recipient after the fact.

In May 2016, we issued a report on NSF's compliance with the Improper Payment Elimination Act (IPERA) requirements for FY 2015. Although we concluded that NSF technically complied with the requirements of IPERA, we identified substantial concerns with the depth, substance, and documentation of the NSF risk assessment. Specifically, we found significant limitations in NSF's analysis of six of the nine OMB risk factors and its assessment of NSF payments to employees.

With respect to the first concern, properly evaluating risks that could contribute to improper payments depends on collecting accurate, relevant information by asking the right questions of the appropriate personnel. We found that in some instances the interviews conducted did not address areas of known risks in sufficient detail, and at times raised concerns about why some questions were asked and not others. We also found that NSF sometimes accepted answers at face value and did not obtain key information to support the information provided.

With respect to the second limitation, NSF did not thoroughly assess payments to employees. The agency did not conduct IPERA-specific testing on payroll in FY 2015 or interview NSF's Division of Human Resource Management (HRM), the division responsible for administering salary and benefits, to discuss any of the nine OMB risk factors during the IPERA risk assessment. As a result of these limitations, NSF's risk assessment may not have fully explored the agency's susceptibility to improper payments. We made eight recommendations to strengthen NSF's future

IPERA risk assessments. NSF generally agreed with the recommendations, and plans to undertake corrective action to address the root causes of the finding.

The *Standards for Internal Control in the Federal Government* states that, “Internal control is a process effected by an entity’s oversight body, management, and other personnel...” It further states that, “...management designs control activities so that all transactions are completely and accurately recorded.” NSF’s challenges in this area are to develop an internal control process that provides reasonable assurance that payments are proper at the time they are made, and to develop a sound process for assessing its risk of improper payments.

#### *Protecting Agency Information and IT Resources*

The protection of its information systems against unauthorized access or modification is critical to NSF’s ability to carry out its mission. As demonstrated by the recent failure of the Uninterruptible Power Supply that shut down NSF’s network for three days last July, access to agency information and IT resources is extremely dependent on external factors. With the agency scheduled to vacate its current buildings next year, the owner may not be as motivated to keep infrastructure updated. To compensate, NSF should increase the timing and robustness of IT resource testing until the time of the move to the new building in 2017.

After the move to the new building in 2017, NSF’s challenge will be to ensure that agency information and IT resources remain available, secure, and complete. Its efforts in this area may be assisted by the use of information security continuous monitoring (ISCM) strategies as mandated by OMB through the DHS Continuous Diagnostic and Mitigation Program.

In addition to certain recurring IT security weaknesses, NSF has some long-standing issues that warrant increased attention, particularly with regard to the systems of its Antarctic Program. In particular, there are two deficiencies still outstanding that were first identified in 2006 that threaten the continuity of mission support and communications from the USAP’s key Denver location in the event the site becomes unavailable or the data center is interrupted. NSF management should allocate appropriate resources to correct these weaknesses and ensure that the systems and information are adequately protected.

#### *Promoting Accountability and Transparency*

The Digital Accountability and Transparency Act (DATA Act) directs the federal government to standardize and publish a wide variety of reports and data in order to foster greater transparency over federal spending. Federal agencies must implement and report the DATA Act data elements by May 2017. The DATA Act also includes oversight requirements for Inspectors General to assess the completeness, timeliness, quality, and accuracy of data submitted by the agencies; our first such review must be completed by November 2017. The government-wide implementation is being led by a joint team from the U.S. Department of the Treasury and the Office of Management and Budget (the DATA Act Project Management Office or PMO).

The iterative nature of the DATA Act PMO’s implementation strategy and evolving federal guidance make it difficult for agencies, including NSF, to integrate the implementation effort into

existing IT governance and resource requirements planning structures. Also, there are issues that still need to be resolved on a government-wide basis, including the late release of Treasury's production-ready broker (to test and validate agency data); and the software patches to the iTRAK financial system used by NSF and other agencies, both of which are beyond NSF's control. Further, NSF has indicated that it needs additional guidance and clarification from OMB and Treasury to fully report under the DATA Act.

Other factors also present a significant challenge for NSF in successfully implementing the requirements of the Act including: the necessary modifications to agency systems and processes; the limited agency FTEs available to ensure that adequate staff with the necessary skills and competencies are dedicated to DATA Act implementation; and the potential that NSF's relocation in 2017 may impact DATA Act activities. Also, the lack of a clear source of funding for NSF's DATA Act implementation efforts presents a potential risk to its success. As the guidance on DATA Act requirements is released in stages, cost estimates and implementation activities will continue to change, making it difficult for the agency to adequately prepare.

#### *Managing the Government's Records*

In 2011, President Obama signed a memorandum initiating a government-wide effort to reform federal recordkeeping in light of the dramatic increase in the amount of electronic information that the government manages. The Office of Management and Budget (OMB) and the National Archives and Records Administration (NARA) issued a follow-up directive in 2012, which required federal agencies to take specific actions by appointed dates to reform the policies and practices for the management of records, and provide a framework for the management of electronic records.

Although NSF has until 2019 to be in compliance with all of the directives issued by NARA, NSF plans to relocate to a new headquarters building in less than one year which will have less office space available for the storage of paper, supplies, and equipment. Accordingly, the agency must reduce the amount of paper, supplies and equipment it uses and stores. As a result, NSF has set a goal of disposing of 500,000 pounds of such material prior to moving to the new building.

Before the agency begins to reduce its paper files, it must guide staff to distinguish between *official* records and non-record materials and personal papers. NSF is required to retain and destroy official records in accordance with record retention schedules approved by NARA. With the upcoming relocation, employees will begin reviewing and purging their files and records and will require clear guidance to prevent the inadvertent disposal of official records. NSF prepared optional online records management training for employees and issued a September 2016 bulletin to help staff identify federal records. However, NSF does not require employees to take the training and has not encouraged employees to voluntarily take the online records training since the end of 2014. Without the training and guidance from NSF, employees are at risk of disposing official records.

In addition, NSF needs to 1) update its NARA record retention schedules to classify electronic records as official NSF records, and 2) review, scan, and digitize its paper records into an electronic format. The agency has a schedule to finish scanning and digitizing records within each directorate

by May 2017, however schedule delays are already occurring due to directorates not being prepared to scan and digitize their records.

**OIG's Assessment of the Agency's Progress:**

Though OIG found the agency in technical compliance with IPERA this past year, we remain concerned about NSF's approach to conducting IPERA risk assessments and will continue to engage in discussions on this issue. With regard to Information and IT Resources, the agency reports that it has initiated implementation of Phase 1 of Continuous Diagnostics Mitigation, and expects to be the first agency to complete it by the end of the year.

NSF has reported that it is on track to implement the DATA Act by the statutory May 2017 deadline. We agree that NSF had made progress towards implementing the DATA Act, including putting in place a governance structure, following government-wide guidance, implementing plans to mitigate the risk of delays in software patch releases, and participating on government-wide working groups. However, due to factors outside of NSF's control, and project management challenges caused by inadequate resources, meeting the May 2017 reporting deadline continues to be a challenge.

With respect to records management, NSF has hired a professional to head the Records Management Section. However, more needs to be done to prepare agency staff to meet the challenging records management goals it has set prior to the relocation of its headquarters.

**CHALLENGE: Management of the IPA Program**

**Overview:** To further the agency's mission of supporting science and engineering research and education, NSF draws on scientists, engineers, and educators on rotational assignment from academia, industry, or other eligible organizations. All of the non-permanent appointments are federal employees, except for Intergovernmental Personnel Act (IPA) assignments; individuals on IPA appointments remain employees of their home institutions.

As a result, IPAs' home institutions administer their pay and benefits, and IPAs are therefore not subject to federal pay and benefits limitations.

**Challenge for the Agency:** While there are benefits that come from having IPAs at NSF, there are also challenges. For example, since individuals can serve in a temporary capacity for up to four years, there is almost constant turnover in staff at NSF, especially in senior leadership positions. In July 2016, IPAs led five of NSF's seven science directorates and 22 (of 30) divisions. Thus, the majority of the positions responsible for providing leadership and direction to accomplish the agency's mission were help by temporary employees.

Relative to the number of permanent employees, NSF is a major user of IPA authority; IPAs comprised less than one percent of the workforce for five other science-centric federal agencies. In addition, IPAs at those agencies were generally used in research-related positions, such as science advisors, and did not typically fill management positions.

The IR/D program permits NSF staff, including IPAs, to engage in research projects while they are at NSF. IPAs participating in IR/D activities usually return to their home institution to continue existing research projects. Of 250 working days in a year, IR/D participants can spend up to 50 days (20 percent of their work time) on research at their home institutions. IPAs are more likely to participate in IR/D and to travel as part of their IR/D activities than permanent employees.

For example, for a one year period ending August 1, 2012, NSF spend nearly \$1.3 million for travel to support IPA's IR/D activities compared with \$183,631 for permanent employees. The amount of time IPAs spend at their home institutions rather than at NSF, raises questions about their ability to fulfill their responsibilities at NSF and to be fully engaged in the agency's mission.

Because IPAs remain employees of their home institutions while at NSF and expect to return there after their tenure at NSF, most come to the Foundation with known conflicts of interests. In light of the Foundation's reliance on rotators to make funding decisions, it is critical that strong controls be in place to identify and mitigate conflicts of interest that occur as a result of IPAs' own research activities or their connections with their home institutions. We are conducting an audit to evaluate the Foundation's controls over IPAs' conflicts of interest.

Finally, NSF's reliance on IPAs comes with a high cost. Both the number of IPAs and their cost have increased in the last three years. NSF has 29 percent more executive level IPAs in 2015 than in 2012, costing nearly \$2.4 million more. NSF paid nearly \$8.9 million for salary, fringe benefits, lost consulting, and per diem for 27 executive level IPAs in 2015 and \$6.5 million for the same expenses for 21 executive level IPAs in 2012.

In addition, as noted previously, IPAs are not subject to federal pay and benefits limits. In 2012, the highest paid annual IPA salary was \$301, 247; in 2015, the highest paid annual IPA salary was \$440,165. The average executive IPA salary also increased from \$223,632 to \$243, 571. Because IPA salaries and benefits are funded with program-related appropriations, savings in IPA costs would free up funds for additional research.

**OIG's Assessment of the Agency's Progress:** NSF established an IPA Steering Committee to analyze IPA costs and identify cost savings, among other things. NSF informed us that it continued to identify and manage conflicts of interest related to IPAs.

### **CHALLENGE: Moving NSF Headquarters to a New Building**

**Overview:** NSF has four months (September through December 2017) to complete its move to the new headquarters and vacate the two buildings in Arlington before its current leases for the Arlington offices expire. During this time, NSF needs to relocate about 2,100 people; move furniture and IT equipment; and decommission its current buildings, with two of these tasks expected to take over one month. Prior to NSF's physical move, the agency must also ensure the new building is operational, with workstation furniture installed, functional IT systems, and operational conference rooms so employees can perform their work.

**Challenge for the Agency:** NSF is faced with significant challenges to completing the move to the new headquarters before leases on its existing buildings expire at the end of 2017. Because of prior delays, there is little margin for error and the risk of any additional delay is high—after the December 31, 2017 deadline, NSF will have to pay approximately \$64,000 per day in rent for its new building. If NSF has not moved by the end of 2017, the General Services Administration will have to re-negotiate leases on its current buildings, which will likely result in increased rental costs the Foundation will have to pay at the same time it begins paying rent for its new headquarters.

To meet its move deadline and avoid additional costs, it is critical for NSF to have a complete and accurate baseline schedule, which plays a critical role in NSF's ability to identify and manage risk. The baseline schedule should be updated frequently and in a timely manner to reflect progress, identify delays, and determine the impact of delays on remaining activities. Although the baseline schedule includes both NSF and the contractor's activities, NSF is responsible for the schedule. We are currently examining NSF's baseline schedule to determine the robustness of this crucial tool.

The frequent turnover in personnel managing the move raises concerns about NSF's ability to meet deadlines and underscores the importance of the baseline schedule to track and measure progress. Since 2014 there have been five project managers overseeing the move. In January 2016, five months after the leases were renegotiated, NSF hired the first person dedicated to managing the schedule, and that person left the agency after one month. In March 2016, NSF hired another scheduler.

**OIG's Assessment of the Agency's Progress:** In the past year, NSF has made progress by successfully meeting its deadlines for reviewing the building designs in condensed timeframes. The agency also completed Phase II negotiations with the union without delaying the move and informed us that it plans to complete the third phase of negotiations without delaying the project schedule. NSF also said that in 2017 it plans to develop a detailed relocation plan and determine what furniture can be re-used in the new building.

### **CHALLENGE: Management of the U.S. Antarctic Program**

**Overview:** NSF, through the United States Antarctic Program (USAP) manages U.S. scientific research in Antarctica. The Antarctic Support Contract (ASC) was awarded to Lockheed Martin in December 2011 and is NSF's largest contract, valued at nearly \$2 billion over 13 years.

The Antarctic Support Contract and its subcontractors provide logistical support in a variety of areas, from laboratory management and food services, to information technology and other support functions that make NSF research possible in one of the most remote areas of the world.

In August 2016, Leidos Holdings, Inc. and Lockheed Martin's Information Systems & Global Solutions business segment merged. As a result of the merger, Leidos will hold the ASC, once plans for all contracts affected by the merger have been reviewed.

**Challenges for the Agency:** Ensuring a successful transition of the ASC project, together with its subcontractors, will be a challenge for NSF. It is essential for NSF to have strong cost controls, especially through reorganizations and mergers, to protect the government against unwarranted increases in ASC costs.

In addition to challenges related to the merger, NSF will also face the challenge of modernizing McMurdo and Palmer research stations. It is important for NSF to apply lessons learned through its large facility work as it proceeds with this new construction project.

NSF must also oversee costs incurred under the ASC and its subcontracts. In 2013 we examined the agency's oversight of medical expenses related to the Antarctic program. The Antarctic Support Contractor (ASC) and its subcontractors prepare, process, and pay as many as 1,600 individual reimbursement requests each year for costs related to medical screening. In the course of our audit which identified opportunities to reduce costs for the medical screening process for Antarctic program participants, we found that guidance about what medical expenses would be reimbursed by the contractor was unclear. As a result, applicants may be submitting claims for expenses that are not eligible for reimbursement.

In addition, the contractor does not have a robust system to ensure the accuracy of invoices for medical costs. NSF should consider increasing its investment in the oversight of invoiced costs until it is better assured of the contractor's internal controls. The Contracting Officer's Representative told us that NSF cannot tell if it is being accurately invoiced by LM for medical processing costs and that NSF relies on the contractor to charge them accurately.

Although medical processing constitutes approximately \$1 million out of the first full year's contract value of \$173 million, weak internal controls over relatively small costs for medical processing raises questions about sufficiency of controls over larger contractor costs. NSF could consider increasing its investment in the oversight of invoiced costs until it is better assured of LM's internal controls over invoicing accuracy.

NSF has three sites—Port Hueneme, California; Punta Arenas, Chile; and Christchurch, New Zealand—where inventory is stored and maintained prior to shipment to Antarctica. The Port Hueneme facility alone handles approximately 40 million pounds of cargo each year. Inventory stored at these sites is at particular risk due to the large volume of material, long logistical lead time, and remoteness from the USAP program headquarters.

**OIG's Assessment of the Agency's Progress:** NSF reported that it has addressed infrastructure upgrades for McMurdo station through continued design efforts. For example, NSF stated that it has initiated design efforts for upgrades to McMurdo lodging, vehicle equipment/operations center, and the Palmer Pier replacement.

In addition, NSF stated that it continued to review and approve invoices to the USAP contractor and that it documented this process in 2013. The agency reported that it will continue to monitor invoices from the USAP contractor in accordance with its established procedures.

## **CHALLENGE: Improving Grant Administration**

**Overview:** Making grants in support of promising scientific research is NSF's primary business. In FY 2015, NSF evaluated over 49,600 proposals for research, education and training projects through a competitive review process, and funded over 12,000 new competitive awards. As of June 30, 2016, NSF had a portfolio of over 42,000 active awards totaling approximately \$28.2 billion to over 2800 awardees. Given the size and exposure to risk that its portfolio represents, it is vital that NSF's grant administration practices ensure that grantees spend their funds appropriately.

**Challenge for the Agency:** Ensuring that grant funds are spent as intended has always been challenging because grant recipients are not required to produce supporting documentation, such as invoices and receipts, in order to receive payment from the agency. While recent efforts to reduce the administrative burden on grantees have value, the agency should proceed carefully so that accountability for public funds is not compromised in the process. Issues with accountability and transparency are further compounded due to the need for NSF to monitor awardees that "pass-through" funds to sub-recipients that perform a significant amount of the work. Therefore, the challenge for NSF is to implement controls over the spending of grant funds that ensure transparency and accountability, but do not unduly encumber awardees and federal program officers.

OMB issued its streamlined guidance, 2 CFR Part 200, "Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards" (Uniform Grant Guidance or UGG), in December 2013. NSF's *Proposal & Award Policies & Procedures Guide* to implement the UGG became effective in December 2014. Also, as noted in prior years' Management Challenges, OMB raised the single audit threshold from \$500,000 to \$750,000, effectively removing audit coverage on millions of dollars in NSF funding. While the new guidance and higher audit threshold potentially increases exposure to risk, NSF's monitoring program continues to focus on awardees receiving between \$2 million and \$15 million in NSF funds. This focus does not take the additional steps needed to oversee the NSF awards to recipients who fall below the new threshold.

Transparency and oversight of NSF funds passed through to sub-recipients poses a challenge to NSF's grant administration. NSF's large facility construction awards include significant amounts of funding that goes to sub-recipients. It is NSF's responsibility to make sure that prime recipients are properly overseeing sub-recipients. Recent audits have shown that NSF lacks the necessary information and visibility over sub-recipients to ensure that they are following federal requirements. Additionally, OIG audits found that some sub-recipients have provided incomplete information in their incurred cost submissions. These submissions are intended to ensure that the costs charged the government are fair and allowable, providing needed visibility over how money is spent. NSF is challenged to require its awardees to provide sufficient cost information to demonstrate that sub-recipients' costs are allowable, as well as fair and reasonable. Without this information, NSF risks over paying or paying costs that are not allowed by federal requirements.

**OIG's Assessment of the Agency's Progress:** NSF continued to take actions this past year to strengthen grant administration. As previously noted, the agency's revised *Proposal & Award Policies & Procedures Guide*, implementing the UGG, became effective in December 2014. In October 2016, OIG will transfer responsibility for identifying single audit findings that require NSF resolution to NSF. NSF reported that it had implemented statistically based baseline award monitoring of financial transactions to uncover anomalies and inaccurate payments. Finally, NSF continues to use its Award Monitoring and Business Assistance Program (AMBAP), which includes baseline and advanced monitoring activities, to ensure awardee compliance with the revised guidance. During advanced monitoring, NSF assesses the internal controls of its awardees to ensure adequate administration of the NSF awards. During FY 2016, NSF planned and completed 28 Advanced Monitoring Site Visit reviews and 64 desk reviews.

### **Challenge: Encouraging the Ethical Conduct of Research**

**Overview:** Congress passed the America COMPETES Act in 2007 to increase innovation through research and development, and to improve the competitiveness of the United States in the world economy. NSF responded to the Act by mandating mentoring plans for all postdoctoral positions and directing that grantees provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduate and graduate students, and postdoctoral researchers participating in the proposed research project.

NSF requires that institutions submitting a proposal to certify that they provide RCR training and oversight. However, information collected during investigations, site visits, and reviews of institutional Responsible Conduct of Research (RCR) plans suggests that some institutions have not adopted an effective approach to RCR training. Furthermore, some research suggests that many of the ethics training programs currently available do little to change the perspectives of students and postdocs regarding the ethical conduct of research. As more stories about research misconduct circulate in the media, the public's confidence in the research community as a whole is weakened and taxpayer support of science is undermined. NSF is therefore challenged to provide more oversight to institutional implementation of these requirements and to provide meaningful guidance regarding RCR training.

**Challenge for the agency:** NSF's primary challenge is to ensure that awardees implement effective RCR programs. At a time when opinion surveys indicate more Americans are becoming distrustful of science, it is important that key science agencies such as NSF do all it can to promote a more ethical culture within the research community, and thereby minimize instances of misrepresentation or cheating. Surveys also suggest that cheating is endemic at various levels of education, with 30% of researchers admitting to engaging in questionable research practices or knowing someone who has engaged in such practices.

The significant number of substantiated allegations of research misconduct investigated by OIG continues unabated. Particularly concerning is the increase in allegations of data fabrication/falsification by students/post-docs. From 2004-2010 our office received 21 such allegations; from 2011-present we received 49 such allegations, an increase of over 100%. In addition, OIG has seen a substantial increase of allegations related to violations of NSF peer review confidentiality, false representations in CVs, false representations of publications in annual/final reports, false or incomplete listing of all affiliations and current support (especially at overseas institutions), and fraudulent or otherwise improper use of grant funds. The number and variety of ethical issues identified in our investigative activities suggest that institutions have not sufficiently emphasized research integrity as a core value – not only at the student level, but at the faculty level as well.

The NSF Act places responsibility on NSF to strengthen scientific and engineering research potential. NSF funds research in virtually every non-medical research discipline and reaches a vast range of educational levels, kindergarten through post-PhD. The agency is therefore in a unique position to lead the government response to these disturbing trends in the responsible conduct of research and foster positive change at all levels of education. NSF's research and training programs reach individuals who are ultimately employed throughout the research community – in academia, industry, and government.

Effective RCR training of the science, engineering, and education workforce will pay substantial dividends. Early educational intervention remains critical to any effort to ensure that future scientists understand proper professional practices and the implications of failing to follow them. While NSF has been responsive to our recommendations contained in individual research misconduct investigation reports, such corrective actions only address incidents after the fact. Broader proactive measures are needed.

**OIG's Assessment of the Agency's Progress:** The agency responded to the America COMPETES Act by requiring that grantees provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduate and graduate students, and postdoctoral researchers who are financially supported by proposed NSF-funded research projects. However, in contrast to the RCR requirements adopted by NIH in 2010, those implemented by NSF do not have specific course requirements. Nor do they provide guidance about the content, structure, or format of the courses.

Other initiatives the agency has undertaken include the development of a new ethics research program called Cultivating Cultures for Ethical Science Technology Engineering Mathematics (CCE STEM). The CCE STEM research effort is focused on identification of factors that create cultures that foster and encourage research integrity, rather than on curriculum development on integrity issues. In February of 2016, NSF upgraded its Online Ethics Center to provide resources to institutions and researchers aimed at helping them navigate ethical issues. The Agency also worked with the National Academies to develop and make available ethics materials that will be applicable across all scientific fields that NSF supports.

OIG is completing a review of institutional responses to NSF's implementation of the America COMPETES Act.

**NATIONAL SCIENCE FOUNDATION**  
4201 WILSON BOULEVARD  
ARLINGTON, VIRGINIA 22230



October 25, 2016

MEMORANDUM

TO: Ms. Allison Lerner  
Inspector General, National Science Foundation

FROM: Dr. France Córdova *FJC*  
Director, National Science Foundation

SUBJECT: Acknowledgement of the Inspector General's FY 2017 Management Challenges Memorandum and Transmittal of NSF's FY 2016 Progress Report on OIG Management Challenges

This serves to acknowledge receipt of your memorandum dated October 17, 2016, summarizing what the Office of Inspector General (OIG) considers to be the most serious management and performance challenges facing the National Science Foundation (NSF). These challenges are: establishing accountability over large cooperative agreements; managing NSF's business operations; managing NSF's Intergovernmental Personnel Act (IPA) program; moving NSF headquarters to a new building; managing the U.S. Antarctic program; improving grant administration; and encouraging the ethical conduct of research. Your memorandum has been shared with NSF's executives and senior officers, and we will continue to address these issues through collaborative, cross-agency communication and action.

This memorandum also provides you with NSF's progress report highlighting the significant actions taken in FY 2016 on the management challenges outlined in your October 15, 2015 memorandum. The report provides anticipated next steps and will serve as a prospective guide for many of the actions planned for FY 2017.

As always, NSF remains committed to serving the research community effectively, to continually improving stewardship across the agency, and to safeguard Federal funds awarded by NSF in support of the agency's mission. We look forward to continuing to work with your office to achieve these goals.

Enclosure

Cc: Chair, National Science Board  
Chair, National Science Board, Audit and Oversight Committee  
**Chief Financial Officer**

## National Science Foundation (NSF) FY 2016 Progress Report on OIG Management Challenges

**CHALLENGE: Establishing Accountability over Large Cooperative Agreements**      **LEAD: BILL KINSER, BRANCH CHIEF (BFA/DACS/CSB)**

**NSF Management Overview:** The Office of Inspector General (OIG) challenge relates to NSF’s oversight of large facilities construction awards. The Foundation currently utilizes end-to-end oversight policies and procedures to ensure adequate stewardship over federal funds for both construction and operations. These activities are carried out starting with the day-to-day oversight of the Science and Engineering Directorates and the Office of Budget Finance and Award Management (BFA) and extend through the decisional and governing responsibilities of the Office of the Director (O/D) and the National Science Board (NSB). The Major Research Equipment and Facility Construction (MREFC) Panel provides additional oversight of the design stage, which includes readiness for advancement and establishing the performance baseline for construction. Within BFA, the Large Facilities Office (LFO) develops policies and procedures related to large facilities, provides assistance to the program offices, and assures that policies, procedures, and good practices are being followed. Other BFA assurance units include the Cooperative Support Branch within the Division of Acquisition and Cooperative Support (DACS/CSB) and the Division of Institution and Award Support’s Cost Analysis and Audit Resolution Branch (DIAS/CAAR) which supports cost analysis, award and post-award monitoring.

NSF has been continuously enhancing its pre-award and post-award oversight of large facilities cooperative agreements since June 2014. These enhancements are documented in the latest revision of the Large Facilities Manual (LFM) and internal Standard Operating Guidance (SOG). The December 2015 report of the National Academy of Public Administration (NAPA) supported NSF’s use of cooperative agreements. However, the report also noted that NSF should equally emphasize increased internal management of the business practices critical to the enhanced oversight and project success in order to bring them into equal balance with the science and technical aspects of the project. NSF agrees with the spirit of all of the NAPA recommendations and plans to accommodate them in some form. One key step forward is that in March 2016, NSF completed the process for selecting a new managing organization for the NEON project, Battelle Memorial Institute. The turnaround of the NEON project reflects NSF’s quick action to restore confidence in the oversight of the project and to ensure sound financial and technical oversight in bringing the construction portion of the project to completion.

Additional progress made in FY 2016, along with future implementation milestones, are described below.

a. *Establish accountability for the billions of federal funds in NSF’s large cooperative agreements at the pre- and post-award stages and throughout the lifecycle of projects, and validate that the strengthened policies are implemented and working.*

**NSF’s Significant Milestones in FY 2016:**

- Implemented NAPA Recommendation 6.5: Hiring of two additional full-time equivalent (FTE) staff in LFO and making the LFO Head, a voting member on the MREFC Panel.
- Formed a Business and Operations Advisory Committee (BOAC) subcommittee on NAPA implementation. Specifically, the subcommittee is charged with providing options for appropriate agency-wide oversight for the NSF O/D by among other things, addressing two NAPA recommendations (Recommendations 6.2 and 6.4) dealing with: 1) the need for the NSF Director to have access to independent advice to serve as a sounding board for objective insight on large research projects; and 2) a potential re-scoping of the role, duties, and membership of the MREFC Panel to include status update reviews of projects in the development and construction phases focusing on cost, schedule, and performance.
- Conducted a workshop with NSB to clarify roles and responsibilities with regard to large facilities oversight to address NAPA Recommendation 6.1 & 6.6: Clarifying oversight roles and use of annual NSF Facilities Plan, respectively.

	<ul style="list-style-type: none"> <li>• Implemented v1.0 of the NSB Facilities Portal as possible replacement to NSF Facilities Plan.</li> <li>• Developed a certification, training, and core competency implementation plan for NSF staff engaged in large facilities oversight as part of the FY 2016 NSF Strategic Objective Review to address NAPA Recommendation 6.7: Project Management skill requirements.</li> <li>• Drafted the joint LFO-DACS/CSB narrative for internal controls testing of enhanced policies and procedures related to large facilities oversight.</li> <li>• Implemented appropriate/applicable enhanced oversight mechanisms currently used for construction awards on operational awards.</li> <li>• Conducted Earned Value Management System (EVMS) verification/validation of the Large Synoptic Survey Telescope (LSST) project.</li> </ul>
	<p><b>NSF’s Anticipated Milestones:</b></p> <ul style="list-style-type: none"> <li>• Develop and implement new SOG for conducting NSF EVMS verification/validation reviews.</li> <li>• Develop new SOG on stage-gate and construction reviews to address NAPA Recommendation 6.3: Financial and project management expertise on panels.</li> <li>• Develop new SOG on training, certification, and core competencies for NSF staff engaged in large facilities oversight.</li> <li>• Complete EVMS verification/validation on Daniel K. Inouye Solar Telescope (DKIST) and Regional Class Research Vessel (RCRV) projects.</li> <li>• Work with BFA’s Division of Financial Management (DFM) under the Process Improvement Plan for the FY 2015 financial statement audit to test and evaluate new narrative and supporting procedures in accordance with OMB Circular, No A-123, “Management’s Responsibility for Internal Control.”</li> </ul>
<p>b. <i>Ensure that costs proposed for and incurred under its large facility projects, such as LSST and NEON, are fair and reasonable, and that the agency’s cost surveillance practices are sufficient to identify: unallowable or unreasonable expenditures, funds spent for awards other than</i></p>	<p><b>NSF’s Significant Milestones in FY 2016:</b></p> <ul style="list-style-type: none"> <li>• Implemented NAPA Recommendation 3.1: Exceptions to Cost Analysis (revisions to BFA SOG 2016-4).</li> <li>• Implemented NAPA Recommendation 4.1: Retain control over a portion of budget contingency (BFA SOG 2016-2).</li> <li>• Implemented NAPA Recommendation 4.2: Require Recipient use of U.S. Government Accountability Office (GAO) cost estimating and scheduling guides (LFM Section 4.2).</li> <li>• Conducted detailed analysis on use of management fee to address NAPA Recommendation 4.3: Elimination of management fee.</li> </ul>

<p><i>those for which they were provided, or potential cost overruns.</i></p>	<ul style="list-style-type: none"> <li>• Implemented contract mechanisms to support independent cost estimate reviews (per GAO) for construction and operations.</li> <li>• Implemented contract mechanism for incurred cost, accounting system and estimating system audits.</li> <li>• Developed incurred cost submission tool for recipients specific to supporting incurred cost audits on cooperative agreements governed under the <i>Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards</i> (Uniform Guidance).</li> <li>• Completed DKIST budget and schedule contingency review.</li> <li>• Initiated Independent Cost Assessment (per GAO) of Antarctic Infrastructure Modernization for Science (AIMS) in support of the Preliminary Design Review planned for December 2016.</li> <li>• Completed NSF cost analysis of the Battelle estimate to complete NEON construction, including Independent Cost Estimate (per GAO).</li> <li>• Developed Corrective Action Plans (CAPs) for LSST and DKIST projects in response to OIG Alert Memos.</li> </ul>
	<p><b>NSF’s Anticipated Milestones:</b></p> <ul style="list-style-type: none"> <li>• Provide analysis of options on use of management fee for NSF Leadership consideration in setting Foundation policy on management fee going forward.</li> <li>• Develop and implement new SOG for selection of appropriate independent cost estimate review in accordance with the GAO <i>Cost Estimating and Assessment Guide</i>.</li> </ul>
<p style="text-align: center;"><b>CHALLENGE: Management of NSF’s Business Operations</b> <span style="float: right;"><b>LEAD: MICHAEL WETKLOW, DIVISION DIRECTOR (BFA/DFM)</b></span></p> <p style="text-align: center;"><b>Improper Payments</b></p> <p><b>NSF Management Overview:</b> In June 2015, the NSF OIG issued an audit report that found NSF non-compliant with the Improper Payments Elimination and Recovery Act (IPERA) for FY 2014. The OIG specified that NSF did not address all of the required OMB Circular A-123 Appendix C improper payment risk factors and that the quantitative portions of the risk assessment did not maintain statistical validity. The OIG recommended that NSF conduct a statistically valid sampling process in order to estimate an improper payments rate. NSF did not believe it was non-compliant with IPERA for FY 2014; nor did NSF agree to conduct additional IPERA statistical sampling. However, NSF did consider the results of the OIG report carefully and performed additional IPERA risk assessment work in FY 2015. Additionally, NSF conducted a series of meetings with the OIG and OMB in order to reach consensus with the OIG on NSF’s efforts to insure compliance with IPERA.</p>	
<p><b>Improper Payments:</b></p> <p>a. i) <i>Develop an internal control process that provides reasonable assurance that payments are proper at the time they are made; and ii)</i></p>	<p><b>NSF’s Significant Milestones in FY 2016</b></p> <ul style="list-style-type: none"> <li>• Completed a process improvement plan, during October 2015, in response to the OIG IPERA audit report.</li> <li>• Completed a qualitative improper payments risk assessment in December 2015 covering FY 2015.</li> <li>• Received OIG-issued inspection report in May 2016, based on its review of the FY 2015 risk assessment, concluding that NSF is compliant with IPERA reporting requirements for FY 2015.</li> </ul>

<p><i>Develop a sound process for assessing the agency's risk of improper payments.</i></p>	<ul style="list-style-type: none"> <li>• Considered all areas for improvement in NSF's IPERA risk assessment process that had been identified in the OIG inspection report.</li> <li>• Completed and submitted a CAP in July 2016 to address the audit findings from the OIG report. In August 2016, the OIG reviewed the CAP and found it responsive to their recommendations. All recommendations were resolved.</li> <li>• Completed a policy and procedure document in September 2016 for future IPERA risk assessments (pursuant to the CAP).</li> </ul> <p><b>NSF's Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>• Complete future IPERA risk assessments on a three-year cycle and report results in FY 2018.</li> <li>• Consider award financial monitoring testing results as an input for the qualitative IPERA risk assessment.</li> </ul>
<p style="text-align: center;"><b>CHALLENGE: Management of NSF's Business Operations Information &amp; IT Resources</b></p> <p style="text-align: right;"><b>LEAD: DOROTHY ARONSON, DIVISION DIRECTOR (OIRM/DIS)</b></p> <p><b>NSF Management Overview:</b> NSF is aware that the security posture of its information systems is of critical importance to NSF's ability to carry out its mission. The IT security program is evaluated yearly by an independent organization in accordance with the Federal Information Security Management Act (FISMA). NSF has been proactive in reviewing security controls and identifying areas to strengthen the program, including incorporation of information gained and lessons learned from the FISMA report. NSF ranks seventh out of the 24 CFO Act agencies in cybersecurity assessment scores in the most recent annual FISMA report to Congress.</p>	
<p><b>Information &amp; IT Resources</b></p> <p><i>b. i) Allocate appropriate resources to correct IT security weaknesses, particularly relating to the U.S. Antarctic Program (USAP) and provide increased assurances of adequate protection; ii) Develop and implement a robust information security continuous monitoring (ISCM) program that protects agency information and IT resources against increasing numbers of IT security threats.</i></p>	<p><b>NSF's Significant Milestones in FY 2016</b></p> <ul style="list-style-type: none"> <li>• US Antarctic Program (USAP)             <ul style="list-style-type: none"> <li>○ USAP continued to allocate appropriate resources to the IT security program to address information security weaknesses identified in the annual FISMA review.</li> <li>○ USAP improved the analysis of system scans to ensure configuration compliance and reviewed processes to ensure proper background investigations on all new hires.</li> <li>○ NSF's Division of Polar Programs established a phased approach to address an improved continuity of operations capability.</li> </ul> </li> <li>• Information Security Continuous Monitoring (ISCM)             <ul style="list-style-type: none"> <li>○ Initiated implementation of the Continuous Diagnostics and Mitigation (CDM) Phase 1. NSF will be the first federal agency to complete implementation of the CDM Phase 1 in Quarter 1 FY 2017.</li> </ul> </li> </ul> <p><b>NSF's Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>• USAP: Continue to address identified IT security weaknesses through program funding.</li> <li>• ISCM: Utilize CDM Phase 1 products and services (focusing on tools implementation) to improve its automated continuous monitoring capability.</li> </ul>

**CHALLENGE: Management of NSF’s Business Operations  
Transparency & Accountability**

**LEAD: JOSÉ MUÑOZ, SENIOR ACCOUNTABLE OFFICIAL (O/D)**

**NSF Management Overview:** NSF is well-positioned to successfully implement the Digital Accountability and Transparency (DATA) Act. The DATA Act is a government-wide initiative led by OMB and the U.S. Department of Treasury (Treasury) to standardize and publish the federal government’s wide variety of reports and data compilations related to spending: financial management, payments, budget actions, procurement, and assistance. NSF senior agency officials were aware of the Act even prior to its enactment in April 2014. When the legislation passed, NSF moved immediately to leverage its resources to prepare for implementation. In October 2014, NSF designated a senior official in its Office of the Director (O/D) to serve as the agency’s DATA Act Senior Accountable Official (SAO). The SAO identified subject matter experts in BFA and the Office of Information and Resource Management (OIRM) for implementation support and the group formed an internal governance structure that included an executive-level steering committee, a DATA Act Working Group (DAWG) and a DATA Act Project Management Office (PMO). Additionally, NSF engaged its OIG to facilitate collaboration around stewardship and in recognition of the OIG requirement to publish a DATA Act readiness review by November 2016, and OIG staff have regularly attended DAWG meetings.

Government-wide, NSF staff have represented the agency in connection with DATA Act-related activities, including the Financial Assistance Committee for E-government (FACE); the Data Standards Working Group, a volunteer subgroup of the FACE charged with performing analyses and making recommendations on issues of government-wide data standardization; the Procurement Committee for E-government; and numerous additional DATA Act-related workshops, meetings and small-group strategy sessions with OMB, Treasury, and other CFO Act agencies. These collaborations have been key to NSF’s DATA Act implementation success.

NSF’s DATA Act implementation has adhered to applicable DATA Act guidance issued by OMB and Treasury. In particular, implementation at NSF is guided by the government-wide DATA Act Implementation Playbook Version 2.0 that tracks the 8-Step Implementation Approach with implementation status reported via the associated OMB/Treasury Dashboard. NSF uses a phased iterative approach to update current processes for reporting procurement and financial assistance information to USASpending.gov using the Award Submission Portal (ASP), and has instituted new processes to produce and upload required account-level budget, spending, and award information. NSF leverages government-wide solutions and resources that are made available for implementation.

NSF is actively taking steps to mitigate risks or challenges and is employing multiple approaches to ensure on time compliance. No major system changes have been identified in order for NSF to meet the deadline. Going forward, to ensure adequate resources are available for a successful and on time implementation, the DAWG will continue to foster strong internal, executive-level and government-wide communication. NSF will also continue to communicate its challenges and needs to OMB and Treasury.

**DATA Act**  
c. *Foster greater transparency over NSF spending through successful implementation of the Digital Accountability and Transparency Act (DATA Act) despite evolving federal*

**NSF’s Significant Milestones in FY 2016**

- Performed inventory of agency data and associated business processes.
- Participated in government-wide effort to implement OMB Circular A-11 DATA Act requirements and successfully submitted NSF A-11 test files to the OMB MAX system.
- Participated in “sandbox” testing to test Treasury’s DATA Act Broker, the tool it developed to check validity of federal agencies’ uploaded files and provides ability for agencies to certify their data.
- Revised future state of NSF’s daily, bi-monthly and quarterly reporting based on the Broker specifications and final technical guidance DATA Act Information Model Version 1.0 (DAIMS v1.0) released April 29, 2016.

<p><i>requirements, the lack of adequate available agency FTE, and a lack of a clear source of funding to make the necessary NSF system and process changes.</i></p>	<ul style="list-style-type: none"> <li>• Submitted to OMB/Treasury NSF’s update to the agency’s August 28, 2015 DATA Act Implementation Plan to show progress to date, incorporated additional guidance provided by OMB/Treasury, and provided revised cost and timeline estimates. Also submitted implementation plan updates to other governmental entities, e.g. Congress, OIG.</li> <li>• Implemented data extract changes in iTRAK, NSF’s financial accounting system, as well as in NSF business applications.</li> <li>• Developed a back-up approach to meeting DATA Act deadline to mitigate the risk of Oracle patches not being delivered in enough time for testing and implementation.</li> <li>• Participated in DATA Act Broker beta testing.</li> </ul>
	<p><b>NSF’s Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>• Generate and test Award Submission Portal (ASP) data file per Treasury’s new specifications.</li> <li>• Comply with ASP submission requirements to USASpending.gov.</li> <li>• Make changes to eJacket and iTRAK to accommodate the change in budget object class from 410100 (Personnel Mobility Program) to 118500 (IPA Salary and Fringe Benefits).</li> <li>• Implement Oracle patch for award attributes (first of five anticipated patches) and modify award system interfaces with iTRAK to populate the following attributes: Procurement Instrument Identifier (PIID), Parent Award Identifier (PAID), Federal Award Identification Number (FAIN), and Unique Record Identifier (URI).</li> <li>• Upload financial assistance and procurement files to populate the award attributes in iTRAK.</li> <li>• Implement remaining Oracle patches and generate the files that will be required to submit to the Broker for subsequent public reporting of financial data [these files are: file A (Appropriations Account Data), B (Object Class and Program Activity Data) and C (Award Financial Data)].</li> <li>• Generate files A, B, and C using the implemented Oracle patches.</li> <li>• Perform Broker testing by uploading agency generated files A, B, and C.</li> <li>• Perform Broker testing by extracting data for files D1 (Award and Awardee Attributes for Procurement), D2 (Award and Awardee Attributes for Financial Assistance), E (Additional Awardee Attributes), and F (Sub-award Attributes).</li> <li>• Perform Broker testing in order to validate files A through F to facilitate certification of NSF’s data.</li> <li>• Implement the back-up approach, as needed, to generate files A, B, C, and reconciliation reports to mitigate the risk of not having the Oracle patches ready for the DATA Act compliance by May 2017.</li> <li>• Achieve compliance with May 2017 DATA Act implementation deadline.</li> </ul>

**CHALLENGE: Management of NSF’s Business Operations  
Government Records**

**LEAD: WONZIE GARDNER, DIVISION DIRECTOR (OIRM/DAS)**

**NSF Management Overview:** In 2012, OMB and the National Archives and Records Administration (NARA) issued a directive, OMB Memorandum (M) 12-18, “Managing Government Records,” consistent with a 2011 Presidential Memorandum, requiring federal agencies to reform the policies and practices for the management of records and provide a framework for the management of electronic records. GAO subsequently issued Report 15-339, dated May 14, 2015, titled, “Information Management: Additional Actions Are Needed to Meet Requirements of the Managing Government Records Directive.”

NSF formulated a CAP in response to the GAO report and is on schedule to meet all the planned actions enumerated in the CAP.

**Government Records**

*d. Respond to GAO’s recommendations related to NSF’s records management policies and practices, and comply with the National Archives and Records Administration’s (NARA) 2012 directive to take specific reform actions by appointed dates.*

**NSF’s Significant Milestones in FY 2016**

- Submitted a CAP in November 2015 in response to the GAO Report 15-339, “Information Management: Additional Actions Are Needed to Meet Requirements of the Managing Government Records Directive.”
- Deployed the eRecords Awards Archival System in February 2016 for the documentation and management of permanent electronic grant records. Because grant records are one of the most critical types of agency records, this activity will constitute a significant component of NSF’s plan for achieving full compliance with OMB M-12-18.

**NSF’s Anticipated Milestones**

- Formalize plans to manage other types of electronic records and make progress towards identifying the necessary revisions to current records management policy, technology requirements, and potential solutions.
- Ensure execution of the comprehensive plan and implementation strategy managing permanent records electronically.
- Formalize NSF plans to implement the Capstone approach, a government-wide approach for managing permanent and temporary e-mail records in an electronic format. OIRM will identify any necessary revisions to current records management policy; assess technology requirements and potential solutions; and develop the implementation strategy that will ensure NSF meets the December 31, 2016 deadline identified in OMB M-12-18.

**CHALLENGE: Management of the IPA Program**

**LEAD: GERRI RATLIFF, DEPUTY DIVISION DIRECTOR (OIRM/HRM)**

**NSF Management Overview:** NSF provides the opportunity for scientists, engineers, and educators to rotate into the Foundation as temporary Program Directors, advisors, and leaders. Rotators bring fresh perspectives from across the country and across all fields of science and engineering supported by the Foundation, helping influence new directions for research in science, engineering, and education, including emerging interdisciplinary fields. Because NSF supports fundamental research at the frontiers of science and engineering, NSF relies on the synergy of federal employees and temporary staff for a constant infusion of new knowledge into the broad understanding of science, and a continuously improving structure of systematic and rigorous merit review.

In April 2016, NSF Director France A. Córdoba announced the establishment of a Steering Committee for Policy and Oversight of the IPA Program (IPA Steering Committee). The Steering Committee serves as the primary body for considering policy on NSF’s use of IPAs and oversees common approaches to budgeting and implementation of the IPA program.

<p>a. <i>Examine the costs associated with NSF’s rotator programs to ensure that federal funds entrusted to the agency are being spent effectively and efficiently.</i></p>	<p><b>NSF’s Significant Milestones in FY 2016</b></p> <ul style="list-style-type: none"> <li>• Established IPA Steering Committee (detailed description set forth under section b).</li> <li>• Submitted Steering Committee reports to Director Córdoba in August 2016, which, among other things:             <ul style="list-style-type: none"> <li>○ Summarized the Steering Committee’s analysis of costs related to salaries, benefits (including relocation benefits), and individual research and development (IR/D) travel and benchmarking with other federal science agencies;</li> <li>○ Recommended the development of an integrated agency-wide workforce framework to ensure that NSF maintains the optimal balance of federal employees and IPAs;</li> <li>○ Identified strategic cost saving areas requiring additional stakeholder consultation, including institutional cost sharing; and</li> <li>○ Identified strategic cost saving areas that could be examined concurrently with the development of an agency-wide framework.</li> </ul> </li> <li>• Documented plans for the IPA Steering Committee to serve as the lead to carry out NSF’s commitment to review the overall IPA program and associated costs and benefits every four years and assess the impacts of actions taken to reduce IPA costs. This review and assessment is part of NSF’s corrective action plan that responds to the OIG’s Cost of IPAs audit.</li> </ul> <p><b>NSF’s Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>• Complete, via IPA Steering Committee task groups, a plan to establish an agency-wide workforce framework and recommendations for the potential use of new or additional hiring authorities in support of that framework.</li> <li>• Ensure IR/D guidance (planned for implementation in FY 2017) supports the goal of combining IR/D with telework, where appropriate, to maximize the use of travel funds.</li> <li>• Implement approved changes to NSF’s policies for the reimbursement of IPA costs.</li> </ul>
<p>b. <i>Establish and maintain strong oversight of NSF’s Intergovernmental Personnel Act (IPA) program in order to provide continuity for programmatic leadership despite frequent turnover in executive positions, to manage potential conflicts of interest in funding decisions, to promote transparency in funding decisions, and to ensure that IPAs and</i></p>	<p><b>NSF’s Significant Milestones in FY 2016</b></p> <ul style="list-style-type: none"> <li>• Established IPA Steering Committee with specific responsibilities to include championing the effective use of IPAs and the importance of addressing management risks; reviewing policies concerning IPA assignees, policies impacting IPA assignees, and policies where the use of IPAs may impact the implementation of those policies; reviewing data on IPAs to inform the Committee’s oversight duties; coordinating the development of an NSF-wide budget for the IPA program; and providing guidance on methods for managing to the overall budget while ensuring a diverse, high quality cadre of IPAs.             <ul style="list-style-type: none"> <li>○ As of September 30, 2016, the IPA Steering Committee met nine times and submitted one initial and two revised reports on managing IPA costs and developing an integrated workforce framework to Director Córdoba.</li> <li>○ The IPA Steering Committee developed strategic principles for management of the IPA program: community engagement, partnership, creativity, transparency, accountability, intentional balance in the workforce structure, and commitment to ongoing improvement.</li> </ul> </li> <li>• Continued identification and management of conflicts of interest related to IPAs:             <ul style="list-style-type: none"> <li>○ Communicate standards of conduct – IPAs are subject to the same ethics rules as everyone else who works at NSF:                 <ul style="list-style-type: none"> <li>▪ Standards of conduct are communicated in the IPA agreement.</li> </ul> </li> </ul> </li> </ul>

<p><i>other rotators comply with federal laws after they leave NSF.</i></p>	<ul style="list-style-type: none"> <li>▪ New employees, including IPAs, attend new employee orientation and are briefed on the ethical obligations of Federal service.</li> <li>▪ IPAs file a financial disclosure report: all financial disclosure report filers, including IPAs, receive annual Conflict of Interest (COI) training. After filing a financial disclosure report, filers including IPAs receive a written reminder of the COI rules.</li> <li>○ Track conflicts – Each COI official tracks conflicts in writing or through eJacket.</li> <li>○ Ensure continued compliance with Federal laws after leaving NSF:             <ul style="list-style-type: none"> <li>▪ Employees, including IPAs, who are at or above the GS-12 salary level or equivalent, are required to attend a COI exit briefing by the Office of the General Counsel (OGC) Ethics Team explaining the post-employment ethics rules.</li> <li>▪ Former employees, including former IPAs, are encouraged to contact the Ethics Team even after they leave.</li> </ul> </li> <li>• Developed and piloted a one-day course, “Oversight of Merit Review for Division Leaders,” to provide NSF Division Leaders, including IPAs, mission-critical information on their role in providing oversight of the NSF Merit Review process. Topics include: Overview of the Proposal &amp; Award Process, Key Roles and Responsibilities in Merit Review, Role of Division Leadership in Ensuring Fairness of Review, How Program Officers Make Recommendations, The Review Analysis, and Understanding Recommendation Logistics and Award Abstracts.</li> </ul> <p><b>NSF’s Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>• The IPA Steering Committee will:             <ul style="list-style-type: none"> <li>○ Review and update core policies relating to IPAs, as found in the NSF Personnel Manual, as needed;</li> <li>○ Establish a framework for and review data on IPAs for oversight of management of the program;</li> <li>○ Coordinate the development of an NSF-wide budget for the IPA program as part of the annual budget cycle; and</li> <li>○ Ensure that periodic data is provided to the directorates and offices on the completion of mandatory training and status of performance plans and appraisals.</li> </ul> </li> </ul>
<p><b>CHALLENGE: Moving NSF Headquarters to a New Building</b>      <b>LEAD: BRIAN MACDONALD, SENIOR RELOCATION PROJECT OFFICER (OIRM/OAD)</b></p> <p><b>NSF Management Overview:</b> NSF is well-positioned to begin occupying its new location in Alexandria, Virginia by August 2017. The NSF Relocation Office (NRO) is leading this effort and is charged with ensuring a successful outcome to NSF’s expiring lease effort through the delivery of a next-generation NSF headquarters facility. NRO’s mission is accomplished through input of the entire NSF staff through Directorate liaisons, the American Federation of Government Employees (AFGE) Union-Local 3403, the agency Relocation Executive Advisory Group (REAG), the General Services Administration (GSA) and other stakeholders to the project.</p> <p>Through demonstrated leadership and disciplined project management, NRO has made significant progress in key areas to ensure project success and to mitigate risks relating to scheduling delays, union negotiations and records management. NRO has also taken concrete steps to align the project’s budget with its estimated cost.</p> <p>The groundbreaking for the new NSF Headquarters was January 2014, construction on the interior space began in April 2016 and work will finish by August 2017. The new building will prominently reflect NSF’s role nationally and internationally in the science and engineering community.</p>	

<p>a. <i>Mitigate the risk of continued project delays associated with a revised relocation schedule that includes little slack time and two phases of union negotiations that still need to be completed.</i></p>	<p><b>NSF’s Significant Milestones in FY 2016</b></p> <ul style="list-style-type: none"> <li>• Working with GSA, settled the owner’s delay claim from \$60 million down to \$14.5 million and reset the project schedule.</li> <li>• Finalized all design documents in accordance with the revised project schedule and without delay.</li> <li>• Along with GSA, awarded a \$70 million contract for tenant improvement construction.</li> <li>• Brought on a full-time, professional project scheduler who developed an Integrated Project Schedule that identifies the project’s critical path, assigns responsibility, and forms the basis for tracking progress.</li> <li>• Ensured all procurements were awarded in accordance with the Integrated Project Schedule, including information technology, furniture, security, and audio-visual contracts.</li> <li>• Managed FY 2016 relocation-related procurement activities; ensured that the FY 2016 and FY 2017 procurement and budget schedules supported and aligned with the projected relocation timeline.</li> <li>• Added two project managers with office relocation experience to the NRO team.</li> <li>• Hired a professional cost estimating and construction quality management firm to prepare detailed costs estimates for major submittals and requested change orders.</li> <li>• Completed Phase 2 negotiations with AFGE Local 3403 without negatively impacting the project schedule.</li> <li>• Started employee workspace selections in accordance with the Phase 2 union agreement and Integrated Project Schedule.</li> <li>• Briefed senior leadership on value-engineering options, and drove decisions that control costs and provide a functional headquarters that helps NSF meet its mission.</li> </ul>
	<p><b>NSF’s Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>• Further develop the Integrated Project Schedule and continue to meet regularly with OIRM leadership to manage the project, monitor progress, mitigate risks, and allocate resources.</li> <li>• Maintain bi-weekly procurement meetings with DACS to ensure all procurements are made without negatively impacting the project schedule.</li> <li>• Complete the third phase of negotiations with AFGE Local 3403 without delaying the project schedule.</li> <li>• Finalize employee workspace selections and order all furniture, fixtures, and equipment according to the project schedule.</li> </ul>
<p>b. <i>Plan for and manage the logistics of the actual move to the new headquarters building,</i></p>	<p><b>NSF’s Significant Milestones in FY 2016</b></p> <ul style="list-style-type: none"> <li>• Determined the strategy to move employees into the new building in accordance with the project schedule. Communicated plan with senior leadership, AFGE, and directorates.</li> </ul>

<p><i>including addressing the lack of a detailed master schedule, having to negotiate with the union on furniture and space issues, fewer opportunities for design review, less storage space, lack of a records schedule for destruction of documents and lack of a responsible project person with direct access to the Director.</i></p>	<ul style="list-style-type: none"> <li>• Engaged OIRM essential senior staff to centralize relocation planning and identify potential move-related cost-impacts.</li> <li>• Determined phasing for the move based on current and new building constraints and other major move assumptions associated with IT, furniture, elevator, dock availability, etc.</li> <li>• Hired two full-time contractors to gather and analyze key data impacting the move plan, as well as develop two relocation sequence options for leadership’s consideration.</li> <li>• Announced to NSF staff the move sequence to Alexandria.</li> </ul> <p><b>NSF’s Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>• Key activities leading up to August 2017 relocation:             <ul style="list-style-type: none"> <li>○ Develop detailed relocation plan.</li> <li>○ Determine furniture for reuse and associated migration plan.</li> <li>○ Develop furniture, fixtures and equipment decommissioning strategy.</li> <li>○ Develop welcome guide/employee orientation requirements.</li> <li>○ Establish new building protocols and policies.</li> <li>○ Establish move communication program for end users.</li> <li>○ Develop migration plan for division equipment.</li> <li>○ Decommission existing facilities.</li> </ul> </li> </ul>
<p><b>CHALLENGE: Management of the U.S. Antarctic Program</b> <span style="float: right;"><b>LEAD: KELLY K. FALKNER, DIVISION DIRECTOR (GEO/PLR)</b></span></p> <p><b>NSF Management Overview:</b> Through the Division of Polar Programs (PLR) in the Directorate for Geosciences, NSF funds and manages the U.S. Antarctic Program (USAP), which supports United States’ research and national policy goals in the Antarctic. Given the remote location, extreme environment, and the short period of time during which the continent is accessible, significant challenges exist for ensuring the availability of necessary logistics, operations, and science support. There are also unique and internationally-linked environmental, health, and safety issues present at the remote location. In exercising its management responsibilities, NSF relies on internal staff with the requisite expertise as well as a network of contracted support and federal agency partners. Periodically, the program is reviewed by external panels of experts.</p>	
<p>a. <i>Establish and maintain a world-class scientific research program in Antarctica’s remote and harsh environment.</i></p>	<p><b>NSF’s Significant Milestones in FY 2016</b></p> <ul style="list-style-type: none"> <li>• Continued progress on the 2012 Blue Ribbon Panel (BRP) recommendations, including investment in prioritized lifecycle acquisitions and infrastructure upgrades.</li> <li>• Addressed major infrastructure upgrades recommended by the BRP report for McMurdo Station through continued design efforts:             <ul style="list-style-type: none"> <li>○ Continued designs of Core Facility and Utilities packages in preparation for the Antarctic Infrastructure Modernization for Science (AIMS) project MREFC Preliminary Design Review (PDR).</li> <li>○ Initiated design efforts using NSF Research and Related Activities (R&amp;RA) funds for upgrades to McMurdo lodging, Vehicle Equipment/Operations Center, Information Technology &amp; Communications (IT&amp;C) Primary Operations Center, and Palmer Pier replacement.</li> </ul> </li> </ul>

	<p><b>NSF’s Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>• Complete necessary planning/design efforts for individual Antarctic Infrastructure Modernization for Science (AIMS) components.</li> <li>• Complete designs for Palmer Pier, lodging, and IT&amp;C Primary Operations Center.</li> <li>• Prepare for AIMS External Panel Review.</li> <li>• Complete planning/design for the Ross Island Earth Station (RIES).</li> </ul>
<p>b. <i>Control the cost of the USAP and ensure adequate oversight of payments to the USAP contractor.</i></p>	<p><b>NSF’s Significant Milestones in FY 2016</b></p> <ul style="list-style-type: none"> <li>• Continued to review and approve and/or adjust, as warranted, invoices to the USAP contractor. Prior to approval, invoice review is done by staff whose primary responsibility is review and resolution of invoiced amounts with the contracting officer and contracting officer’s representative, a documented process initiated in FY 2013.</li> </ul> <p><b>NSF’s Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>• Continue to monitor invoices from the USAP contractor in accordance with established procedures.</li> </ul>
<p>c. <i>Ensure the overall health and safety of all USAP participants.</i></p>	<p><b>NSF’s Significant Milestones in FY 2016</b></p> <ul style="list-style-type: none"> <li>• <u>Pharmacy System</u>: Instituted internal controls to address OIG concerns related to potential drug allergies and interactions and provided assistance in getting information on prescribed drugs. A pharmacy technician was deployed to McMurdo Station during the 2015/16 operating season to review the current state of the pharmacy and its management. The pharmacy system was revitalized and repairs were made to the database that is currently in use.</li> <li>• <u>Law Enforcement</u>: Achieved full compliance of NSF’s law enforcement program with all U.S. Marshals Service requirements for certification and training, and recommendations for law enforcement tools made by the Service.</li> <li>• <u>Breathalyzer Unit Calibration</u>: Procured breathalyzer units that do not require calibration. These units provide redundancy for the existing breathalyzer inventory.</li> </ul> <p><b>NSF’s Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>• <u>Code of Conduct</u>: Finalize a process for receiving and reviewing Code of Conduct violations.</li> <li>• <u>Pharmacy System</u>: Identify a suitable system responsive to NSF’s contractor’s proposal to procure a new pharmacy system.</li> <li>• <u>Law Enforcement</u>: Plan for a 2016/17 site visit to Antarctica, resources and schedules permitting. PLR has had internal conversations with OGC and will reach out to law enforcement organization contacts shortly. Post-site visit, expect to identify any desired changes and target implementation for the following season.</li> </ul>

	<ul style="list-style-type: none"> <li>• <u>Breathalyzer Testing Requirements</u>: Continue to explore the advisability and feasibility of the OIG-recommended requirement for breathalyzer testing for all USAP participants. Consultations with the Department of Justice on policy and legal concerns are planned for FY 2016/17.</li> </ul>
<p><b>CHALLENGE: Improving Grant Administration</b> <span style="float: right;"><b>LEAD: ERIKA RISSI, DEPUTY DIVISION DIRECTOR (BFA/DIAS)</b></span></p>	
<p><b>NSF Management Overview:</b> As of June 30, 2016, the NSF award portfolio consisted of 42,206 active awards, representing \$28.2 billion in obligated funds to 2,873 unique awardees. NSF accountability efforts span six award stages (proposal submission, merit review, pre-award financial review, post-award monitoring, award closeout, and audit follow-up) to ensure financial capability and accomplishment, non-financial administrative and programmatic compliance, and research performance. The foundation of NSF’s accountability efforts is its suite of policy and procedural documents that incorporate federal regulations, legislative mandates, and Agency-specific requirements; the translation of policies and procedures into business rules that are enforced through NSF’s information technology systems; and a risk-based approach to financial and administrative monitoring. Baseline monitoring activities, which are conducted on most awards through standard, recurring, and automated processes, focus on post-award administration and financial transactions in order to identify exceptions and potential issues that may require further scrutiny through advanced monitoring. The baseline monitoring efforts of DFM can reveal potential financial anomalies, inaccurate expenditure reporting, or evidence of a possible misunderstanding of, or non-compliance with, federal cash management requirements and/or NSF guidelines. During FY 2016, NSF and the OIG agreed to expand the scope of their formal dialogue across activities that now span external audit resolution, large facilities, contracts, financial statement audit issues, as well as internal and performance audits. NSF continues to expand and upgrade mechanisms for communicating policies, procedures, and business practices within this dynamic environment to its staff and external stakeholder communities. In FY 2017, NSF will restructure its Cost Analysis and Audit Resolution Branch into two separate organizations (pre-award, post-award) to strengthen effectiveness of grants oversight to meet the growing need for deeper subject matter expertise, improved resource utilization, and strategic planning.</p>	
<p>a. <i>Implement controls over spending of grant funds that ensure transparency and accountability without creating undue administrative impacts on awardees and federal program officers.</i></p>	<p><b>NSF’s Significant Milestones in FY 2016</b></p> <ul style="list-style-type: none"> <li>• Coordinated inter-agency development and clearance of Research Terms &amp; Conditions, which implement the Uniform Guidance issued by OMB. This effort creates greater consistency in the administration of Federal research awards and reduces awardee administrative burden by having one standardized set of terms and conditions to comply with, instead of disparate sets from each research agency. This also allows the Federal research agencies to manage awards in a similar fashion.</li> <li>• Expanded integration of NSF’s new financial and awardee payment process systems to further data transparency and decision-making, as well as to provide real-time cash transaction and funds control capabilities.</li> <li>• Implemented baseline award monitoring of financial transactions to assess allowable costs associated with grant payments, utilizing statistically-based testing and NSF Risk Assessment results as stratification criteria to ensure coverage across the grant portfolio. This process improved transparency and accountability by enabling DFM to use a statistically based sample size that resulted in requiring fewer test samples, which subsequently reduced the burden on those grantees who must provide documentation to support the payments being tested.</li> <li>• Initiated the development of a new baseline monitoring activity for financial transactions to review grants with high unliquidated balances and short remaining grant periods, which will be used to develop new baseline monitoring metrics.</li> <li>• Converted Small Business Innovation Research (SBIR) Phase I grants (with start dates as of July 1, 2016) and SBIR Phase II grants (with start dates as of August 1, 2016) to the Award Cash Management Service (ACMS) to minimize manual processing and</li> </ul>

	<p>leverage ACM\$ funds control capabilities, which will allow for improved transactional accuracy due to automating the process and for quicker, more expeditious processing of SBIR drawdowns for grantees.</p> <ul style="list-style-type: none"> <li>• Implemented use of the Federal Awardee Performance and Integrity Information System to ensure transparency and accountability of performance in federal assistance awards.</li> <li>• Continued to strengthen working relationships among NSF program officers, NSF grants and oversight officials, and the NSF OIG to address significant issues related to allowability, allocability, and reasonableness of funds expended in the conduct of research.</li> </ul>
	<p><b>NSF’s Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>• Refine, as necessary, and conduct FY 2017 baseline award monitoring of financial transactions across NSF’s grant portfolio; explore feasibility of strengthening integration of baseline and advanced monitoring activities; initiate baseline monitoring review of grants with little or no financial activity.</li> <li>• Continue to implement legislative requirements: (1) standardization and publishing of reports and data on federal spending under the DATA Act and (2) reporting NSF information on undispersed balances in grant awards expired more than two years under the Grant Oversight and New Efficiency (GONE) Act.</li> </ul>
<p>b. <i>Due to federal streamlining of written guidance for administering grants, ensure provision of consistent guidance that does not contradict previous responses or written policies.</i></p>	<p><b>NSF’s Significant Milestones in FY 2016</b></p> <ul style="list-style-type: none"> <li>• Ensured continued alignment of advanced monitoring efforts with <i>OMB Uniform Guidance (UG)</i>, as well as that of external websites, fact sheets, and other information provided to NSF awardees.</li> <li>• Provided training to NSF program staff on major revisions to the <i>Proposal &amp; Award Policies &amp; Procedures Guide (PAPPG)</i>, <i>Proposal &amp; Award Manual (PAM)</i>, and NSF grant conditions. To reach a broader audience, training was provided both in-person as well as with an increased virtual presence.</li> <li>• Increased in-person training and outreach at conferences and workshops sponsored by research administration professional societies allowing for more effective, real-time interaction with the community; and continued virtual training opportunities such as the webcast of the NSF Grant Conference, which allowed for on-demand viewing of sessions covering proposal preparation, merit review, award management, the CAREER program, as well as updates to NSF policies and procedures.</li> <li>• Expanded automated Proposal Compliance Validation (PCV) checks by ensuring that proposals submitted to NSF comply with requirements specified in the FY 2016 <i>Proposal &amp; Award Policies &amp; Procedures Guide</i> (Chapter II.C.2 of the GPG). The new system enhancements check the following requirements and may trigger either an error or warning message depending on the funding opportunity type:             <ul style="list-style-type: none"> <li>○ Proposals must be received by 5 p.m. submitter’s local time on the established deadline date.</li> <li>○ Biographical Sketch(es) and Current and Pending Support files are required for each Senior Personnel associated with a proposal.</li> <li>○ Biographical Sketch(es) can only be uploaded as a file, must not exceed two pages, and can no longer be entered as text.</li> </ul> </li> </ul>

	<p>The goal of automated compliance checking is to reduce the administrative burden on the research community and NSF staff while ensuring fair and consistent treatment of submitted proposals. So far, 95% of proposals submitted via FastLane have been checked by PCV and submitted successfully to NSF in FY 2016. (Note: Special Post Docs, Award Supplements, and PI-Transfers are not included in PCV at this time.)</p> <p><b>NSF’s Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>• Continue to review internal guidance and procedures, and more aggressively use advanced monitoring and other outreach opportunities for NSF awardees to emphasize the importance of aligning their policies and procedures with the <i>UG</i>.</li> <li>• Consolidate the external-facing <i>PAPPG</i> from a two-volume document comprising the <i>Grant Proposal Guide</i> and the <i>Award Administration Guide</i> into one concise document covering all NSF policies and procedures from pre-award through post-award and closeout.</li> <li>• Consolidate the internal-facing <i>PAM</i> to provide NSF staff links to the <i>PAPPG</i> and <i>OMB Uniform Guidance</i>, providing access to a single, definitive source for federal policies and procedures.</li> <li>• Continue to brief the research community and NSF staff on upcoming changes to NSF policy documents via in-person and virtual settings to maximize opportunities for dialogue and clarification, as well as on-demand reference information.</li> <li>• Continue to expand use of PCV to ensure fair and consistent application of business rules while decreasing administrative burden on researchers, research administrators, and NSF staff.</li> <li>• Continue multi-year project to upgrade NSF’s Awards System, further enhancing the Agency’s ability to enforce business rules consistently while streamlining internal processes.</li> </ul>
<p>c. <i>Due to OMB Uniform Guidance changes raising the Single Audit threshold from \$500,000 to \$750,000, take additional steps to oversee awardees that fall below the threshold.</i></p>	<p><b>NSF’s Significant Milestones in FY 2016</b></p> <ul style="list-style-type: none"> <li>• Rather than diverting resources to address efforts deemed of lower risk to the federal government, continued to use an internal analysis of risk across the NSF portfolio as a basis for focusing advanced monitoring on awardees receiving between \$2 million and \$15 million in NSF funds. Additionally, prior to implementing the <i>Uniform Guidance</i>, OMB and the Council on Financial Assistance Reform (COFAR), in which NSF played an instrumental role, assessed that increasing the single-audit threshold by \$250,000 (i.e., additional expenditures from <u>any</u> federal source) still allowed coverage of more than 99 percent of federal dollars awarded to more than 87 percent of federal grant recipients.</li> <li>• Continued to fully implement the <i>Uniform Guidance</i> and to review, as applicable, all records that awardees are required to maintain for review by federal agencies, pass-through entities, and the Government Accounting Office throughout a broad array of pre- and post-award oversight efforts, especially advanced and baseline award monitoring activities.</li> </ul>

	<p><b>NSF’s Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>Assess and, as needed, refine criteria (i.e., award-specific, institutional, prior monitoring activities and results, award administration and program feedback) used in the annual NSF Risk Assessment in order to identify those awardees managing the highest risk portfolio, and targeting those institutions for advanced monitoring activities.</li> </ul>
<p>d. <i>Due to OMB Uniform Guidance changes to documentation requirements for labor effort reporting, reinforce with awardees the need to design and implement controls to reduce the risk of improper charges to awards and to provide a means to ensure the controls are achieving their objective.</i></p>	<p><b>NSF’s Significant Milestones in FY 2016</b></p> <ul style="list-style-type: none"> <li>Compared <i>Uniform Guidance</i> with prior OMB guidance, noting three major changes related to labor effort reporting: (1) removed examples of acceptable methods for charging and documenting labor effort to federal awards; (2) removed “suitable means of verification” language; and (3) emphasized development and adherence to strong internal controls by awardees. While awardees may use budget data to estimate reasonable approximation of the activity <u>actually</u> performed, their systems of internal controls must include processes to review interim, estimated charges. NSF believes the <i>Uniform Guidance</i> requirements are essentially identical to those cited under the previous “Planned Confirmation Methodology.”</li> <li>Continued efforts to ensure that awardees comply with federal labor effort reporting requirements through feedback mechanisms resulting from oversight activities such as pre-award reviews, audit resolution, baseline and advanced monitoring, and post-award adjustment reviews.</li> </ul>
	<p><b>NSF’s Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>Modify written internal guidance for performance of NSF oversight activities regarding policies and procedures for labor effort charges by award recipients (i.e., update Standing Operating Guidance to fully align with the <i>Uniform Guidance</i>).</li> <li>Refine, as necessary, and implement FY 2017 baseline award monitoring for the entire grant portfolio.</li> </ul>
<p>e. <i>Due to Uniform Guidance changes in the audit resolution process, offset the 30-day shortened timeframe for NSF by establishing a new accelerated process for identifying and tracking reports requiring resolution.</i></p>	<p><b>NSF’s Significant Milestones in FY 2016</b></p> <ul style="list-style-type: none"> <li>Analyzed 1,799 audit reports resolved between FY 2009 and FY 2016, noting that the large majority of reports were resolved in a timely manner. NSF does not foresee that the <i>Uniform Guidance</i> change poses a significant challenge to compliance with timeliness of resolution.</li> <li>Augmented Cost Analysis and Audit Resolution (CAAR) staff by two Cost Analysts to mitigate effects of workload in other priority areas, to aid in timely resolution of complex OIG audits.</li> <li>Modified the audit resolution module within CAAR’s Monitoring and Tracking Database to track audit reports based on the date of their acceptance by the Federal Audit Clearinghouse (FAC) to set requisite six-month audit resolution target dates.</li> </ul>
	<p><b>NSF’s Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>Accept OIG transfer of responsibility for, and develop procedures for, identifying and tracking single-audit reports submitted to the FAC requiring NSF resolution thus reducing the number of days between FAC acceptance and completed resolution.</li> </ul>

	<ul style="list-style-type: none"> <li>• Continue to assess the effects of recent changes in policies/practices that have potential for impacting timeliness of audit resolution, including assumption of FAC drawdown responsibilities, increase of single-audit thresholds to \$750,000 in federal expenditures, risk management, and potential opportunities for process streamlining.</li> </ul>
<p><b>CHALLENGE: Encouraging the Ethical Conduct of Research LEADS: KELLINA HENDERSON-CRAIG, DEPUTY ASSISTANT DIRECTOR (SBE/OAD) WENDA BAUCHSPIES, PROGRAM DIRECTOR (SBE/SES)</b></p> <p><b>NSF Management Overview:</b> The responsible and ethical conduct of research is critical to ensure excellence, as well as public trust, in science and engineering. In accordance with Section 7009 of the America COMPETES Act (ACA) (42 U.S.C. §1862o–1) and recognizing the importance of ethical conduct of research, NSF requires that each institution submitting a proposal certify, under penalty of perjury, that it has a plan to provide appropriate training and oversight in the ethical conduct of research to all undergraduates, graduate students, and postdoctoral researchers who will be supported by NSF to conduct research. The plan must be available for review upon request and to ensure compliance, NSF includes, as a term and condition of its awards, that institutions are responsible for verifying that undergraduate students, graduate students, and postdoctoral researchers supported by NSF to conduct research have received training in the responsible and ethical conduct of research. NSF’s implementation of the Responsible Conduct of Research (RCR) requirement recognizes the breadth of research disciplines the Foundation funds, as well as the diversity of the educational levels of the individual researchers the agency supports, to ensure that the training will be effective and appropriately tailored. Specific training needs may vary depending on specific circumstances of research or the specific needs of students intending to pursue careers in basic or applied science after completing their education. Accordingly, it is the responsibility of each institution to determine both the content and the delivery method for the training that will meet the institution’s specific needs. Furthermore, each institution must decide if development of content or pedagogical method is required, or if appropriate content and training can be provided from some existing sources or capabilities, and take appropriate action to implement their decisions.</p> <p>NSF has taken concrete steps to enhance the awareness of ethical conduct of research issues by NSF staff, as well as the U.S. and international scientific research and education communities, by supporting the development of tools and resources to enhance the ability of research institutions to cultivate cultures of academic and research integrity. Most notably, the Online Ethics Center (OEC) provides resources, including an Ethics Education Library that institutions can use to deliver effective training that is tailored to meet the needs of their particular project. NSF’s program: Cultivating Cultures for Ethical STEM (CCE STEM) invests in innovative approaches to enhance research into ethical conduct of research issues that can build the capacity of institutions to develop appropriate ethical conduct of research plans as required by the America COMPETES Act. NSF is committed to heighten the U.S. and international STEM community’s awareness of these resources.</p>	
<p><i>Provide more oversight on institutional implementation of Responsible Conduct of Research (RCR) requirements and provide meaningful guidance regarding RCR training.</i></p>	<p><b>NSF’s Significant Milestones in FY 2016</b></p> <ul style="list-style-type: none"> <li>• Continued to support research that provides answers to questions about creating responsible research communities.</li> <li>• Continued to share state-of-the-art understanding of what approaches are most effective in outreach opportunities with NSF staff, and with U.S. and international scientific research and education communities.</li> <li>• Identified and developed funding mechanisms to support reproducible and reliable science.</li> <li>• Funded a major relaunch of the Online Ethics Center (OEC) website in February 2016, representing a significant expansion of resources and site functionality to include all of the sciences NSF supports. OEC is an NSF-funded initiative to serve those who promote learning and advance understanding of responsible research and practice in engineering and science. It provides online</li> </ul>

	<p>resources to engineers, scientists, faculty, and students to understand and address ethically significant issues that arise in scientific and engineering practice and from the developments of science and engineering.</p> <ul style="list-style-type: none"> <li>• Funded the workshop, “Enhancing Robust and Generalizable Experimental Behavioral Science” at Arizona State University. The goal of the workshop is to conduct a systematic analysis of disincentives undermining diversity and incentive structures supporting convenience and inertia over good science practices. An action plan will be developed for addressing and ameliorating these issues through more specific guidance for researchers.</li> <li>• Hosted an RCR workshop at NSF in April 2016 for NSF program officers and other community members. The workshop highlighted the impact of NSF’s policy on RCR training, along with best practices. Experts from federal agencies, the National Academies of Science, and universities discussed graduate and post-doc training, RCR challenges, RCR strategies, and RCR successes.</li> </ul>
	<p><b>NSF’s Anticipated Milestones</b></p> <ul style="list-style-type: none"> <li>• Continue to support and share research that provides answers to questions about creating responsible research communities, robust and reliable science, and best practices for ethical STEM.</li> <li>• Outcomes of the Arizona State University workshop will include structured guidance for addressing the well-documented sampling bias that will contribute to broadening the sampling protocols for experimental behavioral science research.</li> <li>• CCE-STEM program activities include funding a workshop on “Qualitative Research Ethics in the Big-Data”; an institutional transformation grant at the Georgia Institute of Technology titled, “The Role of Service Learning and Community Engagement on the Ethical Development of STEM Students and Campus Culture”; and five grants covering research projects in ethical maturity, ethical practice and responsible conduct of research in STEM.</li> <li>• Issue an NSF Dear Colleague Letter (DCL) emphasizing the importance of the responsible and ethical conduct of research, and highlighting the availability of NSF-funded tools and resources on which institutions can rely in developing their required RCR plans. The DCL will also showcase NSF-funded research and workshops in this area.</li> </ul>

## Freeze the Footprint

NSF is scheduled to move to new headquarters in Alexandria, Virginia starting in August 2017. GSA negotiated new leases for NSF’s current primary office spaces, Stafford Place I and II, to allow time for the new NSF headquarters to be built and made ready for occupancy. Because NSF will be moving to a new facility, the agency cannot make any major investments in the current headquarters space to renovate and create new and more flexible work spaces to accommodate demands for staff growth and meeting spaces, as there would not be enough time to realize a return on the investment. NSF will continue to work with its facilities team to ensure maximum utilization of the current space available. Additionally, the new lease rates in Alexandria will be lower than the current lease rates in Stafford Place I and II.

NSF has dedicated a significant effort to planning for its new headquarters, which will take the agency 15 years into the future. This forward-looking effort is incorporating the most creative thinking in terms of flexible workspaces, functionally-based office and workspace standards, virtual technologies, cloud computing, and alternate work styles that will allow the agency to increase in staff numbers but not in real estate footprint.

**Table 3.10 - Freeze the Footprint: Baseline Comparison**

Square Footage	FY 2012 Baseline	2015	Change (FY 2012 2015)
NSF Occupancy Agreements	581,455	597,354	15,899
Grantee Assets	611,089	663,238	52,149
<b>Total</b>	<b>1,192,544</b>	<b>1,260,592</b>	<b>68,048</b>

## Awards to Affiliated Institutions

The following chart lists institutions affiliated with members of the National Science Board (NSB) in FY 2016.

Affiliated Institution <sup>1</sup>	Awards Obligated in FY 2016 (Dollars in thousands)
American Association for the Advancement of Science	\$ 704
Arizona State University	63,138
California Institute of Technology	73,535
Cornell University	100,267
Georgetown University	6,611
Georgia Institute of Technology	70,049
Illinois Institute of Technology	5,693
Massachusetts Institute of Technology	68,293
Princeton University	17,446
Purdue University	68,903
Stanford University	42,284
Tufts University	13,177
University of California – Berkeley	117,118
University of Chicago	13,741
University of Colorado	50,968
University of Michigan	93,864
University of Oregon	18,872
Washington University	23,611
<b>TOTAL</b>	<b>\$ 848,274</b>

<sup>1</sup> This table is provided solely in the interest of openness and transparency. NSB establishes the policies of NSF within the framework of applicable national policies set forth by the President and Congress. Federal conflict of interest rules prohibit NSB members from participating in matters where they have a conflict of interest or there is an impartiality concern without prior authorization from the designated agency Ethics Official. Individual NSF grant awards are made pursuant to a peer-review based process and most are not reviewed by the NSB. With regard to matters that are brought to the Board, NSB members are not involved in the review or approval of grant awards to their affiliated institutions.

## **Patents and Inventions Resulting From NSF Support**

The following information about inventions is being reported in compliance with Section 3(f) of the National Science Foundation Act of 1950, as amended [42 U.S.C. 1862(f)]. There were 1,403 NSF invention disclosures reported to NSF either directly or through the National Institutes of Health's iEdison database during FY 2016. Rights to these inventions were allocated in accordance with Chapter 18 of Title 35 of the United States Code, commonly called the "Bayh-Dole Act."

## Acronyms

ACMS	Award Cash Management Service	FFMIA	Federal Financial Management Improvement Act of 1996
ADA	Anti-Deficiency Act	FFRDC	Federally Funded Research and Development Center
AFGE	American Federation of Government Employees	FISMA	Federal Information Security Management Act of 2002
AFR	Agency Financial Report	FMFIA	Federal Managers' Financial Integrity Act of 1982
AIMS	Antarctic Infrastructure Modernization for Science	FTE	Full-Time Equivalent
AOAM	Agency Operations and Award Management	FY	Fiscal Year
APR	Annual Performance Report	GAAP	Generally Accepted Accounting Principles
ASC	Antarctic Support Contract	GAO	Government Accountability Office
ASP	Award Submission Portal	GONE	Grants Oversight and New Efficiency (Act)
BFA	Office of Budget, Finance and Award Management	GPRA	Government Performance and Results Act of 1993
BI	Broader Impacts	GRFP	Graduate Research Fellowship Program
BOC	Budget Object Class	GSA	General Services Administration
BRP	Blue Ribbon Panel	H-1B	Nonimmigrant Petitioner Account
CAAR	Cost Analysis and Audit Resolution (Branch)	HRM	Division of Human Resource Management
CAP	Corrective Action Plan	ICASS	International Cooperative Administrative Support Services
CCE STEM	Cultivating Cultures for Ethical STEM	ICQA	Internal Control Quality Assurance
CFO	Chief Financial Officer	IG	Inspector General
COFAR	Council on Financial Assistance Reform	IP	Improper Payments
COI	Conflict of Interest	IPA	Intergovernmental Personnel Act
CSRS	Civil Service Retirement System	IPIA	Improper Payments Information Act of 2002
DACS/CSB	Division of Acquisition and Cooperative Support, Cooperative Support Branch	IPERA	Improper Payments Elimination and Recovery Act of 2010
DAS	Division of Administrative Services	IPERIA	Improper Payments Elimination and Recovery Improvement Act of 2012
DATA	Digital Accountability and Transparency Act	IT	Information Technology
DHS	Department of Homeland Security	K-12	Kindergarten to Grade 12
DIS	Division of Information Systems	LFM	Large Facilities Manual
DKIST	Daniel K Inouye Solar Telescope	LFO	Large Facilities Office
DMF	Social Security Administration's Death Master File	LIGO	Laser Interferometer Gravitational-Wave Observatory
DNP	Do Not Pay	LSST	Large Synoptic Survey Telescope
DOL	Department of Labor	MREFC	Major Research Equipment and Facilities Construction
DRB	Director's Review Board	NAPA	National Academy of Public Administration
EHR	Education and Human Resources	NEON	National Ecological Observatory Network
EIS	Enterprise Information System	NIH	National Institutes of Health
ERM	enterprise risk management	NRO	National Science Foundation Relocation Office
EVMS	Earned Value Management System	NSB	National Science Board
FAC	Federal Audit Clearinghouse	NSF	National Science Foundation
FASAB	Federal Accounting Standards Advisory Board		
FBWT	Fund Balance with Treasury		
FECA	Federal Employees' Compensation Act		
FedRAMP	Federal Risk and Authorization Management Program		
FERS	Federal Employees Retirement System		

NSTC	National Science and Technology Council
O/D	Office of the Director
OIG	Office of Inspector General
OIRM	Office of Information and Resource Management
OMB	Office of Management and Budget
OPM	Office of Personnel Management
PAM	Proposal and Award Manual
PAPPG	Proposal and Award Policies and Procedures Guide
PCV	Proposal Compliance Validation
PLR	Division of Polar Research
PP&E	General Property, Plant, and Equipment
R&D	Research and Development
R&RA	Research and Related Activities
RCR	Responsible Conduct of Research
RSSI	Required Supplementary Stewardship Information
S&E	Science and Engineering
SBIR	Small Business Innovation Research
SBR	Statement of Budgetary Resources
SFFAS	Statement of Federal Financial Accounting Standards
SOG	Standard Operating Guidance
SOS	Schedule of Spending
SSAE	Statement on Standards for Attestation Engagements
STEM	Science, Technology, Engineering, and Mathematics
STTR	Small Business Technology Transfer
UG	Uniform Guidance
USAP	United States Antarctic Program
USSGL	U.S. Standard General Ledger



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