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					
Audit Opinion	Unmodified				
Restatement	No				
Material Weaknesses	**Beginning Balance**	**New**	**Resolved**	**Consolidated**	**Ending Balance**
Total Material Weaknesses	*0*	*-*	*-*	*-*	*0*

Table 3.2 - Summary of Management Assurances

Effectiveness of Internal Control over Financial Reporting (FMFIA § 2)						
Statement of Assurance	Unmodified					
	Beginning Balance	**New**	**Resolved**	**Consolidated**	**Reassessed**	**Ending Balance**
Total Material Weaknesses	*0*	*-*	*-*	*-*	*-*	*0*

Effectiveness of Internal Control over Operations (FMFIA § 2)						
Statement of Assurance	Unmodified					
	Beginning Balance	**New**	**Resolved**	**Consolidated**	**Reassessed**	**Ending Balance**
Total Material Weaknesses	*0*	*-*	*-*	*-*	*-*	*0*

Conformance with Financial Management System Requirements (FMFIA § 4)						
Statement of Assurance	Systems conform to financial management system requirements					
	Beginning Balance	**New**	**Resolved**	**Consolidated**	**Reassessed**	**Ending Balance**
Total Non-Conformances	*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.

    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.

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.

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
TOTAL	**$8.952**	**$8.710**

    f. Not Applicable.
        1. Not applicable.

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

Not applicable.

        2. Not applicable.

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

Not applicable

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

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October 17, 2016

MEMORANDUM

To: Dr. Maria Zuber
                Chair, National Science Board

                Dr. France Cordova
                Director, National Science Foundation

From: 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.[1]

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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[1] *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 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
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NSF

**OFFICE OF THE
DIRECTOR**

October 25, 2016

MEMORANDUM

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

FROM: Dr. France Córdova
           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.

	• Implemented v1.0 of the NSB Facilities Portal as possible replacement to NSF Facilities Plan.
	• 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.
	• Drafted the joint LFO-DACS/CSB narrative for internal controls testing of enhanced policies and procedures related to large facilities oversight.
	• Implemented appropriate/applicable enhanced oversight mechanisms currently used for construction awards on operational awards.
	• Conducted Earned Value Management System (EVMS) verification/validation of the Large Synoptic Survey Telescope (LSST) project.
	NSF's Anticipated Milestones:
	• Develop and implement new SOG for conducting NSF EVMS verification/validation reviews.
	• Develop new SOG on stage-gate and construction reviews to address NAPA Recommendation 6.3: Financial and project management expertise on panels.
	• Develop new SOG on training, certification, and core competencies for NSF staff engaged in large facilities oversight.
	• Complete EVMS verification/validation on Daniel K. Inouye Solar Telescope (DKIST) and Regional Class Research Vessel (RCRV) projects.
	• 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."
b. 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	**NSF's Significant Milestones in FY 2016:**
	• Implemented NAPA Recommendation 3.1: Exceptions to Cost Analysis (revisions to BFA SOG 2016-4).
	• Implemented NAPA Recommendation 4.1: Retain control over a portion of budget contingency (BFA SOG 2016-2).
	• Implemented NAPA Recommendation 4.2: Require Recipient use of U.S. Government Accountability Office (GAO) cost estimating and scheduling guides (LFM Section 4.2).
	• Conducted detailed analysis on use of management fee to address NAPA Recommendation 4.3: Elimination of management fee.

those for which they were provided, or potential cost overruns.	• Implemented contract mechanisms to support independent cost estimate reviews (per GAO) for construction and operations. • Implemented contract mechanism for incurred cost, accounting system and estimating system audits. • Developed incurred cost submission tool for recipients specific to supporting incurred cost audits on cooperative agreements governed under the *Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards* (Uniform Guidance). • Completed DKIST budget and schedule contingency review. • Initiated Independent Cost Assessment (per GAO) of Antarctic Infrastructure Modernization for Science (AIMS) in support of the Preliminary Design Review planned for December 2016. • Completed NSF cost analysis of the Battelle estimate to complete NEON construction, including Independent Cost Estimate (per GAO). • Developed Corrective Action Plans (CAPs) for LSST and DKIST projects in response to OIG Alert Memos.
	NSF's Anticipated Milestones: • Provide analysis of options on use of management fee for NSF Leadership consideration in setting Foundation policy on management fee going forward. • Develop and implement new SOG for selection of appropriate independent cost estimate review in accordance with the GAO *Cost Estimating and Assessment Guide*.

CHALLENGE: Management of NSF's Business Operations   **LEAD: MICHAEL WETKLOW, DIVISION DIRECTOR (BFA/DFM)**
                         Improper Payments

NSF Management Overview: 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.

Improper Payments: a. *i) Develop an internal control process that provides reasonable assurance that payments are proper at the time they are made; and ii)*	**NSF's Significant Milestones in FY 2016** • Completed a process improvement plan, during October 2015, in response to the OIG IPERA audit report. • Completed a qualitative improper payments risk assessment in December 2015 covering FY 2015. • 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.

Develop a sound process for assessing the agency's risk of improper payments.	• Considered all areas for improvement in NSF's IPERA risk assessment process that had been identified in the OIG inspection report. • 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. • Completed a policy and procedure document in September 2016 for future IPERA risk assessments (pursuant to the CAP).
	NSF's Anticipated Milestones • Complete future IPERA risk assessments on a three-year cycle and report results in FY 2018. • Consider award financial monitoring testing results as an input for the qualitative IPERA risk assessment.

CHALLENGE: Management of NSF's Business Operations Information & IT Resources　　　　　　　　　**LEAD: DOROTHY ARONSON, DIVISION DIRECTOR (OIRM/DIS)**

NSF Management Overview: 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.

Information & IT Resources
 	
 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.
	NSF's Significant Milestones in FY 2016
	
	 • US Antarctic Program (USAP)
	    o USAP continued to allocate appropriate resources to the IT security program to address information security weaknesses identified in the annual FISMA review.
	    o USAP improved the analysis of system scans to ensure configuration compliance and reviewed processes to ensure proper background investigations on all new hires.
	    o NSF's Division of Polar Programs established a phased approach to address an improved continuity of operations capability.
	
	 • Information Security Continuous Monitoring (ISCM)
	    o 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.

	NSF's Anticipated Milestones • USAP: Continue to address identified IT security weaknesses through program funding. • ISCM: Utilize CDM Phase 1 products and services (focusing on tools implementation) to improve its automated continuous monitoring capability.

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	**NSF's Significant Milestones in FY 2016**
c. *Foster greater transparency over NSF spending through successful implementation of the Digital Accountability and Transparency Act (DATA Act) despite evolving federal*	• 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.

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.	• 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. • Implemented data extract changes in iTRAK, NSF's financial accounting system, as well as in NSF business applications. • 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. • Participated in DATA Act Broker beta testing.
	NSF's Anticipated Milestones • Generate and test Award Submission Portal (ASP) data file per Treasury's new specifications. • Comply with ASP submission requirements to USASpending.gov. • 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). • 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). • Upload financial assistance and procurement files to populate the award attributes in iTRAK. • 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)]. • Generate files A, B, and C using the implemented Oracle patches. • Perform Broker testing by uploading agency generated files A, B, and C. • 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). • Perform Broker testing in order to validate files A through F to facilitate certification of NSF's data. • 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. • Achieve compliance with May 2017 DATA Act implementation deadline.

CHALLENGE: Management of NSF's Business Operations   LEAD: WONZIE GARDNER, DIVISION DIRECTOR (OIRM/DAS)
               Government Records

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	**NSF's Significant Milestones in FY 2016**
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.*	• 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. Córdova 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.

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a.	*Examine the costs associated with NSF's rotator programs to ensure that federal funds entrusted to the agency are being spent effectively and efficiently.*	**NSF's Significant Milestones in FY 2016** • Established IPA Steering Committee (detailed description set forth under section b). • Submitted Steering Committee reports to Director Córdova in August 2016, which, among other things: o 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; o Recommended the development of an integrated agency-wide workforce framework to ensure that NSF maintains the optimal balance of federal employees and IPAs; o Identified strategic cost saving areas requiring additional stakeholder consultation, including institutional cost sharing; and o Identified strategic cost saving areas that could be examined concurrently with the development of an agency-wide framework. • 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.
		NSF's Anticipated Milestones • 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. • 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. • Implement approved changes to NSF's policies for the reimbursement of IPA costs.
b.	*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*	**NSF's Significant Milestones in FY 2016** • 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. o 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 Córdova. o 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. • Continued identification and management of conflicts of interest related to IPAs: o Communicate standards of conduct – IPAs are subject to the same ethics rules as everyone else who works at NSF: ▪ Standards of conduct are communicated in the IPA agreement.

other rotators comply with federal laws after they leave NSF.	▪ New employees, including IPAs, attend new employee orientation and are briefed on the ethical obligations of Federal service.
	▪ 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.
	 o Track conflicts – Each COI official tracks conflicts in writing or through eJacket.
	 o Ensure continued compliance with Federal laws after leaving NSF:
	  ▪ 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.
	  ▪ Former employees, including former IPAs, are encouraged to contact the Ethics Team even after they leave.
	
	• 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 & 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.

	NSF's Anticipated Milestones • The IPA Steering Committee will: o Review and update core policies relating to IPAs, as found in the NSF Personnel Manual, as needed; o Establish a framework for and review data on IPAs for oversight of management of the program; o Coordinate the development of an NSF-wide budget for the IPA program as part of the annual budget cycle; and o Ensure that periodic data is provided to the directorates and offices on the completion of mandatory training and status of performance plans and appraisals.

CHALLENGE: Moving NSF Headquarters to a New Building   LEAD: BRIAN MACDONALD, SENIOR RELOCATION PROJECT OFFICER (OIRM/OAD)

NSF Management Overview: 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.

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.

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.

a. *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.*	**NSF's Significant Milestones in FY 2016** • Working with GSA, settled the owner's delay claim from $60 million down to $14.5 million and reset the project schedule. • Finalized all design documents in accordance with the revised project schedule and without delay. • Along with GSA, awarded a $70 million contract for tenant improvement construction. • 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. • Ensured all procurements were awarded in accordance with the Integrated Project Schedule, including information technology, furniture, security, and audio-visual contracts. • 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. • Added two project managers with office relocation experience to the NRO team. • Hired a professional cost estimating and construction quality management firm to prepare detailed costs estimates for major submittals and requested change orders. • Completed Phase 2 negotiations with AFGE Local 3403 without negatively impacting the project schedule. • Started employee workspace selections in accordance with the Phase 2 union agreement and Integrated Project Schedule. • Briefed senior leadership on value-engineering options, and drove decisions that control costs and provide a functional headquarters that helps NSF meet its mission.
	NSF's Anticipated Milestones • 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. • Maintain bi-weekly procurement meetings with DACS to ensure all procurements are made without negatively impacting the project schedule. • Complete the third phase of negotiations with AFGE Local 3403 without delaying the project schedule. • Finalize employee workspace selections and order all furniture, fixtures, and equipment according to the project schedule.
b. *Plan for and manage the logistics of the actual move to the new headquarters building,*	**NSF's Significant Milestones in FY 2016** • Determined the strategy to move employees into the new building in accordance with the project schedule. Communicated plan with senior leadership, AFGE, and directorates.

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.	• Engaged OIRM essential senior staff to centralize relocation planning and identify potential move-related cost-impacts. • 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. • 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. • Announced to NSF staff the move sequence to Alexandria.

	NSF's Anticipated Milestones
	
	• Key activities leading up to August 2017 relocation:
	  o Develop detailed relocation plan.
	  o Determine furniture for reuse and associated migration plan.
	  o Develop furniture, fixtures and equipment decommissioning strategy.
	  o Develop welcome guide/employee orientation requirements.
	  o Establish new building protocols and policies.
	  o Establish move communication program for end users.
	  o Develop migration plan for division equipment.
	  o Decommission existing facilities.

CHALLENGE: Management of the U.S. Antarctic Program   LEAD: KELLY K. FALKNER, DIVISION DIRECTOR (GEO/PLR)

NSF Management Overview: 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.

a. *Establish and maintain a world-class scientific research program in Antarctica's remote and harsh environment.*	**NSF's Significant Milestones in FY 2016**
	
	• Continued progress on the 2012 Blue Ribbon Panel (BRP) recommendations, including investment in prioritized lifecycle acquisitions and infrastructure upgrades.
	
	• Addressed major infrastructure upgrades recommended by the BRP report for McMurdo Station through continued design efforts:
	  o Continued designs of Core Facility and Utilities packages in preparation for the Antarctic Infrastructure Modernization for Science (AIMS) project MREFC Preliminary Design Review (PDR).
	  o Initiated design efforts using NSF Research and Related Activities (R&RA) funds for upgrades to McMurdo lodging, Vehicle Equipment/Operations Center, Information Technology & Communications (IT&C) Primary Operations Center, and Palmer Pier replacement.

		NSF's Anticipated Milestones • Complete necessary planning/design efforts for individual Antarctic Infrastructure Modernization for Science (AIMS) components. • Complete designs for Palmer Pier, lodging, and IT&C Primary Operations Center. • Prepare for AIMS External Panel Review. • Complete planning/design for the Ross Island Earth Station (RIES).
b.	*Control the cost of the USAP and ensure adequate oversight of payments to the USAP contractor.*	**NSF's Significant Milestones in FY 2016** • 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.
		NSF's Anticipated Milestones • Continue to monitor invoices from the USAP contractor in accordance with established procedures.
c.	*Ensure the overall health and safety of all USAP participants.*	**NSF's Significant Milestones in FY 2016** • <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. • <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. • <u>Breathalyzer Unit Calibration</u>: Procured breathalyzer units that do not require calibration. These units provide redundancy for the existing breathalyzer inventory.
		NSF's Anticipated Milestones • <u>Code of Conduct</u>: Finalize a process for receiving and reviewing Code of Conduct violations. • <u>Pharmacy System</u>: Identify a suitable system responsive to NSF's contractor's proposal to procure a new pharmacy system. • <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.

	• Breathalyzer Testing Requirements: 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.

CHALLENGE: Improving Grant Administration   LEAD: ERIKA RISSI, DEPUTY DIVISION DIRECTOR (BFA/DIAS)

NSF Management Overview: 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.

a. *Implement controls over spending of grant funds that ensure transparency and accountability without creating undue administrative impacts on awardees and federal program officers.*	**NSF's Significant Milestones in FY 2016** • Coordinated inter-agency development and clearance of Research Terms & 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. • 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. • 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. • 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. • 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 (ACM$) to minimize manual processing and

	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.
	• Implemented use of the Federal Awardee Performance and Integrity Information System to ensure transparency and accountability of performance in federal assistance awards.
	• 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.
	NSF's Anticipated Milestones
	• 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.
	• 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.

b. Due to federal streamlining of written guidance for administering grants, ensure provision of consistent guidance that does not contradict previous responses or written policies.	**NSF's Significant Milestones in FY 2016**
	
	• Ensured continued alignment of advanced monitoring efforts with *OMB Uniform Guidance (UG),* as well as that of external websites, fact sheets, and other information provided to NSF awardees.
	
	• Provided training to NSF program staff on major revisions to the *Proposal & Award Policies & Procedures Guide (PAPPG), Proposal & Award Manual (PAM),* and NSF grant conditions. To reach a broader audience, training was provided both in-person as well as with an increased virtual presence.
	
	• 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.
	
	• Expanded automated Proposal Compliance Validation (PCV) checks by ensuring that proposals submitted to NSF comply with requirements specified in the FY 2016 *Proposal & Award Policies & Procedures Guide* (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:
	
	   o Proposals must be received by 5 p.m. submitter's local time on the established deadline date.
	   o Biographical Sketch(es) and Current and Pending Support files are required for each Senior Personnel associated with a proposal.
	   o Biographical Sketch(es) can only be uploaded as a file, must not exceed two pages, and can no longer be entered as text.

<table>
<tr><td></td><td>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.)</td></tr>
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NSF's Anticipated Milestones

- 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 *UG.*

- Consolidate the external-facing *PAPPG* from a two-volume document comprising the *Grant Proposal Guide* and the *Award Administration Guide* into one concise document covering all NSF policies and procedures from pre-award through post-award and closeout.

- Consolidate the internal-facing *PAM* to provide NSF staff links to the *PAPPG* and *OMB Uniform Guidance*, providing access to a single, definitive source for federal policies and procedures.

- 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.

- 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.

- 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.

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c. 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.

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NSF's Significant Milestones in FY 2016

- 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 *Uniform Guidance,* 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.

- Continued to fully implement the *Uniform Guidance* 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.

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		NSF's Anticipated Milestones • 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.
d.	*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.*	**NSF's Significant Milestones in FY 2016** • Compared *Uniform Guidance* 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 *Uniform Guidance* requirements are essentially identical to those cited under the previous "Planned Confirmation Methodology." • 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.
		NSF's Anticipated Milestones • 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 *Uniform Guidance*). • Refine, as necessary, and implement FY 2017 baseline award monitoring for the entire grant portfolio.
e.	*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.*	**NSF's Significant Milestones in FY 2016** • 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 *Uniform Guidance* change poses a significant challenge to compliance with timeliness of resolution. • 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. • 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.
		NSF's Anticipated Milestones • 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.

	• 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.

CHALLENGE: Encouraging the Ethical Conduct of Research LEADS: KELLINA HENDERSON-CRAIG, DEPUTY ASSISTANT DIRECTOR (SBE/OAD)
WENDA BAUCHSPIES, PROGRAM DIRECTOR (SBE/SES)

NSF Management Overview: 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.

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.

Provide more oversight on institutional implementation of Responsible Conduct of Research (RCR) requirements and provide meaningful guidance regarding RCR training.	**NSF's Significant Milestones in FY 2016** • Continued to support research that provides answers to questions about creating responsible research communities. • 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. • Identified and developed funding mechanisms to support reproducible and reliable science. • 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

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.

- 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.

- 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.

NSF's Anticipated Milestones

- 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.

- 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.

- 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.

- 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.

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
Total	**1,192,544**	**1,260,592**	**68,048**

Awards to Affiliated Institutions

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

Affiliated Institution[1]	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
TOTAL	*$ 848,274*

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[1] 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
ADA	Anti-Deficiency Act
AFGE	American Federation of Government Employees
AFR	Agency Financial Report
AIMS	Antarctic Infrastructure Modernization for Science
AOAM	Agency Operations and Award Management
APR	Annual Performance Report
ASC	Antarctic Support Contract
ASP	Award Submission Portal
BFA	Office of Budget, Finance and Award Management
BI	Broader Impacts
BOC	Budget Object Class
BRP	Blue Ribbon Panel
CAAR	Cost Analysis and Audit Resolution (Branch)
CAP	Corrective Action Plan
CCE STEM	Cultivating Cultures for Ethical STEM
CFO	Chief Financial Officer
COFAR	Council on Financial Assistance Reform
COI	Conflict of Interest
CSRS	Civil Service Retirement System
DACS/CSB	Division of Acquisition and Cooperative Support, Cooperative Support Branch
DAS	Division of Administrative Services
DATA	Digital Accountability and Transparency Act
DHS	Department of Homeland Security
DIS	Division of Information Systems
DKIST	Daniel K Inouye Solar Telescope
DMF	Social Security Administration's Death Master File
DNP	Do Not Pay
DOL	Department of Labor
DRB	Director's Review Board
EHR	Education and Human Resources
EIS	Enterprise Information System
ERM	enterprise risk management
EVMS	Earned Value Management System
FAC	Federal Audit Clearinghouse
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

FFMIA	Federal Financial Management Improvement Act of 1996
FFRDC	Federally Funded Research and Development Center
FISMA	Federal Information Security Management Act of 2002
FMFIA	Federal Managers' Financial Integrity Act of 1982
FTE	Full-Time Equivalent
FY	Fiscal Year
GAAP	Generally Accepted Accounting Principles
GAO	Government Accountability Office
GONE	Grants Oversight and New Efficiency (Act)
GPRA	Government Performance and Results Act of 1993
GRFP	Graduate Research Fellowship Program
GSA	General Services Administration
H-1B	Nonimmigrant Petitioner Account
HRM	Division of Human Resource Management
ICASS	International Cooperative Administrative Support Services
ICQA	Internal Control Quality Assurance
IG	Inspector General
IP	Improper Payments
IPA	Intergovernmental Personnel Act
IPIA	Improper Payments Information Act of 2002
IPERA	Improper Payments Elimination and Recovery Act of 2010
IPERIA	Improper Payments Elimination and Recovery Improvement Act of 2012
IT	Information Technology
K-12	Kindergarten to Grade 12
LFM	Large Facilities Manual
LFO	Large Facilities Office
LIGO	Laser Interferometer Gravitational-Wave Observatory
LSST	Large Synoptic Survey Telescope
MREFC	Major Research Equipment and Facilities Construction
NAPA	National Academy of Public Administration
NEON	National Ecological Observatory Network
NIH	National Institutes of Health
NRO	National Science Foundation Relocation Office
NSB	National Science Board
NSF	National Science Foundation

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