

Chapter 1

Management's Discussion and Analysis

Agency Overview

Mission and Vision

The mission of the National Science Foundation (NSF) was established by Congress in the legislation that created the agency: “To promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense; and for other purposes.”¹ Over the past 64 years NSF’s investments have advanced the nation’s prosperity and have become indispensable to our long-term economic health and well-being. Discoveries made possible through NSF’s investments in basic research in science and engineering (S&E) have enhanced the nation’s “innovation ecosystem”—an exponentially growing interdisciplinary mix of ideas and techniques, together with a highly trained S&E workforce capable of advancing the frontiers of science both by recognizing societal need and imagining possibilities.²

These discoveries include Global Positioning System (GPS), the internet and web browsers, Doppler radar, and medical diagnostic and therapeutic technologies. In 2014, NSF-supported scientists developed oral compounds that protect brain cells after traumatic injury; rapidly sequenced and analyzed 99+ Ebola virus genomes; and created the world’s largest DNA origami (nanoscale folding of DNA), with applications ranging from drug delivery to electronics. NSF-supported researchers also advanced driverless car technology and developed a variety of useful smartphone apps, including one that identifies jaundice in newborns. Other discoveries may have no apparent or near-term technological application but still contribute to the innovation knowledge base required to advance science. NSF’s mission affirms our commitment, through investment in these discoveries, to advance the frontiers of science and engineering, ensuring the sustained vigor of both fundamental research and the nation’s innovation ecosystem as a means to maintaining global leadership throughout the 21st century.³

Bionic Suit: The 2014 World Cup kickoff was like no other. A paraplegic volunteer did the ceremonial first kick, wearing an exoskeleton that took cues from his brain activity. The exoskeleton used computer algorithms to detect the brain signals of the kicker, who was wearing an EEG cap. The research began nearly 2 decades ago with an NSF grant to Duke University neurobiologist Miguel Nicolelis for research into how neurons in the cerebral cortex are involved in motor learning.



The exoskeleton's hydraulic pumps power the kicker forward.
Image Credit: NSF

NSF’s vision is a nation that capitalizes on new concepts in science and engineering and provides global leadership in advancing research and education.⁴ NSF is the funding source for 24 percent of all the federally supported basic scientific research conducted by America’s colleges and universities and this

¹ The National Science Foundation Act of 1950 (Public Law 81-507).

² *NSF Strategic Plan for 2014 – 2018: Investing in Science, Engineering, and Education for the Nation’s Future*, page 3; see www.nsf.gov/pubs/2014/nsf14043/nsf14043.pdf.

³ *Ibid.*

⁴ *Ibid.*

share increases to nearly 60 percent when medical research supported by the National Institutes of Health is excluded.⁵

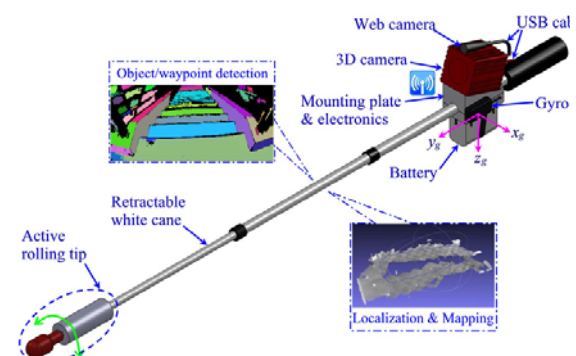
Overall, NSF achieves its mission and vision by making awards and managing portfolios of the highest quality that further our strategic goals, reflect national priorities, and keep the United States at the forefront of innovation and as a global leader of the 21st century science and engineering enterprise. In doing so, NSF pursues transformational work, new fields, and new theoretical paradigms, particularly through multidisciplinary mechanisms that reflect the increasingly interdisciplinary nature of modern science and engineering. We further understand that such complex, multi-faceted work will only be successful at meeting tomorrow's challenges if we simultaneously focus on the people component, leading to solutions to global challenges including economic competitiveness, information access, physical and cybersecurity, and many others.⁶

NSF's investment builds on its 6-decade legacy of supporting basic research and the innovation ecosystem by preparing scientists and engineers who are able to extend their focus beyond the laboratory and make contributions to the 21st century S&E enterprise from the frontiers of science. Our investments connect research and education to support the development of a world-class scientific workforce that can engage fully and contribute imaginatively in the 21st century, which increasingly relies on technology to meet challenges, identify possibilities, and leverage opportunities. We seamlessly integrate the education of future scientists, engineers, and educators into the broad portfolio of research that we support.

A cornerstone of NSF investment in the development of a world-class workforce is the Graduate Research Fellowship Program, which has funded nearly 49,800 Graduate Research Fellows since 1952. The ranks of NSF fellows include numerous individuals who have made transformative breakthroughs in science and engineering research. Many of them have become leaders in their chosen careers—450 have become members of the National Academies of Science or Engineering and 42 have been honored as Nobel laureates. In fact, 214 Nobel Prize winners have received NSF support at some point in their careers. These investments are a critical means by which NSF achieves its mission—identifying, nurturing, and investing in scientific potential.

NSF is dedicated to excellence, stewardship, and efficiency, always striving to excel as a federal agency, investing in priorities that will address key national challenges and promote innovation and economic growth. NSF uses three interrelated strategic goals to achieve the agency's mission: *Transform the*

Seeing-Eye Robot: At the University of Arkansas at Little Rock, researchers prototyped a robotic walking stick for the blind. It has cameras to detect objects in the way such as chairs and stairs, an audio system that communicates to the user, and a computer that remembers recent pathways and objects in them. This project was developed under the National Robotics Initiative, a multi-agency program led by NSF.



The co-robotic cane has a rolling tip that points the cane to the desired direction of travel. It is designed to detect the user's intent as well as 3-D objects and to build a working map for the user. Credit: Dr. Cang Ye, University of Arkansas at Little Rock.

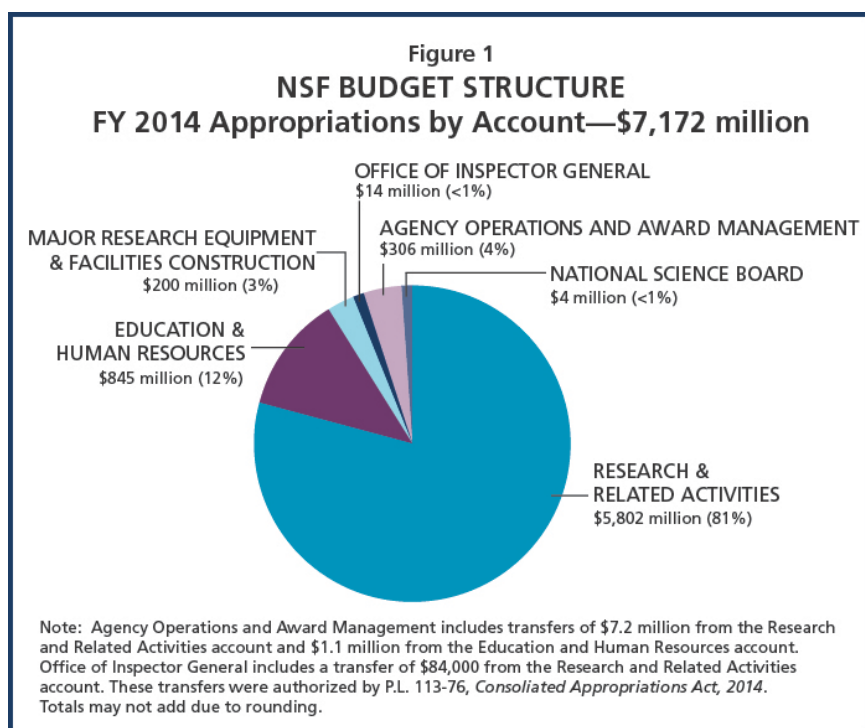
⁵ NSF/National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development, FYs 2012–14; see www.nsf.gov/statistics/nsf14316/content.cfm?pub_id=4418&id=2.

⁶ For more information, see *Exploring What Makes Us Human: NSF Social, Behavioral and Economic Sciences*, page 1 (www.nsf.gov/about/congress/reports/sbe_research_2.pdf).

Frontiers of Science and Engineering; Stimulate Innovation and Address Societal Needs through Research and Education; and Excel as a Federal Science Agency. NSF's new strategic plan, *Investing in Science, Engineering, and Education for the Nation's Future, 2014–2018*, published in March 2014, is the agency's roadmap to achieving the NSF mission and vision. A discussion of the plan and NSF's strategic goals and objectives, as well as the agency's priority goals and cross-agency priority goals can be found in the Performance chapter, beginning on page I-10.

Following the Money

NSF is funded primarily through six congressional appropriations, which totaled \$7,172 million in FY 2014 (Figure 1).⁷ Budget authority in FY 2014 was 4.2 percent above the prior year FY 2013 budget authority of \$6,884 million. Research and Related Activities (R&RA), Education and Human Resources (EHR), and Major Research Equipment and Facilities Construction (MREFC) fund the agency's programmatic activities and accounted for 95 percent of NSF's total appropriations in FY 2014.



- R&RA, which supports basic research and education activities at the frontiers of science and engineering, including high-risk and transformative research, accounted for 81 percent of FY 2014 funding. The FY 2014 R&RA net funding of \$5,802 million was \$258 million or 4.7 percent above its prior year FY 2013 level of \$5,544 million. As authorized by P.L. 113-76, *Consolidated Appropriations Act, 2014*, a transfer of \$7.2 million was made from R&RA to the Agency Operations and Award Management (AOAM) account and a transfer of \$84,000 was made to the Office of Inspector General (OIG) account.

⁷ In Figure 1, FY 2014 Appropriations by Account of \$7,172 million plus Donations (\$33 million) and H1-B Nonimmigrant Petitioner Receipts (\$128 million) equal Appropriations (Discretionary and Mandatory) of \$7,333 million as shown in the Statement of Budgetary Resources.

- EHR, which supports activities that ensure a diverse, competitive, and globally engaged U.S. science, technology, engineering, and mathematics (STEM) workforce and a scientifically literate citizenry is NSF's second largest appropriation, accounting for 12 percent of the agency's budget. The FY 2014 appropriation of \$845 million was \$12.1 million or 1.5 percent above its prior year level of \$833 million. A transfer of \$1.1 million was made from EHR to the AOAM account.
- The MREFC appropriation, which supports the construction of unique national research platforms and major research equipment that enable cutting-edge research, accounted for 3 percent of the agency's total appropriations. The FY 2014 funding of \$200 million is a \$3.8 million or 2.0 percent increase from its prior year FY 2013 level of \$196 million.
- The AOAM appropriation supports NSF's administrative and management activities and accounted for about 4 percent of the agency's FY 2014 funding. Transfers from the R&RA and EHR appropriations—\$7.2 million and \$1.1 million, respectively—boosted AOAM funding to \$306 million. This is a 4.3 percent increase (\$12.7 million) from its FY 2013 level of \$294 million.
- Separate appropriations support the activities of the OIG and National Science Board (NSB); each account for less than 1 percent of NSF's FY 2014 budget. The FY 2014 OIG appropriation of \$14.3 million is a \$1.1 million or 8.3 percent increase from its prior year FY 2013 appropriation of \$13.2 million. The OIG appropriation was bolstered by an \$84,000 transfer from the R&RA account. The NSB appropriation of \$4.3 million in FY 2014 is a \$175,000 or 4.3 percent increase from its prior year FY 2013 funding of \$4.1 million.

In FY 2014, 89 percent of research funding was allocated based on competitive merit review.⁸ About 35,000 members of the science and engineering community participated in the merit review process as panelists and proposal reviewers.⁹ Awards were made to 1,826 institutions in 50 states, the District of Columbia, and 4 U.S. territories. These institutions employ America's leading scientists, engineers, and educators and train the leading-edge innovators of tomorrow. In FY 2014, an estimated 300,000 people were directly involved in NSF programs and activities, receiving salaries, stipends, or participant support. Beyond these figures, NSF programs indirectly impact millions of people. These programs reach K-12 students and teachers, the general public, and researchers through activities including workshops; informal science activities such as museums,

New Media Model: "Plum Landing," created by WGBH in Boston, uses animations, games, a mobile app, videos, and hands-on activities to increase children's understanding of science and nature. Designed for kids aged 6 to 9, it introduces core science concepts and models key habits that scientists use when exploring the natural world. Since its debut last April, the website has garnered 8 million+ page views. Children also are exploring their environments—to date, they've submitted 70,000 photos and drawings.

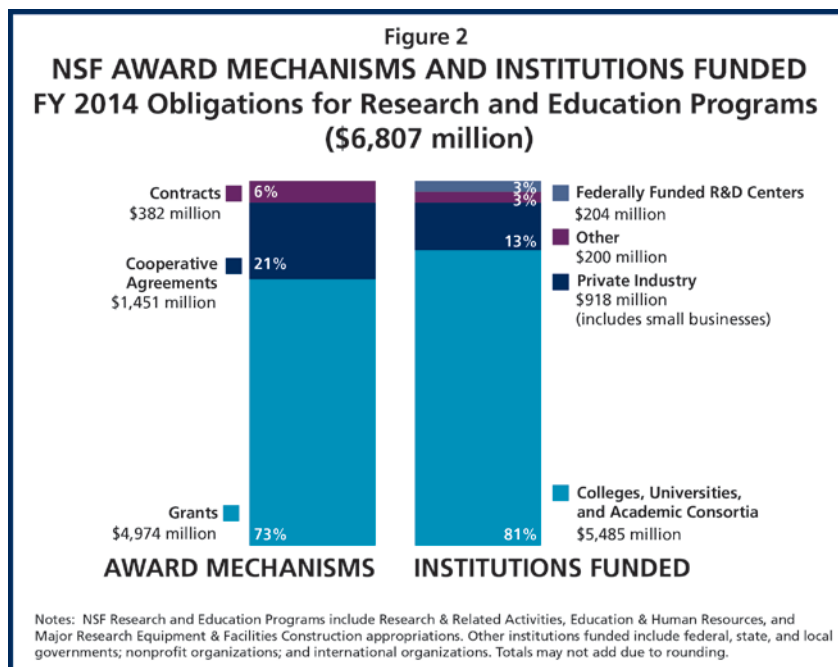


A girl takes a picture of a plant with the "Plum's Photo Hunt" app on her mobile phone. Credit: © Bill Shribman.

⁸ NSF does not require merit review for certain kinds of proposals, including proposals for international travel grants and some conferences, symposia, and workshops.

⁹ For more information about NSF's merit review process, see www.nsf.gov/bfa/dias/policy/merit_review and *Report to the National Science Board on the National Science Foundation's Merit Review Process FY 2013* (NSB-14-32) at www.nsf.gov/nsb/publications/pub_summ.jsp?ods_key=nsb1432.

television, videos, and journals; outreach efforts; and dissemination of improved curriculum and teaching methods.



In FY 2014, NSF funded 10,981 new awards, mostly to academic institutions. As shown in Figure 2, 81 percent of support for research and education programs (\$5,485 million) was to colleges, universities, and academic consortia. Private industry including small businesses accounted for 13 percent (\$918 million) and support to Federally Funded Research and Development (R&D) Centers accounted for 3 percent (\$204 million). Other recipients included federal, state, and local governments; nonprofit organizations; and international organizations. A small number of awards fund research in collaboration with other countries, which adds value to the U.S. scientific enterprise and maintains the U.S. leadership at the helm of the global scientific enterprise.

Most NSF awards (94 percent) were funded through grants or cooperative agreements (Figure 2). Grants can be funded either as standard awards, in which funding for the full duration of the project is provided in a single fiscal year, or as continuing awards, in which funding for a multi-year project is provided in increments. Cooperative agreements are used when the project requires substantial agency technical involvement during the project performance period (e.g., research centers, multi-use facilities). Contracts (procurement instruments) are used to acquire products, services, and studies (e.g., program evaluations) required primarily for NSF or other government use.

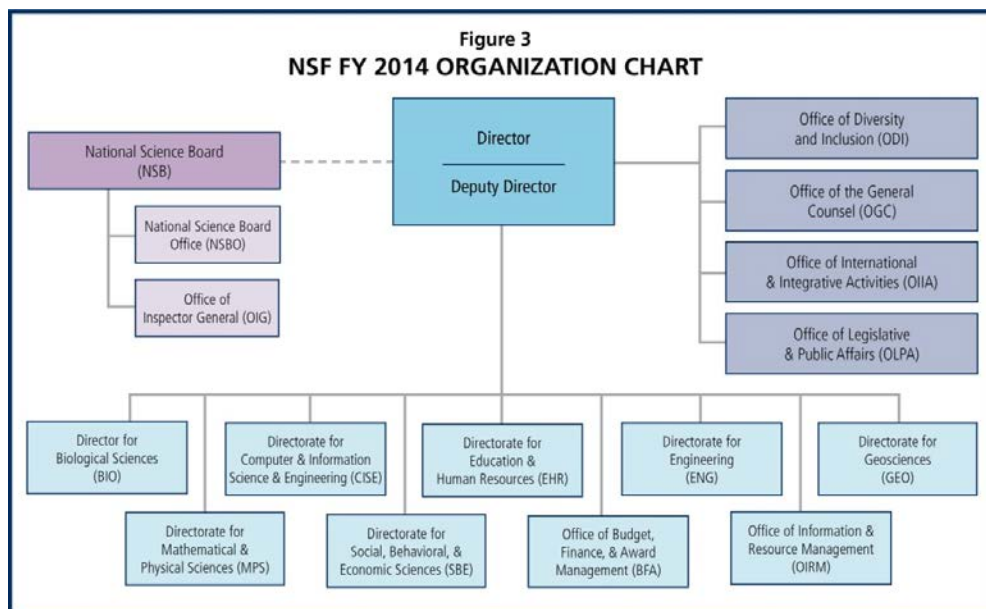
Organizational Structure

NSF is an independent federal agency headed by a Director appointed by the President and confirmed by the U.S. Senate. On March 31, 2014, Dr. France A. Córdoba was sworn in as NSF's 14th Director.¹⁰ A 25-member National Science Board (NSB) meets five times a year to establish the overall policies of the agency. NSB members are appointed by the President and are prominent contributors to the science and engineering research and education community.¹¹ The NSF Director is a member *ex officio* of the Board. Both the Director and the other NSB members serve 6-year terms. The NSF workforce includes nearly

¹⁰ Dr. Córdoba's biography is available at www.nsf.gov/news/speeches/cordova/cordova_bio.jsp.

¹¹ A list of the members of the National Science Board is available at www.nsf.gov/nsb/members.

1,400 permanent staff.¹² NSF also regularly recruits visiting scientists, engineers, and educators as rotators who work at NSF for up to four years.¹³ The blend of permanent staff and rotators who infuse new talent and expertise into the agency is reflective of our core values and integral to effectuating NSF's mission to support the entire spectrum of science and engineering research and education at the frontier. As shown in Figure 3, NSF's organizational structure aligns with the major fields of science and engineering (www.nsf.gov/staff/organizational_chart.pdf).



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

Management Challenges

For FY 2014, the OIG identified nine major management and performance challenges facing the agency: establishing accountability over large cooperative agreements, improving grant administration, strengthening contract administration, management of the U.S. Antarctic Program, moving NSF headquarters to a new building, managing programs and resources in times of budget austerity, ensuring proper stewardship of American Recovery and Reinvestment Act (ARRA) funds, encouraging the ethical conduct of research, and implementing a new financial management system.¹⁴ Management's report on the significant activities undertaken in FY 2014 to address these challenges is included in this report as Appendix 3B. The report also discusses activities planned for FY 2015 and beyond. Some of the agency accomplishments in FY 2014 are highlighted below:

- **To establish accountability over large cooperative agreements:** NSF has continued to ensure that awardees of large construction projects were managing their risks and properly accounting for contingency. The agency has developed Standard Operating Guidance for staff to use when conducting cost analysis of construction cost estimates. NSF also makes use of audit services in

¹² Full-time equivalents

¹³ As of September 30, 2014, temporary appointments included 179 under the Intergovernmental Personnel Act.

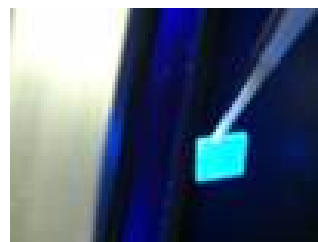
¹⁴ The NSF Inspector General's Memorandum on Management Challenges for NSF in FY 2014 can be found in NSF's FY 2013 Agency Financial Report (www.nsf.gov/pubs/2014/nsf14002/pdf/nsf14002.pdf), Appendix 3A.

awarding and administering large facility-related cooperative agreements, and has drafted guidance on the use and management of contingency to be incorporated into the next revision of the Large Facilities Manual in FY 2015. In addition, NSF has developed Standard Operating Guidance setting forth a risk-based approach to determining the need for audit services prior to awarding large facility-related cooperative agreements; this guidance will be implemented for staff use in FY 2015.

- **To improve grant administration:** NSF has initiated streamlined processes for “Do Not Pay” results and improved implementation of internal controls in place to identify grantees requiring corrective action plan follow-up. With regard to the newly published OMB Uniform Guidance, NSF has evaluated the impact of the policy to ensure full agency support for its objectives of effectively focusing federal resources on performance and outcomes while simultaneously ensuring financial integrity of taxpayer dollars and reducing administrative burden for non-federal entities receiving federal awards. NSF has initiated upgrading of all relevant policies, procedures, and award terms and conditions. NSF will continue a strong program of management, oversight, and outreach to ensure that NSF awardees have implemented relevant policies, procedures, and systems to adequately document salaries, wages, and related costs.
- **To strengthen contract administration:** NSF has taken targeted steps to ensure that all accounting systems and Cost Accounting Standards (CAS) Disclosure Statements are determined adequate for all covered contracts, has actively pursued audit completion for required CAS Disclosure Statements and promptly reviewed and resolved any issues raised in such audits, and has reviewed the new USAP contractor’s transfer of the NSF contract to a different segment within the company and determined that it did not affect the NSF cost. The agency has also added supplemental guidance to the NSF Acquisition Manual to ensure Pre- and Post-Award Audits performed on NSF contracts are consistent with the terms of the Memorandum of Understanding with NSF-OIG, and established a process to follow in the NSF Acquisition Manual (see Section 2542.101-70). NSF has prepared “white papers” that outline a plan for resolving the audit findings to date on the Raytheon Antarctic Logistics Support Contract (RTSC Polar), and has completed Defense Contract Audit Agency (DCAA) final audits on the RTSC Polar contract and initiated prompt resolution of questioned costs.
- **To manage the U.S. Antarctic Program:** NSF has taken steps to implement the OIG-recommended changes to the internal tracking matrix for Blue Ribbon Panel (BRP) recommendations and provided status updates regarding the progress and feasibility of implementation. The Director has authorized proceeding to the conceptual design review phase for development of Antarctic Infrastructure Modernization for Science, a potential MREFC project to address the major infrastructure upgrades recommended by the BRP report for McMurdo and Palmer Stations.
- **To move NSF Headquarters to a new building:** NSF has managed design and engineering tasks in concert with the General Services Administration and the building owner to pursue NSF’s move completion by the lease date of December 30, 2016. More than 80 NSF staff design review meetings, workshops, and strategy sessions have been conducted. An exhaustive update of NSF’s 2-year-old

Non-contact detection of explosive materials:

In research relevant to homeland security and antiterrorism efforts, Cornell University researchers created an ultrasensitive polymer that uses fluorescence to detect explosives not only on surfaces but in the air. Currently, to identify explosive ingredients, airport security officers run a swab over a suspected object prior to analysis.

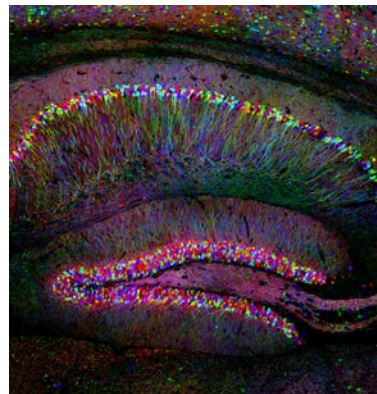


Glowing polymer goes dark when exposed to explosive vapors. Credit: Deepti Gopalakrishnan and William Dichtel.

Program of Requirements for the design of NSF's new space, inclusive of comprehensive information technology and electronic security specifications, furniture and equipment inventory and reuse analysis, and a paper records/files analysis have been completed. NSF has conducted floor studies and worked with the Architect of Record (AOR) on test fits of the new building and has modified the Program of Requirements to be more consistent with the interests expressed by both NSF management and American Federation of Government Employees (AFGE) Local 3403. The agency has also taken steps to ensure that effective working relationships and communications with NSF were established early in the process with all of the new headquarters stakeholders (GSA, City of Alexandria, owner's architect/engineering and construction teams, others). To plan for dual operations in Arlington and Alexandria, NSF has conducted two relocation planning meetings with agency operational units including information technology, facilities, meeting services, and human resources management. NSF has escalated efforts to educate and engage internal NSF stakeholders about the new headquarters, and has implemented a governance, evaluation, and recommendation structure for efficient decision-making involving senior executive staff, liaisons for each directorate, and a cross functional/organizational group. NSF has also participated in monthly Alexandria City Economic Development Partnership Board of Directors meetings to represent and address NSF's interests in the city's planning process; attended City of Alexandria permit and review board meetings with the AOR and project developer; and resumed regular meetings with the AFGE Local 3403 on project information, pre-decisional items, as well as impact and implementation issues.

- **To manage programs and resources in times of budget austerity:** NSF has worked to instill confidence by business review and process improvements in the following areas: Merit Review Business Practice—by investing in expanded training for moderators and leveraging virtual meeting technology; Travel—by instituting and realizing savings totaling \$8.4 million in FY 2014; Conferences—by continued adherence to policy (NSF Bulletin No. 12-19) to ensure that all conference costs are appropriate, necessary, and managed in a way that minimizes expenses; Printing—by continued development of a comprehensive Managed Print Services Strategy; and costs associated with the staff hired under the Intergovernmental Personnel Act (“IPAs”), as outlined in a corrective action plan—by conducting a formal analysis of IPA data, a discussion with the Federal Demonstration Partnership and internal focus groups with IPAs and managers of IPAs.
- **To ensure proper stewardship of ARRA funds:** NSF has successfully tracked expenditures for all active ARRA awards, facilitating closeout as appropriate, and continued advanced monitoring activities for all NSF awardees with additional risk points assigned to ARRA awards with waivers to expend funds beyond September 30, 2013. The agency continues to employ the ARRA review module as part of the advanced monitoring to ensure that all ARRA awardees have processes to effectively segregate

Memory making and protein: Researchers discovered that the Arc gene and its protein product, also called Arc, play an essential role in memory formation. One of tens of thousands of proteins in the brain, Arc is found in the brain's hippocampus region (the area involved in many forms of learning), and activates as memories form. Knowing how a healthy brain forms memories is an important step to understanding what goes wrong in a range of memory disorders including Alzheimer's disease and stroke.



A fluorescent imaging agent lights up the brain's hippocampus. Credit: Jean Livet, Institut de la Vision, Paris; Jeff Lichtman and Joshua Sanes, Harvard University.

financial information in their accounting systems, as well as report that information as required. ARRA recipient reporting requirements were repealed by law as of February 1, 2014. NSF's exemplary ARRA recipient reporting data quality review process ultimately resulted in an average reporting compliance rate of 99.65 percent for 18 quarters of recipient reporting.

- **To encourage the ethical conduct of research:** NSF launched a new ethics program to replace the Ethics Education in Science and Engineering Program. The new program, "Cultivating Cultures for Ethical STEM" (CCE STEM)," focuses on cultivating climates that expect and encourage academic and research integrity at all levels. NSF also awarded a 5-year project to the National Academies to expand the National Academy of Engineering's Online Ethics Center for Engineering and Science to include material relevant to all fields that NSF supports. This award included a large supplement to University of Delaware's Center for Science, Ethics, and Public Policy, to develop a cohort of international collaborators to collect new ideas and best practices from international sources about ethics and social responsibility in research and education, and expertise in developing policies and codes of ethics for STEM faculty, students, and practitioners.

To implement a new financial management system (iTRAK): NSF implemented its financial system modernization initiative successfully on schedule and within budget, beginning with engaging division directors across the agency to identify key staff to work with the iTRAK team and ensuring that the project schedule accounted for peak workload and seasonal cycles across the agency when key staff would be unavailable. Various steps were taken to ensure a smooth transition to the new financial accounting system including prioritizing iTRAK activities ahead of certain operational tasks; detailing key staff to the iTRAK project and bringing back former NSF staff as rehired annuitants to provide additional resources; implementing an outreach campaign across the agency to inform executives, managers, and staff of the business process changes necessary to implement iTRAK, including meetings and focus group sessions; engaging the iTRAK governance groups such as the iTRAK Executive Council and iTRAK Change Control Board to review changes to business processes and to assist in the outreach and communication of changed business processes; and conducting a series of Town Halls and widely disseminating information about critical dates and changes in procedures for FY 2014 year-end close. A rigorous training plan that included over 100 in-person training classes and six online courses was established, as was an iTRAK help desk to provide immediate, ongoing assistance as needed.

Blue Waters: One of the most powerful supercomputers in the world and a major advance in U.S. research infrastructure, Blue Waters enables researchers to tackle simulation problems in astronomy, physics, chemistry, engineering, and other fields that less powerful computing systems simply can't handle. Blue Waters also helps researchers drill down into massive quantities of data, a capability essential to realizing the promise of personalized medicine and understanding trends in massive datasets from environmental observations. Teams from across the nation will use Blue Waters to investigate a broad range of phenomena including the fundamental nature of matter and energy, the development of new materials, the effects of earthquakes, and the evolution of the universe.



As a petascale system, Blue Waters completes quadrillions (millions of billions) of calculations every second, delivering sustained performance of 1 petaflop. As a petascale data system, Blue Waters possesses 1.5 petabytes (PB) of memory, 26 PB of disk capacity and 300 PB of tape data capacity. *Image credit: NCSA/University of Illinois.*

Performance

This discussion of NSF's FY 2014 performance management activities focuses on the agency's efforts related to the Government Performance and Results Act of 1993 (GPRA) and the GPRA Modernization Act of 2010,¹⁵ and on the agency's workload and management metrics.

FY 2014 Strategic Framework

NSF is subject to GPRA and the GPRA Modernization Act of 2010, as well as related performance reporting guidance issued by OMB.¹⁶ In March 2014, NSF published a new Strategic Plan, *Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014 – 2018*.¹⁷ It lays out the following strategic goals:

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

These three strategic goals are associated with seven specific objectives (Figure 4). Objectives are intended to be comprehensive of agency program activities. Progress toward these objectives is monitored in several ways—through annual performance goals (10 goals in FY 2014), agency priority goals (3 in FY 2014–FY 2015), and strategic reviews (see next section).

In addition to these strategic goals and objectives, which are intended to monitor agency performance against its entire mission, NSF set three agency priority goals for FY 2014–FY 2015 to monitor progress in specific areas where near-term focus on agency execution can have the most impact. In FY 2014, NSF continued its practice of having agency leaders conduct quarterly data-driven performance reviews for each of the three agency priority goals. NSF also participates actively in cross-agency priority goals (CAP) relevant to its mission and execution of that mission. Figure 4 shows NSF's FY 2014 Annual priority goals and CAP goals.

The following discussion of NSF's performance goals and results summarizes information available to date. NSF's *FY 2014 Annual Performance Report* (APR) will provide a fuller discussion of all the agency's performance measures, including descriptions of the metrics, methodologies, results, and trends,

¹⁵ See www.whitehouse.gov/omb/mgmt-gpra/index-gpra.

¹⁶ OMB Circular A-11, *Preparation, Submission, and Execution of the Budget* (Part 6); see www.whitehouse.gov/omb/circulars_a11_current_year_a11_toc.

¹⁷ www.nsf.gov/about/performance/strategic_plan.jsp.

along with a list of relevant external reviews. All of NSF's FY 2014 performance goals have undergone an independent verification and validation review by an external consultant using U.S. Government Accountability Office guidance.¹⁸ More detailed information about NSF's GPRA verification and validation review will be part of the APR. NSF's FY 2014 APR will be included in the agency's *FY 2016 Budget Request to Congress*, which will be available at www.nsf.gov/about/performance.

Strategic Objectives and Strategic Reviews

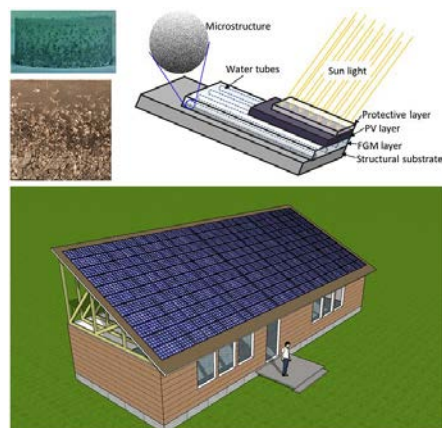
In the spring of 2014 NSF designed and conducted the inaugural Strategic Review Process in response to the requirement of the GPRA Modernization Act 2010 Section 1116(f). OMB Circular A-11(270.2) specifies that: “Annually, agency leaders should review progress on each of the agency’s strategic objectives established by the agency Strategic Plans and updated annually in the Annual Performance Plan. These reviews should inform strategic decision-making, budget formulation, and near-term agency actions, as well as preparation of the Annual Performance Plan and Annual Performance Report.” NSF’s approach was to conduct a strategic and focused cross-cutting analysis using the results of existing assessment processes, evaluations, and reports as well as other sources of evidence. The following provides information on the focus of the strategic reviews for each of the strategic objectives in the Strategic Plan.

- ***G1/O1: Invest in fundamental research to ensure a continuous stream of advances across NSF science, engineering, and education.*** Support of interdisciplinary and potentially transformative research (IDR and PTR) at NSF contributes significantly to our ability to achieve the first strategic objective. The strategic review used the results of evaluations, and analysis of unstructured and administrative data to investigate a number of hypotheses about whether NSF has adequate mechanisms to support IDR and PTR.
- ***G1/O2: Integrate education and research to produce a diverse science, technology, engineering and mathematics (STEM) workforce with cutting-edge capabilities.*** The assumption that there is a shared understanding of what it means to “integrate education and research” was tested. The meaning and context of integration has varied over time. Enduring mechanisms include: 1) ensuring that the content of science courses include the latest research, 2) encouraging leading researchers to be involved in the education process, and 3) enabling student participation in research at all levels.
- ***G1/O3: Provide world-class research infrastructure to enable major scientific advances.*** The review examined NSF’s current practices for the assessment of facilities and determined that they are sufficient and appropriate. The increasing level of complexity of the facility programs that NSF funds, as well as the recognition that NSF is changing the overall planning for the lifecycle of facilities, point to the time being ripe for the agency to address the question of appropriate facility stewardship.
- ***G2/O1: Strengthen the links between fundamental research and societal needs through investments and partnerships.*** The strategic review investigated the current conventional wisdom for knowledge transfer, examined various models and mechanisms available within NSF to support knowledge transfer and their impacts, and identified gaps between what is needed and what we are currently doing.

¹⁸ U.S. Government Accounting Office. *The Results Act: An Evaluator’s Guide to Assessing Agency Annual Performance Plans* (GAO/GGD-10.1.20) (1998) (www.gao.gov/special.pubs/gg10120.pdf).

- **G2/O2: Build the capacity of the nation to address societal challenges using a suite of formal, informal, and broadly available STEM educational mechanisms.** The strategic review examined mechanisms that NSF uses to convey its role in addressing societal challenges and promote awareness of those challenges through STEM education mechanisms. The review also investigated whether NSF has appropriate mechanisms to increase the capacity of STEM professionals to communicate, disseminate, or engage others in their research and education endeavors.
- **G3/O1: Build an increasingly diverse, engaged, high performing workforce by fostering excellence in recruitment, training, leadership, and human capital management.** The strategic review pointed to a potentially significant challenge in the coming years. Data on NSF's workforce suggest attrition scenarios that could have a significant impact on NSF's performance toward its mission through and after the anticipated FY 2017 move to Alexandria. NSF needs to take immediate actions to ensure that the people with the best possible match of skills to the tasks at hand are in place at the time of the move and beyond.
- **G3/O2: Use effective methods and innovative solutions to achieve excellence in accomplishing the agency's mission.** The strategic review used organizational theory to gain an understanding of the strengths and weaknesses of NSF's structure and culture. The strategic review team hypothesized that at NSF there are two predominant, interdependent cultures: one that is academic in nature and one that is business-oriented. These two interdependent cultures correlate respectively with the levels of flexibility and control that are manifested in NSF's business model. The review applied what was learned to understand how NSF can improve our use of working groups or teams.

Solar Cells on Rooftops: These roofing shingles take the light and the heat. They contain a solar cell, developed by Columbia University researchers, that converts light and heat into electricity. Harnessing both light and heat energy increases the potential power each solar cell can generate, which may provide significant cost and energy savings. A built-in cooling system improves the cells' efficiency in high-temperature climates and provides hot water for household purposes.



Solar cells that harvest energy from light and heat integrate into shingles. Credit: Huiming Yin, Columbia University

More information, including information about the specific “Opportunities for Action or Improvement” recommended by the strategic reviews, will be published with NSF's *FY 2016 Budget Request to Congress*.

Figure 4: NSF Performance Framework

| NSF 2014–2018 Strategic Goals | |
|---|--|
| Strategic Goal | Strategic Objectives |
| G1: Transform the Frontiers of Science and Engineering | O1: Invest in fundamental research to ensure significant continuing advances across science, engineering, and education. |
| | O2: Integrate education and research to support development of a diverse STEM workforce with cutting-edge capabilities. |
| | O3: Provide world-class research infrastructure to enable major scientific advances. |
| G2: Stimulate Innovation and Address Societal Needs through Research and Education | O1: Strengthen the links between fundamental research and societal needs through investments and partnerships. |
| | O2: Build the capacity of the Nation to address societal challenges using a suite of formal, informal, and broadly available STEM educational mechanisms. |
| G3: Excel as a Federal Science Agency | O1: Build an increasingly diverse, engaged, and high performing workforce by fostering excellence in recruitment, training, leadership, and management of human capital. |
| | O2: Use effective methods and innovative solutions to achieve excellence in accomplishing the agency's mission. |

| NSF FY 2014-FY 2015 Priority Goals | | |
|------------------------------------|--|---|
| Type of Goal | Goal Header | Goal Statement |
| Agency Priority Goal | Ensure Public Access to Publications | Increase public access to NSF-funded peer-reviewed publications. By September 30, 2015, NSF-funded investigators will be able to deposit versions of their peer-reviewed articles in a repository that will make them available to the public. |
| | Increase the Nation's Data Science Capacity | Improve the nation's capacity in data science by investing in the development of human capital and infrastructure. By September 30, 2015, implement mechanisms to support the training and workforce development of future data scientists; increase the number of multi-stakeholder partnerships to address the nation's big-data challenges; and increase investments in current and future data infrastructure, extending data-intensive science into more research communities. |
| | Optimize the Award Process to Level Workload | Improve agency and awardee efficiency by leveling award of grants across the fiscal year. By September 30, 2015, NSF will meet targets to level distribution of awards across the fiscal year and subsequently improve awardee capacity to effectively manage research funding. |
| Cross-Agency Priority (CAP) Goal | STEM Education | Improve Science, Technology, Engineering and Mathematics (STEM) Education by implementing the Federal STEM Education 5-Year Strategic Plan, announced in May 2013, specifically: <ul style="list-style-type: none"> • Improve STEM instruction • Increase and sustain youth and public engagement in STEM • Enhance STEM experience of undergraduate students • Better serve groups historically under-represented in STEM fields • Design graduate education for tomorrow's STEM workforce • Build new models for leveraging assets and expertise • Build and use evidence-based approaches |
| | Lab-to-Market | Increase the economic impact of federally-funded research and development by accelerating and improving the transfer of new technologies from the laboratory to the commercial marketplace. |

FY 2014 Progress Toward Goals

In FY 2014, NSF tracked progress toward its three strategic goals through 10 annual performance goals. All program activities within the agency were covered by the goals.

Mission-Oriented Strategic Goals

Several goals supported both objectives under both mission-oriented goals, *Transform the Frontiers of Science and Engineering* and *Stimulate Innovation and Address Societal Needs Through Research and Education*.

- NSF developed a process for uniform monitoring of key program investments. Progress toward this goal's objectives involved selection of a common set of key indicators to measure NSF-wide activities at various stages in their implementation.
- Career-Life Balance investments promoted policies and practices designed to support fuller utilization of the talents of individuals from all sectors of the American population, principally women, under-represented minorities, and persons with disabilities. In FY 2014, NSF collaborated with NIH to coordinate policies, conducted outreach to increase awareness of the program's opportunities, and began an analysis of the first 3 years of the program.
- All NSF-funded facility construction projects kept cost and schedule variance below 10 percent.
- The Graduate Research Fellowship Program offered a wider range of career development opportunities to awardees through two new internship programs, offering students exposure to both federal government and international opportunities.
- Undergraduate education efforts were coordinated through a new program description and the Improving Undergraduate STEM Education Program to maximize the effectiveness of NSF investments in improving the STEM learning experiences of undergraduates.

Management Goal

In FY 2014, annual goals to achieve the management-oriented strategic goal, Excel as a Federal Science Agency, focused on customer service, human resources development, and technological upgrades.

- In an important financial modernization step, NSF met its targets in transitioning to its commercial off-the-shelf financial system, iTRAK. More information on iTRAK can be found on page I-26.
- Seventy-two percent of applicants were informed whether their proposals were declined or recommended for funding within 6 months of submission. This exceeded the target of 70 percent.
- More than 31 percent of review panels were conducted virtually, exceeding the goal of 15 percent.
- NSF continued to make progress toward achieving "Model Equal Employment Opportunity (EEO) Agency" status. Five of the six essential elements required by the Equal Employment Opportunity Commission to attain a model EEO agency program have been met, and two compliance desk reviews were planned.
- For the fourth year, NSF's temporary scientific staff members were included under the same performance management system used for full-time employees. The Division for Human Resource Management developed internal resources for leadership to monitor key human capital metrics.

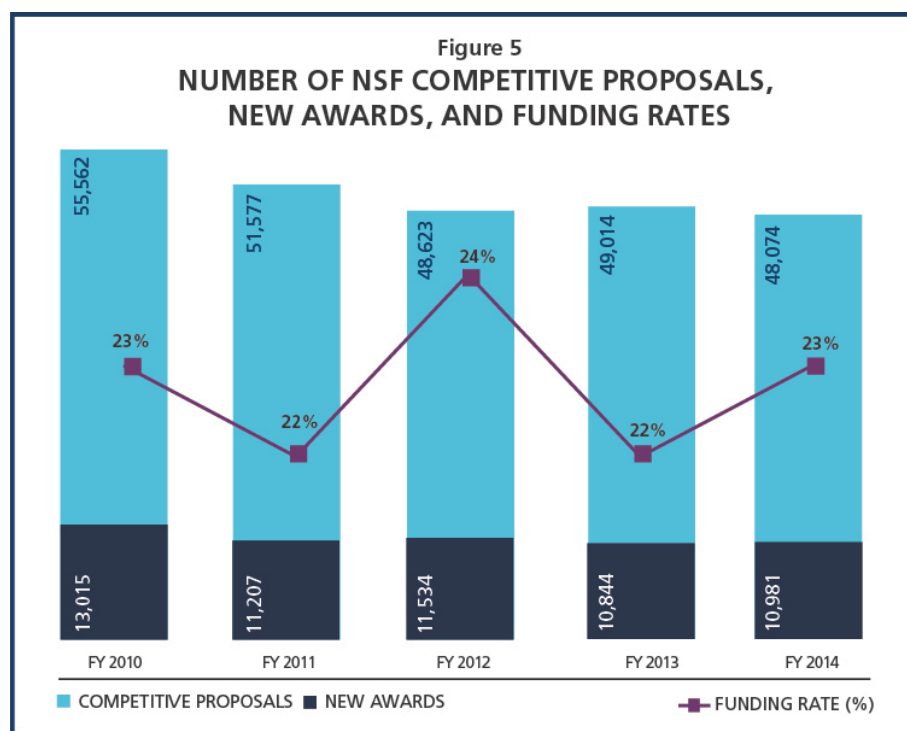
Agency Priority Goals and Cross-Agency Priority Goals

For current information about agency and cross-agency priority goals, please see www.performance.gov.

Workload and Management Trends

NSF continuously monitors key portfolio, workload, and financial measures to understand short- and long-term trends and to help inform management decisions. For an analysis of the long-term trends in competitive proposals, awards, funding rate, and other portfolio metrics, see the *Report to the National Science Board on the National Science Foundation's Merit Review Process, Fiscal Year 2013* (NSB-14-32) at www.nsf.gov/nsb/publications/pub_summ.jsp?ods_key=nsb1432.

- In FY 2014, the number of competitive proposals reviewed by NSF dropped nearly 2 percent—a decrease of 940, to 48,074 (Figure 5). The decrease in competitive proposals—to the lowest since FY 2009—reflects changes such as the consolidation of programs into one with a short proposal period and the movement and elimination of proposal deadlines.
- Although the number of new awards increased slightly in FY 2014—by 1.3 percent (137) to 10,981—it is nearly 6 percent below the 11,650 average annual number of awards made between FY 2010 and FY 2013.
- The increase in new award actions coupled with a 2 percent decrease in the number of competitive proposals resulted in a 1 percentage point increase in the funding rate, to 23 percent. The 23 percent funding rate is the average annual rate that has prevailed in the last 4-year period, from FY 2010 to FY 2013.



- As shown in Figure 6, in FY 2014, the average annual award size of competitive awards increased 6.7 percent, from \$169,107 in FY 2013 to \$180,507 in FY 2014. This is the first increase in average annual award size since FY 2009, and the largest average annual award size since FY 2010. As noted in the FY 2013 Merit Review Report, “Adequate award size and duration are important for enabling science of the highest quality and ensuring that the proposed work can be accomplished as planned.

Larger award size and longer award duration may also permit the participation of more students and allow investigators to devote a greater portion of their time to conducting research.”¹⁹

- In FY 2014, NSF’s workforce in terms of full-time equivalents (FTE) was at 1,390, a decrease of 24 from the prior year and the lowest since FY 2009. The drop in FTEs was primarily the result of staff retirements during the year.
- The number of active awards decreased 3.6 percent (1,996) in FY 2014, from 55,542 in FY 2013 to 53,546 in FY 2014. This decrease reflects a combination of factors including the expiration of the majority of NSF’s grants funded through the American Recovery and Reinvestment Act of 2009 (ARRA)—of which only about 300 remain active out of a portfolio of more than 5,000—and the fact that the number of new awards made in the years following ARRA have dropped back to levels observed in pre-ARRA years.

Figure 6: Workload and Management Trends

| Measure | | FY 2010 | FY 2011 | FY 2012 | FY 2013 | FY 2014 | Percent Change (FY 2014/ FY 2013) | Average FY 2010- FY 2013 |
|-----------|---|-----------|-----------|-----------|-----------|-----------|-----------------------------------|--------------------------|
| Portfolio | Competitive proposal actions | 55,562 | 51,577 | 48,623 | 49,014 | 48,074 | -1.9% | 51,194 |
| | Competitive award actions | 13,015 | 11,207 | 11,534 | 10,844 | 10,981 | 1.3% | 11,650 |
| | Average annual award size (competitive awards) | \$189,338 | \$172,533 | \$169,217 | \$169,107 | \$180,507 | 6.7% | \$175,049 |
| | Funding rate | 23% | 22% | 24% | 22% | 23% | 1-percentage point | 23% |
| Workload | Number of employees (FTE, usage) | 1,424 | 1,415 | 1,415 | 1,414 | 1,390 | -1.7% | 1,417 |
| | Number of active awards * | 55,449 | 56,414 | 56,432 | 55,542 | 53,546 | -3.6% | 55,959 |
| | Proposal reviews conducted | 287,017 | 262,005 | 235,654 | 233,116 | 225,847 | -3.1% | 254,448 |
| Financial | Number of grant payments | 22,782 | 29,214 | 28,016 | 27,649 | 27,978 | 1.2% | 26,915 |
| | Award expenses incurred but not reported at 9/30 (\$ in millions) | \$1,702 | \$1,679 | \$1,769 | \$344 | \$250 | -15.7% | 1,374 |

* Active awards include all active awards regardless of whether funds were received during the fiscal year.

- During FY 2014, NSF completed its first full year with grantees using the Award Cash Management Service (ACM\$) for all payment activity. In the ACM\$ environment, all NSF awardee institutions are required to submit payment requests at the award level. Award expenses are posted to the NSF financial system at the time of the payment request. The implementation of ACM\$ has enabled NSF

¹⁹ Ibid, page 19.

to significantly increase the volume of award financial data available to the agency for management and monitoring activity. In FY 2014, NSF awardees submitted approximately 28,000 payments comprised of over 785,000 award level disbursement/expense transactions. In prior years under the Federal Financial Report (FFR), NSF awardee institutions processed an average of 200,000 award expense transactions per year.

- In addition to the increase in financial data available to NSF management, ACM\$ has significantly improved the timeliness of that data. In prior years, as of September 30th, NSF awardee institutions using the FFR had approximately \$1.7 billion in award expenses that they had incurred but not yet reported to NSF. Under ACM\$, the amount of incurred but not reported award expenses has decreased to approximately \$250 million. This amount was verified through statistical sampling of awardee institutions at September 30, 2014.
- The increase in award financial data has also led to opportunities to enhance financial activity monitoring processes. NSF is accomplishing this through implementation of financial close-out for all awards 90 days after the award expiration date, tracking of awards with large unliquidated balances as awards approach expiration, and increased focus on tracking awards with canceling appropriations.

Financial Discussion and Analysis

Efficient management requires planning and decisionmaking based on timely and accurate financial information. Managers at all levels of an organization depend on reliable financial information for making critical resource allocation decisions to provide effective services. FY 2014, which began with a disruptive 16-day government shutdown, was a particularly challenging year. The lapse in appropriations put pressure on NSF to reassess its priorities and significantly complicated year-end activities. Extra time and effort were needed to work through a backlog of activities and resume financial operations, as well as meet the agency's year-end reporting responsibilities.

In spite of these challenges, in FY 2014, several projects were undertaken to make the agency's financial information more accessible and ensure sound stewardship of the public trust.

- NSF modernized its over 25-year-old financial management system, successfully transitioning to a fully integrated financial management solution. The new "iTRAK" system enables the seamless flow of financial information for relevant and timely decisionmaking; improves the effectiveness and efficiency of financial and business processes; and enhances financial and business accountability, integrity, and compliance with OMB requirements.
- NSF improved its accountability and effectiveness of operations by developing a new risk assessment methodology and estimation process for improper payments.
- Implementation of the Award Cash Management Service (ACM\$), which established a new approach to award payments and post-award financial processes, went through its first full year. As expected, ACM\$ has resulted in timelier access to financial data, fund status monitoring, and expense reports. NSF expects further improvements in ACM\$ use and reporting as grantees continue to adapt to the new service.

In accordance with the Chief Financial Officers Act of 1990 and the Government Management Reform Act of 1994, NSF prepares financial statements in conformity with generally accepted accounting principles (GAAP) for U.S. federal entities. The financial statements present NSF's detailed financial information relative to its mission and the stewardship of those resources entrusted to the agency. It also provides readers with an understanding of the resources that NSF has available, the cost of our programs, and the status of resources at the end of the fiscal year. NSF subjects its financial statements to an independent audit to ensure that they are free from material misstatement and can be used to assess NSF's financial status and related financial activity for the years ending September 30, 2014 and September 30, 2013.

For FY 2014, NSF received its 17th consecutive unmodified audit opinion. The audit report noted no material weaknesses but included two significant deficiencies. The prior year significant deficiency related to the monitoring of construction-type agreements was repeated. NSF will continue to work to strengthen controls for awarding and overseeing construction-type cooperative agreements, exercising enhanced end-to-end cost surveillance in response to OIG concerns.

The second significant deficiency is related to NSF's methodology for calculating its grant accrual. The methodology that NSF used in FY 2013 to calculate the amount incurred but not yet reported by its grantees and thus not yet paid by NSF to the grantee under the new ACM\$ system resulted in an underestimation. In FY 2014, pursuant to guidelines set forth in Technical Release (TR 12) *Accrual Estimates for Grant Programs*, NSF performed a statistical validation of grantee expenses incurred, but not yet reported/drawn as of September 30, 2013. NSF determined that the underestimated amount was

due to a combination of change in estimate and corrections of errors in FY 2013. The correction of errors portion of the increase was not material to the FY 2013 financial statements and, accordingly, the FY 2013 financial statements were not restated (refer to Note 7 of the financial statements for more details).

The Independent Auditors' Report can be found on page II-3. Management's response to the Independent Auditors' Report can be found on page II-17

Understanding the Financial Statements

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

NSF's FY 2014 financial statements and notes are presented in accordance with OMB Circular A-136, *Financial Reporting Requirements*. NSF's current year financial statements and notes are presented in a comparative format. The Stewardship Investment schedule presents information over the last five years. Figure 7 summarizes the changes in NSF's financial position in FY 2014.

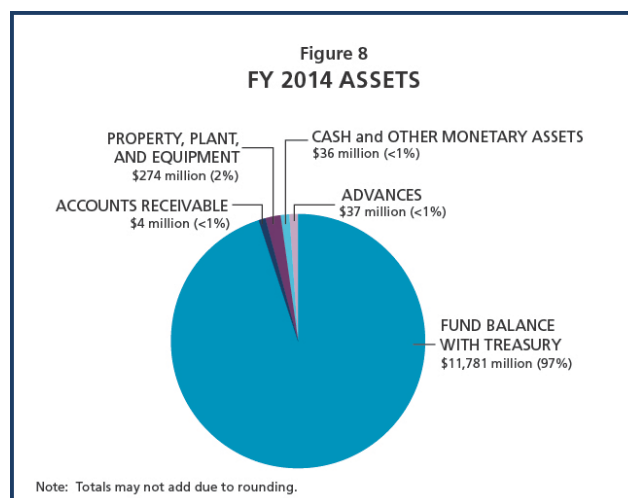
Figure 7. Changes in NSF's Financial Position in FY 2014 (dollars in thousands)

| Net Financial Condition | FY 2014 | FY 2013 | Increase/ (Decrease) | % Change |
|-------------------------|--------------|--------------|----------------------|----------|
| Assets | \$12,131,850 | \$11,970,603 | \$161,247 | 1.3% |
| Liabilities | \$380,259 | \$259,846 | \$120,413 | 46.3% |
| Net Position | \$11,751,591 | \$11,710,757 | \$40,834 | 0.3% |
| Net Cost | \$7,256,651 | \$7,117,071 | \$139,580 | 2.0% |

Balance Sheet

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

In FY 2014, Total Assets (Figure 8) increased 1.3 percent from FY 2013. The bulk of the change occurred in the *Fund Balance with Treasury* account, which increased by \$193.6 million in FY 2014. *Fund Balance with Treasury* is funding available from which NSF is authorized to make expenditures and pay amounts due through the disbursement authority of the Department of Treasury. It is increased through appropriations and collections and decreased by expenditures and rescissions.



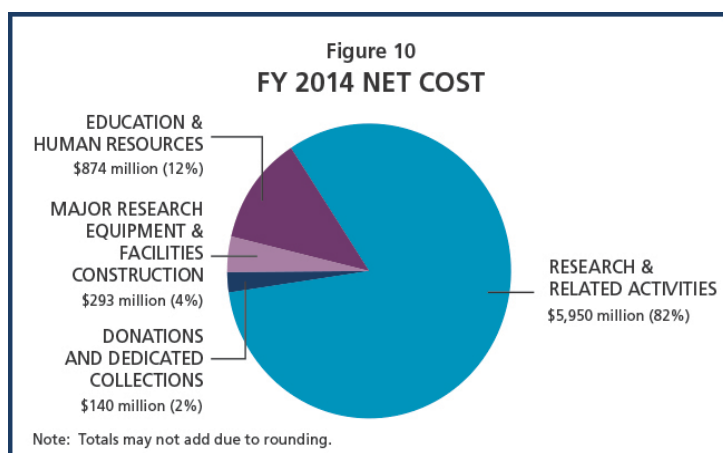
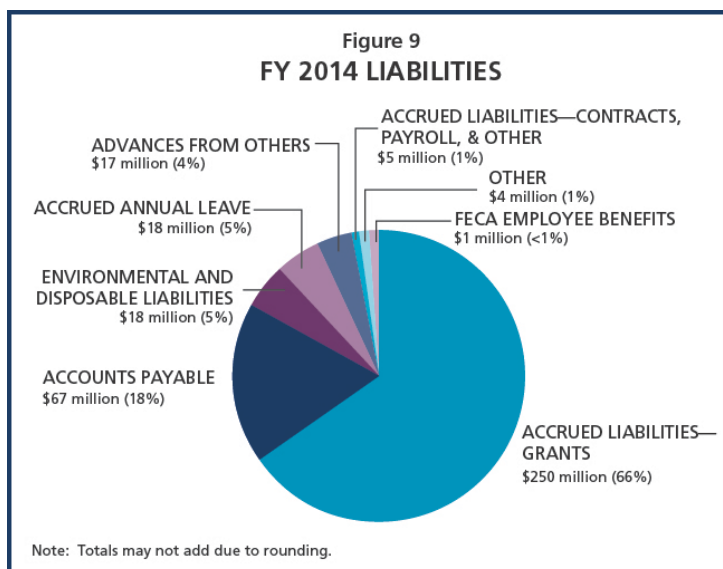
In FY 2014, Total Liabilities (Figure 9) increased 46.3 percent from FY 2013. This change is related to the increase in *Accrued Liabilities—Grants*, which increased by \$159.2 million in FY 2014. The increase in *Accrued Liabilities—Grants* can be partially attributed to the implementation of ACMS in FY 2013, which required a modification of NSF's grant accrual methodology. NSF is actively collecting information from its grantees and ACMS as a new grant accrual methodology is developed for future years. Although a new methodology has not been finalized as of September 30, 2014, NSF's interim

approach uses statistical sampling and grantee confirmation survey results to estimate grant expenses incurred but not yet reported.

Statement of Net Cost

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

Approximately 96 percent of all current year NSF Net Costs of Operations incurred were directly related to the support of the Research and Related Activities (R&RA), Education and Human Resources (EHR), Major Research Equipment and Facilities Constructions (MREFC) programs; and Donations and Dedicated Collections. Additional costs were incurred for indirect general operation activities (e.g., salaries, training, and activities related to the advancement of NSF information systems technology) and activities of the NSB and the OIG. These costs were allocated to R&RA, EHR, MREFC, and Donations and Dedicated Collections and account for 4 percent of the total current year Net Cost of Operations (Figure 10). These administrative and management activities are focused on supporting the agency's program goals.



Statement of Changes in Net Position

The Statement of Changes in Net Position presents the agency's cumulative net results of operation and unexpended appropriations for the fiscal year. NSF's Net Position increased slightly by 0.3 percent, or \$40.8 million, in FY 2014.

Statement of Budgetary Resources

This statement provides information on how budgetary resources were made available to NSF for the year and the status of those budgetary resources at year-end. For FY 2014, *Total Budgetary Resources* increased by \$269.8 million. *Budgetary Resources—Appropriations* for the R&RA, EHR, and MREFC accounts were \$5,801.6 million, \$845.4 million, and \$200.0 million, respectively. The combined *Budgetary Resources—Appropriations* in FY 2014 for the NSB, OIG, and AOAM accounts totaled \$324.8 million. NSF also received funding via warrant from the H-1B Non-immigrant Petitioner Fees

Accounts (H-1B) in the amount of \$128.0 million, and via donations from foreign governments, private companies, academic institutions, nonprofit foundations, and individuals in the amount of \$32.5 million. In FY 2014, the *Budgetary Resources—Appropriations* line was also affected by H-1B sequestration in the amount of \$9.5 million.

Stewardship Investments

NSF-funded investments yield long-term benefits to the general public. NSF investments in research and education produce quantifiable outputs, including the number of awards made and the number of researchers, students, and teachers supported or involved in the pursuit of science and engineering research and education. NSF incurs stewardship costs to empower the nation through discovery and innovation. In FYs 2014 and 2013, these costs amounted to \$309.8 million and \$327.4 million, respectively.

Limitations of the Financial Statements

In accordance with the guidance provided in OMB Circular A-136, NSF discloses the following limitations of the agency's FY 2014 financial statements, which appear in Chapter 2 of this report: The principal financial statements have been prepared to report the financial position and results of operations of NSF, pursuant to the requirements of 31 U.S.C. 3515(b). While the statements have been prepared from NSF books and records in accordance with GAAP for federal entities and the format prescribed by OMB, the statements are in addition to the financial reports used to monitor and control budgetary resources, which are prepared from the same books and records. The statements should be read with the realization that they are for a component of the U.S. Government, a sovereign entity.

Other Financial Reporting Information

Debt Collection Improvement Act of 1996

Net Accounts Receivable totaled \$4.4 million at September 30, 2014. Of that amount, \$2.2 million is due from other federal agencies. The remaining \$2.2 million is due from the public. NSF fully participates in the Department of the Treasury Cross-Servicing Program. In accordance with the Debt Collection Improvement Act, this program allows NSF to refer debts that are delinquent more than 180 days to the Department of the Treasury for appropriate action to collect those accounts. OMB Circular A-129, *Policies for Federal Credit Programs and Non-Tax Receivables*, details agencies' responsibility to effectively manage delinquent debt, including writing-off and closing-out receivables. NSF writes off delinquent debt more than two years old. Additionally, NSF seeks Department of Justice concurrence for action items over \$100,000.

Cash Management Improvement Act

In FY 2014, NSF had no awards covered under Cash Management Improvement Act Treasury-State Agreements. The timeliness of NSF's payments to grantees through its payment systems makes the timeliness of payment issue under the Act essentially not applicable to the agency. No interest payments were made in FY 2014.

Systems, Controls, and Legal Compliance



National Science Foundation FY 2014 Statement of Assurance

The National Science Foundation (NSF) management is responsible for improving the accountability and effectiveness of its program and operations by establishing, assessing, correcting, and reporting on internal controls to meet the objectives of the Federal Managers Financial Integrity Act of 1982 (Integrity Act) and the Federal Financial Management Improvement Act of 1996 (FFMIA). The agency head is required to provide a statement on whether there is reasonable assurance the agency's controls are achieving their intended objectives and report any material weaknesses in the controls, as required by Section 2 and whether the agency's financial systems conform to government-wide requirements, as required by Section 4 of the Integrity Act. Management is required to provide a separate assessment of the effectiveness of internal controls over financial reporting.

NSF's internal control program is designed to ensure full compliance with applicable laws and regulations: OMB Circular A-123, *Management's Responsibility for Internal Control*, including Appendix A—*Internal Control over Financial Reporting*, Appendix B—*Improving the Management of Government Charge Cards*, Appendix C—*Requirements for Effective Measurement and Remediation of Improper Payments*, Appendix D—*Compliance with the Federal Financial Management Improvement Act; Conducting Acquisition Assessments* under OMB Circular A-123; and OMB Circular No. A-130, *Management of Federal Information Resources*.

NSF completed its evaluations and carefully considered the appropriate balance between controls and risk in operations and the financial management system. Based on the results of these evaluations, NSF provides reasonable assurance that as of September 30, 2014, its internal control over operations and the financial management system were operating effectively to ensure compliance with applicable laws and regulations. No material weaknesses were identified in the design or operation of internal control under Section 2 of the Integrity Act and Section 4 of the Integrity Act, and no system non-conformances were identified for compliance with the FFMIA.

In addition, NSF conducted its assessment of the effectiveness of internal control over financial reporting, which included the safeguarding of assets and compliance with applicable laws and regulations. Based on the results of this assessment for the period ending June 30, 2014, NSF provides reasonable assurance that internal control over financial reporting was operating effectively and no material weaknesses were identified in the design or operation of internal control over financial reporting.

For FY 2014, NSF is providing an unqualified statement of assurance that its internal control and the financial management system meet the objectives of the Integrity Act, FFMIA, and financial reporting, as well as related laws and guidance.

/S/
FRANCE A. CORDOVA
Director

December 15, 2014

Management Assurances

NSF is continually seeking ways to improve transparency and accountability in the achievement of its mission. The internal control system is a continuous integrated component of operations effected by people. It provides a reasonable assurance, not absolute assurance, that the organization's objectives are achieved. Tone from the top, analysis of risk, policies and procedures, quality information, and assessing the quality of internal control performance over time are necessary components to ensure compliance with federal laws, regulations, and guidance.

Internal control supports efficient and effective operations, reporting reliable information about operations, and compliance with applicable laws and regulations. The Integrity Act,²⁰ the GAO *Standards for Internal Control in the Federal Government*,²¹ and OMB Circular A-123, *Management's Responsibility for Internal Control* (including the appendices),²² require ongoing evaluations and annual reporting of the adequacy of the systems of internal control.

The Statement of Assurance is management's assessment of the effectiveness of NSF's internal control. For FY 2014, NSF's internal controls assessment provides reasonable assurance that the objectives of the Integrity Act were achieved and also concludes that the internal controls over financial reporting are effective. NSF is submitting an unqualified Statement of Assurance for FY 2014.

Highlights From NSF's FY 2014 Internal Control Quality Assurance Program

To achieve an unqualified Statement of Assurance, NSF's FY 2014 Internal Control Quality Assurance (ICQA) Program review consisted of evaluating 11 business processes for the period July 1, 2013, through June 30, 2014, to assess internal control over financial reporting. The internal control review assessed internal control over operations and the financial management system for the period October 1, 2013, through September 30, 2014.

NSF integrated the internal control review for improper payments with the annual internal control review and focused on FY 2012 and FY 2013 data. Efficiencies were gained through the synergy of the combined effort by leveraging components of the three types of risk-based internal control reviews to include risk assessments, flowcharting, control matrices, testing, and reporting of results.

With the understanding that internal control is more than just an exercise in compliance with the Integrity Act, the NSF's internal control reviews utilized an innovative internal control approach that enables an enterprise-wide review—an approach that helps NSF management ensure internal control is not limited to just organizational components with financial touch points.

The FY 2014 internal control assessment consisted of assuring efficiency and effectiveness of operations, reliability of financial reporting, and compliance with laws and regulations. Internal controls within NSF are established with a top-down approach, at the entity-level, and within the business processes. NSF adopted the components of internal control and principles from the Committee of Sponsoring Organizations of the Treadway Commission's (COSO) Internal Control–Integrated Framework, to assure an effective internal control system.²³

²⁰ For more information about the Federal Managers Financial Integrity Act of 1982, see www.whitehouse.gov/omb/financial_fmfi1982.

²¹ For more information about GAO *Standards for Internal Control in the Federal Government*, see www.gao.gov/products/GAO-14-704G.

²² For more information about OMB Circular A-123, see www.whitehouse.gov/omb/circulars_a123_rev.

²³ For more information about the COSO internal control integrated framework, see www.coso.org/ic.htm.

To meet the requirements of the OMB Circular A-123, *Management's Responsibility for Internal Control* and its appendices, the internal control review was designed and conducted to include financial reporting, charge cards, improper payments, financial systems, and acquisition. These considerations with the 11 business process internal control reviews provided a comprehensive review resulting in an unqualified Statement of Assurance.

NSF's Integrated Internal Control System—OMB Circular A-123, Appendices A and B

The NSF risk-based integrated internal control system supports the organization to adapt to new/revised federal mandates, resource constraints, and emerging priorities. NSF management evaluates its internal control system to assure it is effective and updated when necessary. In FY 2014, the Internal Control Quality Assurance Team performed the following:

1. Established a Program Governance structure, documenting the methodology and communication flow of NSF's Internal Control Quality Assurance Program
2. Updated process documentation (narratives and flow diagrams) for each key business process
3. Selected samples based on the frequency of performance of control from the universe of NSF controls performed during FY 2014, using a methodology that is risk-based, statistically valid, and compliant with current OMB guidelines
4. Conducted tests of all transactions selected in the samples and determined if the controls were designed adequately and operating effectively
5. Prepared a final report that details the results of testing and assisted NSF in meeting the reporting requirements for its FY 2014 Statement of Assurance.

This approach leveraged various data collection techniques including conducting interviews, administering surveys, and facilitating working sessions to “widen the lens,” thus helping to ensure that mission critical areas—that may not have a financial impact—are given adequate attention and consideration. The above process assures internal control over financial reporting is assessed and documented, including internal and external financial reports and compliance with laws and regulations that pertain to those financial reports (Appendix A).

Consistent with the application of the annual internal control methodology with Appendix A, the same process was applied to the government charge card program. The annual internal control review assessed and documented compliance with Appendix B to assure the risk of fraud, waste, and errors were reduced in accordance with the requirement to improve the management of government charge card programs.

Improper Payment Initiative—OMB Circular A-123, Appendix C

NSF took a retrospective and prospective view in developing and implementing a revised risk assessment methodology and sampling plan. The agency reviewed its grant program and other activities it administers to develop an approach for determining risk and susceptibility to improper payments. The objective is to detect and prevent improper payments in the future.

The annual internal control review assesses contracts/payments; the procure-to-pay approach supports reliance on the annual contracts management review to adhere to the improper payment review requirements (Appendix C). NSF utilizes a shared service provider for payroll. The annual internal control review conducts transactional payroll testing and relies upon the SSAE 16 received from the shared service provider, adhering to the improper payment review requirements.

To support these efforts, this year for the first time the internal control review integrated the United States Antarctic Program (USAP) payment review with the annual internal control review. The USAP payments were tested within the contract management review. The contract management review annually tests

procure-to-pay for contracts/payments. This approach eliminated duplication of effort and integrated the USAP contract/payments rather than having two distinctive initiatives.

There were two significant areas in which the Internal Control Quality Assurance Program review leveraged the annual internal control review, to eliminate duplication of efforts: 1) with the improper payment review, related to contract management and payroll, and 2) the contract management review, to eliminate duplication of effort with reviewing contract payments.

The improper payment review process was a 2-year effort coordinated with OMB to include the risk assessment, statistical sampling plan, and pilot testing this year. The FY 2014 testing consisted of fourth quarter transactions for FY 2013 data to coincide with a new grant payment system. Contract and payroll transactions are tested thoroughly in the annual internal control review; NSF will continue to include contract and payroll transaction testing within the scope of the annual internal control review.

The details of NSF's FY 2014 Improper Payments Elimination and Recovery Act risk assessment are included in Appendix 2 of this report.

Internal Control Assessment--OMB Circular A-123, Appendix D

To support the 2-year approach for implementing the financial management system policies and procedures OMB approved, the existing internal control methodology was utilized to assess the current legacy financial system and controls. The internal control review was conducted to leverage the improved process for grant payments and consider the upcoming changes to the financial system.

NSF also utilized guidance from the GAO *Federal Information System Controls Audit Manual* (FISCAM) to assess the entity-level controls related to NSF's Security Management Program, Access Controls, Configuration Management, Segregation of Duties, and Contingency Planning. Additionally, the Application level controls for NSF's Awards System and eJacket application were assessed to assure compliance with the FFMIA (Appendix D). The ICQA team validated the design and operational effectiveness of 40 controls. In alignment with Section 2.1.6 of the FISCAM, the information system controls were compliant.

In addition, the internal control program monitored the new financial system implementation to plan for future program impacts.

Acquisition Assessment--OMB Circular A-123

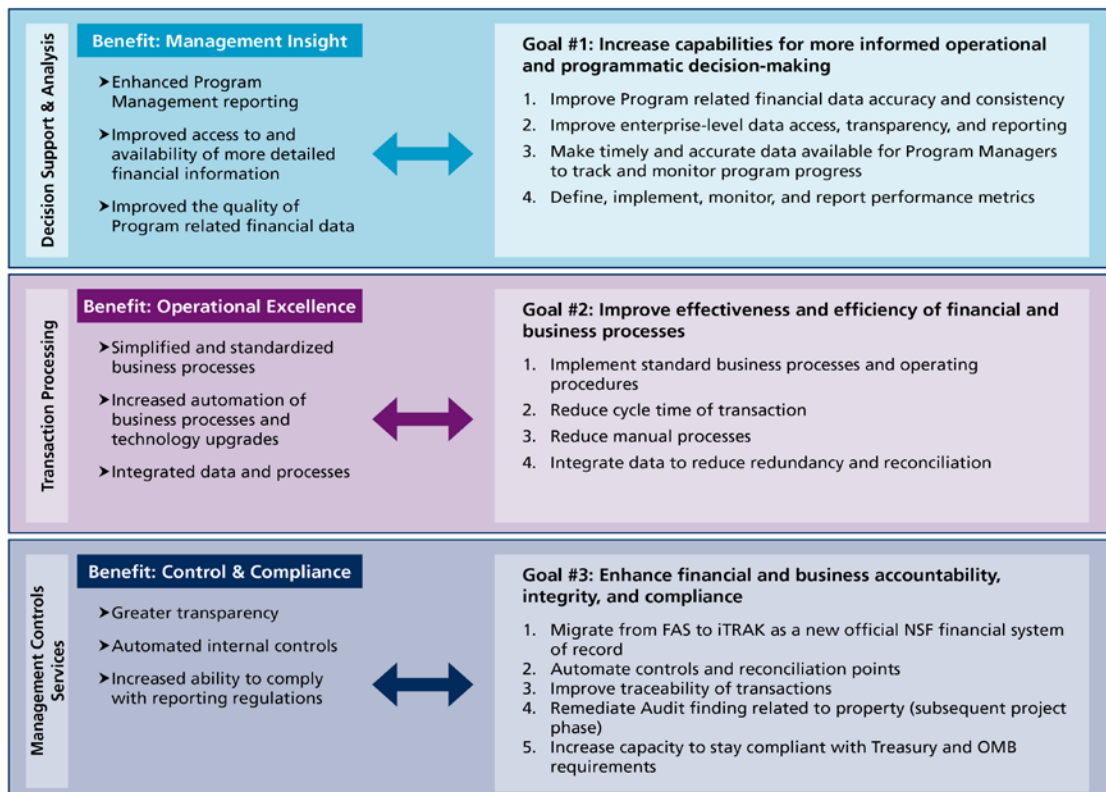
NSF developed a baseline for the acquisition assessment to include the four cornerstones identified by GAO: 1) organizational alignment, 2) policies and processes, 3) human capital, and 4) information management and stewardship. This was the basis for NSF's self-assessment. The internal control continues to survey the acquisition organization, conduct entity-level control reviews, and review contracts management annually. The established baseline for the acquisition assessment allows NSF to review one cornerstone annually. This approach integrates the entity-level acquisition review into the existing internal control review and reporting processes that are used to support the annual OMB Circular A-123-related assurance statement, as appropriate.

Financial System Strategy and Framework

After a 4-year planning period and a 2-year implementation period, in October 2014, NSF successfully transitioned to a new financial management solution that replaces its 25-year-old custom legacy Financial Accounting System (FAS). The new system, known as “iTRAK,” is a cloud-based commercial off-the-shelf (COTS) Oracle Federal Financials system hosted in a shared service environment. Motivations for using a COTS system include the expectations of a reduction in the overall system-development costs (as components can be bought or licensed instead of being developed from scratch) and reduced long-term maintenance costs. As COTS incorporates industry best practices, there will be greater standardization and integration with other federal and financial systems. In addition, since compliance requirements are inherent in the COTS system the new solution will help NSF uphold its strong compliance record. NSF selected Accenture, a management consulting, technology services and outsourcing company, to implement iTRAK. They are teamed with Booz Allen Hamilton, a management and technology consulting company.

iTRAK was developed in accordance with OMB Memorandum M-10-26, *Immediate Review of Financial Systems IT Projects*, OMB Memorandum M-13-08, *Improving Financial Systems Through Shared Services*, and other government-wide requirements. iTRAK was developed to comply with OMB Circular A-123, Appendix D and other applicable regulatory requirements. Specifically, iTRAK ensures that transactions are posted in accordance with the U.S. Standard General Ledger (USSGL) at the transaction level; maintains accounting data to permit reporting in accordance with Generally Accepted Accounting Principles (GAAP) as prescribed by the Federal Accounting Standards Advisory Board (FASAB) for federal reporting entities; enforces strict funds control to prevent anti-deficiencies across the budgeting and spending functions; and enables strong access control and definition of “responsibilities” to support segregation of duties control. Figure 11 shows the goals and benefits of iTRAK.

Figure 11. iTRAK Benefits and Goals



As the agency's new core financial system, iTRAK interfaces with NSF's existing awards and grants management systems including eJacket, NSF's internal awards processing system; FastLane, NSF's online website through which the agency conducts its relationship with the proposal community, reviewers, and research administrators and their organizations; the Award Management and Award Letter System ("Awards"); the Award Cash Management Service (ACMS); the Graduate Research Fellowship Program (GRFP); and the Guest Travel and Reimbursement System. As shown in Figure 12 below, iTRAK also interfaces with LearnNSF, the agency's staff training module; other federal systems such as the Federal Personnel Payroll System (FPPS), eTravel/Concur, and GSA's System for Award Management (SAM); and the U.S. Treasury as well as with J.P. Morgan Chase Bank.

Future iTRAK phases include integration of an Acquisition Module, a Fixed Asset Module, and a Budget Formulation Module with the Oracle COTS core financial system, as resources permit.

Figure 12. The iTRAK Framework

