Chapter 1

Management's Discussion and Analysis

Agency Overview

Mission and Vision

The mission of the U.S. National Science Foundation (NSF) is "to promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense."[1] Fundamental to this mission is innovation, which arises from basic research in science and engineering and is necessary for economic prosperity and national security.[2] Our vision is a nation that capitalizes on new concepts in science and engineering and provides global leadership in advancing research and education.[3]

NSF is the only federal agency dedicated to supporting non-biomedical research and education across all fields of science and engineering. NSF is the funding source for approximately 20 percent of all the federally supported basic scientific research conducted by America's colleges and universities. In many fields—such as mathematics, computer science, and the social sciences—NSF is the predominant source of federal funding. For example, NSF supports 81 percent of the computer science research at universities.[4] These investments in research and education have fueled many important innovations that have stimulated economic growth and improved the quality of life and health for all Americans.

In keeping with our mission, NSF aims to accelerate the application of scientific discoveries by investing in a national "culture of innovation." This investment builds on our legacy of more than 60 years in supporting basic research and spawning innovation by broadening the impact of select, NSF-funded, basic research projects, and by preparing scientists and engineers to extend their focus beyond the laboratory and contribute to 21st century science and engineering from the frontiers. In addition, our investments integrate research and education to support the development of a world-class scientific workforce that can engage fully in and contribute imaginatively to a 21st century world that increasingly relies on technology to meet challenges and leverage opportunities.

As part of our investment in the development of this workforce, NSF has funded 45,768 Graduate Research Fellowships since 1952. The ranks of NSF fellows include numerous individuals who have made transformative breakthroughs in science and engineering research. Many have become leaders in their chosen fields; 356 have become members of the National Academy of Sciences or National Academy of Engineering, and 40 have been honored as Nobel laureates. In fact, 204 Nobel Prize winners have received NSF support at some point in their careers, including five of the most recent winners announced in October 2012.[5] These investments are a critical means by which NSF achieves its mission; we excel at identifying, nurturing, and investing in scientific potential.

We also achieve our mission by making awards and managing a portfolio of the highest quality research and education projects that further our strategic goals, reflect our national priorities, and keep the United States at the forefront of innovation as a global leader of the 21st century science and engineering enterprise. In doing so, NSF is visionary, pursuing transformational work, new fields, and new theoretical paradigms, particularly through grants that reflect the increasingly multidisciplinary nature of modern science and engineering. We are dedicated to excellence, continuous learning and growth. We are broadly

[1] The National Science Foundation Act of 1950 (Public Law 81-507).
[2] Bush, V. (1945). *Science—The Endless Frontier: A Report to the President* available at www.nsf.gov/about/history/vbush1945.htm
[3] *Empowering the Nation Through Discovery and Innovation, the NSF Strategic Plan for Fiscal Years (FY) 2011−2016* available at www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf11047.
[4] See NSF FY 2013 Budget Request to Congress, page Overview-12 at www.nsf.gov/about/budget/fy2013/toc.jsp.
[5] See www.nsf.gov/news/news_summ.jsp?cntn_id=100683.

inclusive, seeking to include contributions from all sources while reaching out, especially to groups that are underrepresented in science and engineering.

All NSF programs and activities are driven by three interrelated strategic goals—*Transforming the Frontiers*, *Innovating for Society*, and *Performing as a Model Organization*. Our pursuit of our mission can be assessed through our success in achieving our performance goals, which include measureable targets for our near-, mid-, and long-term actions. Figure 4 (page I-11) depicts our FY 2011−2016 strategic plan, which we continued to use in FY 2012 as our roadmap to achieving the NSF mission and vision.[6]

Photo credit: Lisa Hunter, University of Hawaii. James Linden built this thermal enclosure for the ATS telescope.

Alumni of the NSF-supported Akamai Workforce Initiative are finding high-tech jobs within the state of Hawaii. This is a major triumph for the program and a success of the model that provides internships and ongoing support for undergraduate students with high-tech companies and observatories on the islands of Maui and Hawaii. In addition to supporting the advancement of STEM learning within Hawaii, Akamai also cultivates local talent and places that talent into jobs within the state, an outcome that is especially important to Native Hawaiian students and students who have lived in Hawaii for all or most of their lives. See http://cfao.ucolick.org/EO/awi for more information.

Following the Money

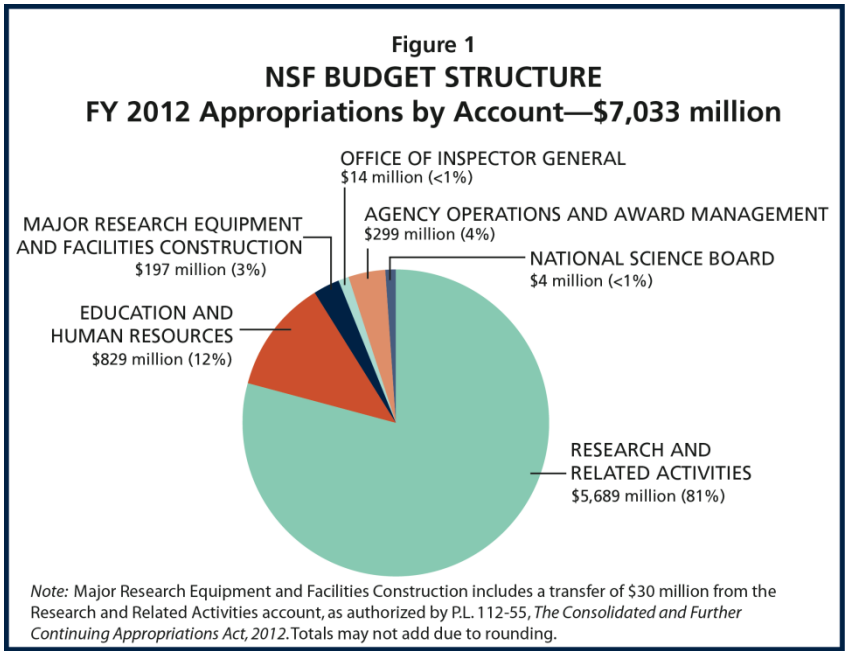
NSF is funded primarily through six congressional appropriations, which totaled $7,033 million in FY 2012 (Figure 1).[7] Research and Related Activities (R&RA), Education & Human Resources (EHR), and Major Research Equipment and Facilities Construction (MREFC) fund the agency's programmatic activities and account for 95 percent of NSF's total appropriations.

- R&RA supports basic research and education activities at the frontiers of science and engineering, including high-risk and transformative research. It accounted for 81 percent of FY 2012 funding.
- EHR supports activities that ensure a diverse, competitive, and globally engaged U.S. science, technology, engineering, and mathematics workforce and a scientifically literate citizenry. It accounted for 12 percent of FY 2012 funding.
- 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 FY 2012 funding.
- The Agency Operations and Award Management (AOAM) appropriation supports NSF's administrative and management activities. It accounted for 4 percent of the agency's FY 2012 funding.

[6] The NSF strategic plan details our mission and vision, along with the core values, strategic and performance goals, targets and core strategies, and evaluation and assessment mechanisms designed to ensure that we are achieving our mission and vision. The strategic plan is available at www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf11047.

[7] In Figure 2, FY 2012 appropriations of $7,033 million plus Trust Funds ($47 million) and H1-B Nonimmigrant Petitioner Receipts ($129 million) equal $7,209 billion as shown in the Statement of Budgetary Resources.

- Separate appropriations support the activities of the Office of Inspector General (OIG) and National Science Board (NSB).



In FY 2012, 89 percent of research funding was allocated based on competitive merit review.[8] Nearly 38,000 members of the science and engineering community participated in the merit review process as panelists and proposal reviewers.[9] Awards were made to 1,895 institutions in 50 states, the District of Columbia, and 3 U.S. territories. These institutions employ America's leading scientists, engineers, and educators, and train the leading-edge innovators of tomorrow. NSF estimates that in FY 2012, 319,000 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, television, videos, and journals; outreach efforts; and dissemination of improved curriculum and teaching methods.

In FY 2012, NSF funded 11,534 new awards, mostly to academic institutions. As shown in Figure 2, 80 percent of support for research and education programs ($5,462 million) was to colleges, universities, and academic consortia. Private industry—including small businesses, which were an important focus of the Administration—accounted for 14 percent ($920 million) and support to Federally Funded 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 funded 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.

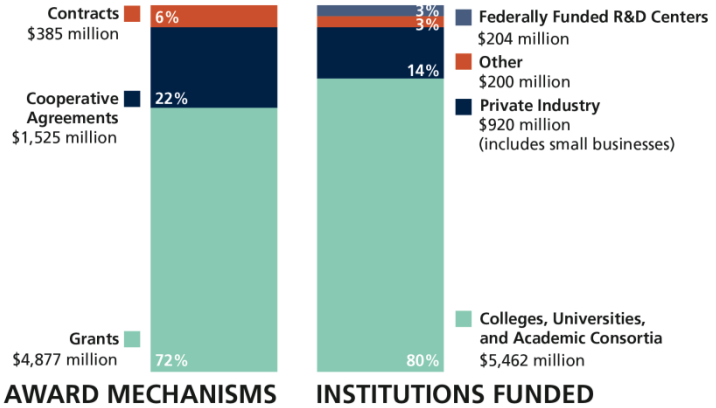
[8] NSF does not require merit review for certain kinds of proposals, including proposals for international travel grants and some conferences, symposia, and workshops.

[9] For more information about NSF's merit review process, see www.nsf.gov/bfa/dias/policy/meritreview and *Report to the National Science Board on the National Science Foundation's Merit Review Process FY 2011* (NSB-12-28) at www.nsf.gov/nsb/publications/2012/nsb1228.pdf.

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 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.

Figure 2

NSF AWARD MECHANISMS AND INSTITUTIONS FUNDED
FY 2012 Obligations for Research and Education Programs ($6,787 million)



Notes: NSF Research and Education Programs include Research & Related Activities, Education & Human Resources, and Major Research Equipment & Facilities Construction appropriations. Other institutions funded include federal, state, and local governments; nonprofit organizations; and international organizations. Totals may not add due to rounding.

Organizational Structure

NSF is an independent federal agency headed by a Director appointed by the President and confirmed by the U.S. Senate.[10] A 25-member National Science Board (NSB) meets five times a year to establish the overall policies of the Foundation. NSB members—prominent contributors to the science and engineering research and education community—are also appointed by the President with the consent of the Senate.[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 about 1,400 permanent staff.[12] NSF also regularly recruits visiting scientists, engineers, and educators as rotators who work at NSF for up to 4 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.

[10] Biographies of the Director and Deputy Director, appointed by the President and confirmed by the Senate, are available on the NSF website: www.nsf.gov/od.

[11] On August 10, 2012, the President signed the Presidential Appointment Efficiency and Streamlining Act of 2011, P.L. 112-166 (effective October 10, 2012), which removes the Senate confirmation requirement for NSB members. For additional information about the NSB, see Appendix 6 and www.nsf.gov/nsb.

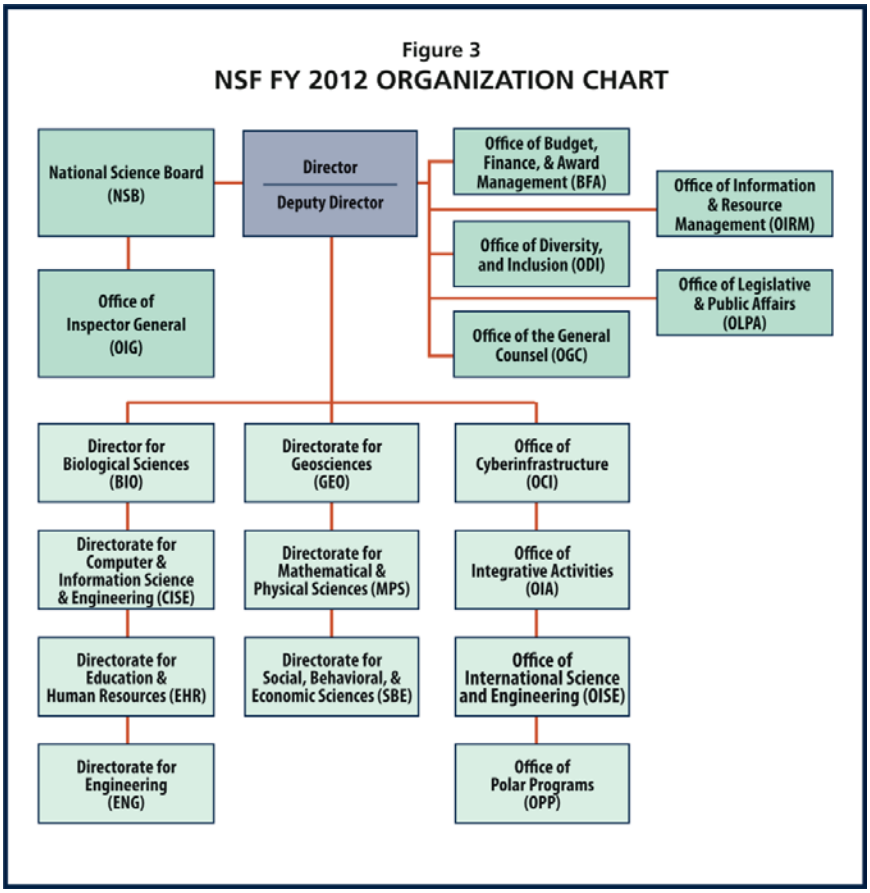
[12] Full-time equivalents.

[13] As of September 2012, temporary appointments included 184 under the Intergovernmental Personnel Act.

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 September 2012, NSF announced that in FY 2013, three program offices now falling under the Office of the Director will be realigned and reintegrated into units where there is more programmatic and administrative depth and expertise. The Office of Cyberinfrastructure will become a division within the Directorate for Computer and Information Science and Engineering; the Office of Polar Programs will become a division within the Directorate for Geosciences; and the Office of International Science and Engineering will be merged with the Office of Integrative Activities. This realignment will improve the scientific impact and organizational efficiency of the affected organizations, by creating stronger integration across programs and setting a tone for considering organizational arrangements more broadly.

In addition to the agency's headquarters located in Arlington, Virginia, NSF maintains offices in Paris, France; Tokyo, Japan; and Beijing, China to facilitate international activities. To support the U.S. Antarctic Program (USAP), NSF maintains an office in Christchurch, New Zealand.

Figure 3
NSF FY 2012 ORGANIZATION CHART



Management Challenges

In FY 2012, the NSF Office of Inspector General (OIG) identified seven major management and performance challenges facing the agency: ensuring proper stewardship of Recovery Act funds, improving grant administration, strengthening contract administration, implementing improvements in workforce management and the workplace environment, encouraging the ethical conduct of research,

effectively managing large facilities and instruments, and managing programs and resources in times of budget austerity. The OIG also identified two emerging challenges: transitioning to cloud computing and the trusted internet connection, and planning for the next NSF headquarters.[14] Management's report on the significant activities undertaken in FY 2012 to address these challenges is included as Appendix 4B of this report. The report also discusses activities planned for FY 2013 and beyond. Some of the agency accomplishments in FY 2012 are highlighted below:

- *To ensure proper stewardship of Recovery Act funds:* NSF continued to implement a robust, comprehensive, and multi-stage review program for recipient reporting. This process has matured over the past 12 reporting quarters, receiving recognition from the Office of Management and Budget (OMB) and the Recovery Accountability and Transparency Board (RATB) and contributing to process-improvement recommendations government-wide. NSF delivered a reporting compliance rate of more than 99 percent over the last eleven reporting quarters with the highest rate in FY 2012 reaching 99.8 percent compliance, which exceeded the government-wide reporting compliance rate in each quarter. This was the result of targeted outreach through phone calls and emails to recipients in danger of non-compliance with reporting requirements for multiple quarters and suspending or terminating the awards of non-compliant grantees when necessary. In addition, NSF implemented an aggressive communication strategy to notify all American Recovery and Reinvestment Act (ARRA) award recipients of the OMB directive to accelerate spending in order to exhaust remaining funds by September 30, 2013. All NSF communications have emphasized *responsible* acceleration of ARRA expenditures, in accordance with the terms and conditions of the award and allowable pursuant to the applicable cost principles.

- *To improve grant administration:* NSF established the operationally focused NSF-OIG Audit Quality Subgroup under the Stewardship Collaborative. The Subgroup agreed to segregate internal (NSF) versus external (awardee) audit findings and release of detailed schedules of questioned costs upon issuance of audit reports. NSF has finished initial development of the Award Cash Management Service (ACM$), which will increase control over how awardees draw down funds, including on contingency budgets on large-scale construction projects. Selection of a system solution for iTRAK, NSF's new financial management system, was completed and the initial implementation phase has begun, including staffing for the iTRAK Project Management Office that will oversee the process. NSF continues to expand and upgrade mechanisms and tools for communicating policies, regulations, and business practices to staff and external stakeholder communities. NSF also piloted four successful virtual Award Monitoring and Business Assistance Program site visits to mitigate current and future resource restraints while still maintaining adequate oversight.

- *To strengthen contract administration:* NSF has continued to take a comprehensive approach by improving policies, procedures, and human capital initiatives. Specifically, guidance to address gaps related to cost reimbursement contracting has been reinforced and key acquisition workforce policy has been updated to ensure full compliance with recent policy changes issued by OMB's Office of Federal Procurement Policy. In addition, NSF added language to its contracting manual addressing the importance of monitoring incurred cost audits, as well as continues to work on obtaining all incurred cost audits for close-out of the U.S. Antarctic Program contract.

- *To implementing improvements in workforce management and the workplace environment:* NSF has made consistent progress in addressing past recommendations, as well as in responding to new or

[14] The OIG's memorandum on NSF's FY 2012 management challenges is included in Appendix 3A in NSF's FY 2011 Agency Financial Report at www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf12001.

modified recommendations as they arise from internal or external sources. Actions have been taken in the context of NSF's Strategic Plan and annual Government Performance and Results Act performance goals, and to align with the NSF Human Capital Strategic Plan and the NSF Diversity and Inclusion Strategic Plan. Management actions regarding workforce issues have included hiring a new Chief Human Capital Officer and including human resource topics in the weekly meetings of NSF's senior management groups, which are now more broadly engaged in establishing effective human capital management practices.

- *To encourage the ethical conduct of research:* As part of NSF's response to the America Competes Act, NSF has continued to strengthen awardee understanding and adherence to conduct standards by ensuring that the science and engineering communities have resources to train students and postdoctoral fellows in making informed, ethical, and responsible decisions in research and professional practices. NSF, as part of its outreach efforts, has also presented information on the responsible conduct of research at various conferences, seminars, and orientation meetings.

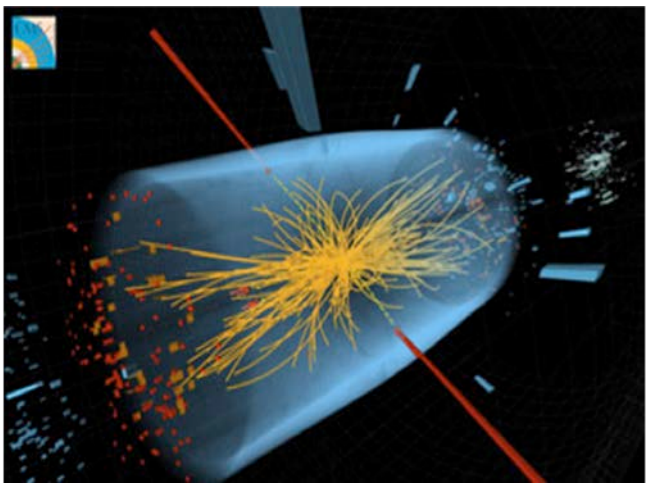


Photo credit: CERN/CMS collaboration 2011. Photo is a rendering of a typical candidate event from the Compact Muon Solenoid (CMS) Experiment in the search for the Higgs boson.

In July 2012, physicists working on experiments at the Large Hadron Collider (LHC) at the CERN laboratory announced the discovery of a new particle that future analysis may show to be the long-sought Higgs boson, the missing piece in the Standard Model of particle physics. If the particle is confirmed to be the Higgs boson, this represents a keystone in our knowledge of the elementary forces and particles that exist in our universe. NSF supports approximately 400 scientists at U.S. Universities, including students, postdocs, and faculty members who helped to design, build and operate the particle detectors and participated in these LHC experiments.

- *To effectively manage large facilities and instruments:* NSF has continued to ensure that all projects were on time, on budget, and meeting performance expectations by participating in construction and final design reviews, as well as regularly monitoring all open construction projects funded through the Major Research Equipment and Facility Construction (MREFC) appropriations account. NSF also assessed performance of awardees by conducting Business Systems Reviews (BSR) and related post-BSR monitoring activities on several active MREFC projects, including the National Radio Astronomy Observatory, and Phase I reviews of the National Optical Astronomy Observatory, National Solar Observatory, and Advanced Technology Solar Telescope.

- *To manage programs and resources in times of budget austerity:* NSF has made significant progress towards reducing certain administrative costs by identifying and implementing efficiencies, by prioritizing work, eliminating or scaling back the scope of some activities, and exploring new ways of getting the job done. Travel costs have been reduced by 9 percent below the FY 2010 baseline. Efforts are also underway to streamline how NSF procures and uses telecommunications services (including mobile devices) and to reduce the cost of light refreshments in support of conferences and panels.

With respect to the emerging challenges, NSF will:

- *Transition to cloud computing and to the trusted internet connection:* NSF has begun adopting cloud computing and implementing the Trusted Internet Connection (TIC) capabilities in alignment with federal information technology (IT) priorities. NSF's focus for both efforts has been to maintain a strong security capability throughout service transitions while ensuring limited impact on agency operations. The agency reports periodically to OMB on implementation of its cloud computing and TIC efforts.

- *Plan for the next NSF headquarters:* NSF has worked with GSA to revise the new lease procurement strategy and provided significant support to GSA and other stakeholders in efforts to secure Congressional approval of NSF's prospectus. We have continued to assess internal technology, communications and furniture assessments, and pilot programs related to this effort.

Future Challenges and Opportunities: Vision for 2013 and Beyond

The most important driver of challenges and opportunities for NSF is the agency's position as a global leader at the forefront of a new era of science. This new era cuts across every field of science and engineering, including social sciences. It may be categorized into two areas: the "Era of Observation" and the "Era of Data and Information."

In the new era of observation, NSF funding supports large-scale experimental tools and infrastructure across all research domains. Examples of such funding include neutrino research in Antarctica and astronomical research through telescopes in Chile, Hawaii, Arizona, and Puerto Rico. Community-based observational platforms provide the infrastructure to engage large, interdisciplinary teams of scientists in addressing extremely complex and challenging questions. Additional examples include EarthScope, the Ocean Observatories Initiative, and the National Ecological Observatory Network. NSF's investments will expand the frontiers of human discovery by enabling scientists to observe from the outer edges of the solar system and the universe, to the physical, chemical, geological and biological variables in the ocean and on the seafloor. The new era of observation also includes supporting research phenomena at the nano-, pico-, and femto-scales—observing, for example, a single biological molecule or a neuron in the human brain, or displacements of a nanometer with a level of sophistication that could not have been achieved even five years ago.

The unprecedented amounts of data yielded by this new era of observation have ushered in a new era of data and information. Data are viewed as a valuable part of the research enterprise. NSF's data management and sharing plan furthers this vision, requiring that investigators share research results with other researchers at no more than incremental cost.[15] NSF's commitment to enabling the development of next-generation data assets and data-intensive science across research disciplines, further exemplifies this new era. This requires ever increasing levels of transparency and accessibility of NSF publications and data.

Recognizing the complexities that increased transparency can bring—including issues of privacy, intellectual property, cost, national security, competitiveness, and cybersecurity—NSF's leadership

[15] Proposals submitted to NSF must include a short supplementary document labeled "Data Management Plan" (DMP) that describes how the proposal will conform to NSF policy on the dissemination and sharing of research results. The agency will not accept proposals without a DMP. For more information, see the Grant Proposal Guide, Chapter II.C.2.j, www.nsf.gov/pubs/policydocs/pappguide/nsf11001/gpg_2.jsp#dmp and the Data Management and Sharing Frequently Asked Questions(FAQs), www.nsf.gov/bfa/dias/policy/dmpfaqs.jsp.

envisions building a policy infrastructure to deal with these challenges, not just in the United States, but globally. NSF is creating an international policy hub based on a centralized infrastructure for data gathering, evaluation, and analysis. At its inaugural, 2-day Global Summit on Merit Review in May 2012, research councils from 50 countries established the Global Research Council (GRC). The global summit was the first step toward a more unified approach to the scientific process. The GRC will create principles of engagement for all the funding agencies in the world, taking up issues beyond merit review and fostering multilateral research and collaboration across continents. Global scientific collaboration expands the pool of knowledge that belongs to everyone and serves as a tool to improve health, security, and opportunity. The next GRC meeting will be held in May 2013. This meeting will be hosted by the German Research Foundation, which has asked NSF to chair it.

Members of the Global Research Council (GRC) gather at NSF headquarters in May 2012 for the GRC's inaugural meeting.

This vision for the future challenges NSF is to scale-up and think big. NSF must foster cutting-edge research for knowledge creation to ensure economic prosperity and keep America at the forefront of innovation. NSF must do so in a tight fiscal environment that compels prioritization of resources and pushes the limits of leadership and staff creativity. NSF must continue to broaden the participation of underrepresented groups, leveraging the full range of U.S. scientific potential; remove disciplinary barriers and organizational silos to encourage interdisciplinary research projects; embed education into research and research into education; develop a global perspective for every activity; gain leverage through collaboration; and define and articulate science's grand challenges.

At the core of these efforts is the OneNSF philosophy, which guides all agency investments, and the principles for NSF's interactions globally, nationally, and within agency headquarters. OneNSF envisions NSF as an agency that works seamlessly and in a well-integrated way across organizational and disciplinary boundaries. It strives to create new knowledge, stimulate discovery, address complex societal problems, and promote national prosperity through a variety of mechanisms. The *FY 2013 NSF Budget Request* established agency priorities through a OneNSF framework. OneNSF helps to define investment priorities such as Cyberenabled Materials, Manufacturing, and Smart Systems; Cyberinfrastructure Framework for 21st Century Science and Engineering; Expeditions in Education (E^2); NSF Innovation Corps (I-Corps); Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE); Secure and Trustworthy Cyberspace; and Science, Engineering, and Education for Sustainability (SEES).[16]

[16]These and other budget priorities are highlighted in the Overview of NSF's FY 2013 Budget Request to Congress, www.nsf.gov/about/budget/fy2013. Other highlighted priorities include Clean Energy; Advanced Manufacturing; The Faculty Early Career Development program (CAREER); The Graduate Research Fellowship program (GRF); Science and Technology Centers (STCs); Research at the Interface of the Biological, Mathematical, and Physical Sciences (BioMaPS); Experimental Program to Stimulate Competitive Research (EPSCoR); Enhancing Access to the Radio Spectrum (EARS); US Ignite; Science, Technology, Engineering, and Mathematics (STEM) Education; and the Federal Cyberservice: Scholarship for Service (SFS).

Performance

This discussion of NSF's FY 2012 performance management activities focuses on the agency's efforts related to the Government Performance and Results Act of 1993 (GPRA), the GPRA Modernization Act of 2010,[17] the American Recovery and Reinvestment Act (ARRA or Recovery Act), and management workload metrics.

FY 2012 Strategic Framework

NSF is subject to the Government Performance and Results Act of 1993 and the GPRA Modernization Act of 2010, as well as related performance reporting guidance issued by OMB.[18] NSF's Strategic Plan, *Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years (FY) 2011–2016*,[19] lays out the following strategic goals:

- *Transform the Frontiers* emphasizes the seamless integration of research and education as well as the close coupling of research infrastructure and discovery.
- *Innovate for Society* points to the tight linkage between NSF program and societal needs and highlights the role that new knowledge and creativity play in economic prosperity and society's general welfare.
- *Perform as a Model Organization* emphasizes the importance to NSF of attaining excellence and inclusion in all operational aspects.

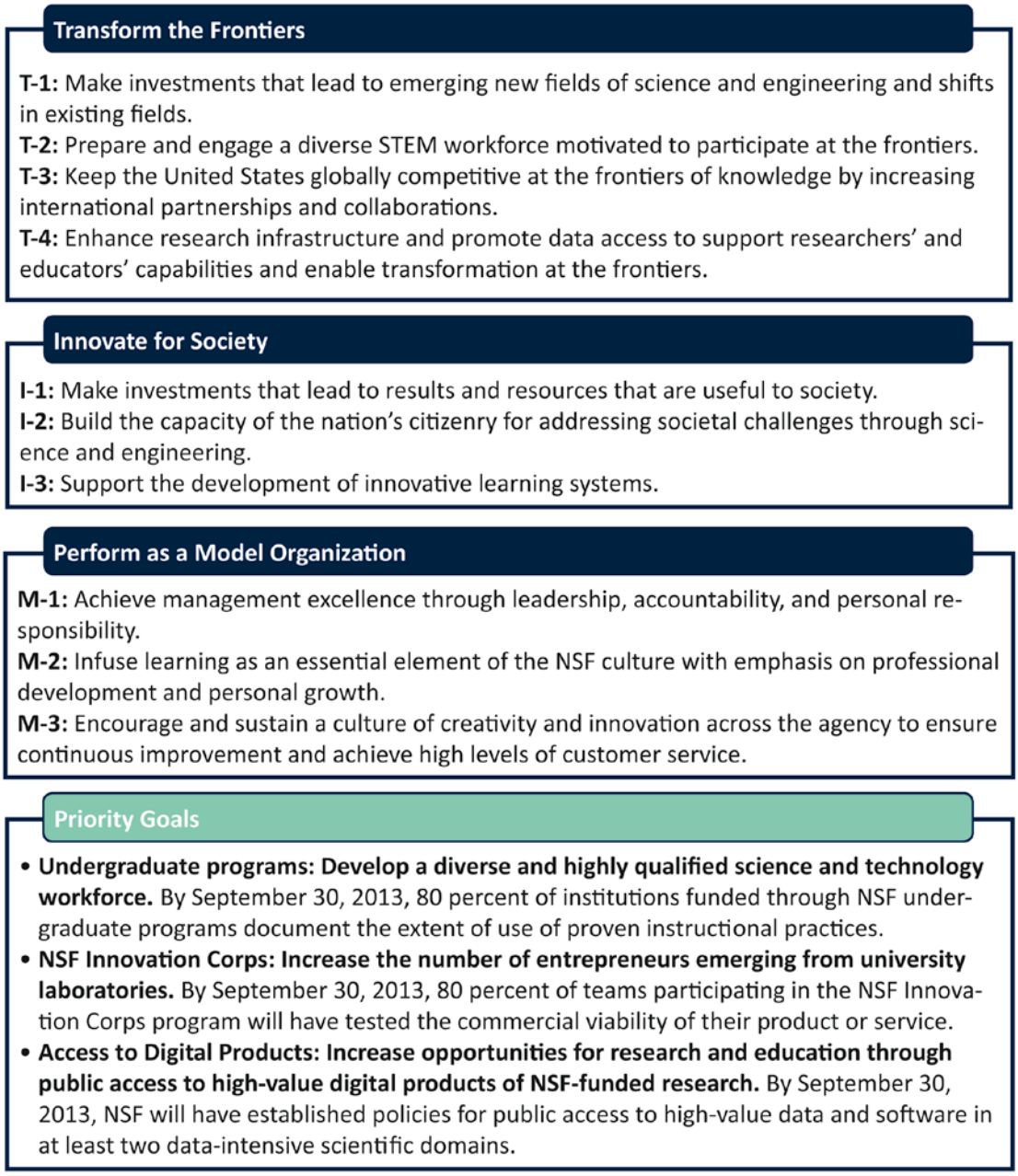
These three strategic goals are broken down into ten specific strategic objectives (Figure 4). Progress toward these objectives is monitored through annual performance targets. In FY 2012, a total of 15 targets were set.

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 2012--FY 2013 to monitor progress in specific areas where near-term focus on agency execution can have the most impact. In FY 2012, the agency instituted quarterly data-driven performance reviews for each of the three agency Priority Goals, led by agency leaders.

The following discussion of NSF's performance goals and results summarizes information available to date. NSF's *FY 2012 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, along with a list of relevant external reviews. All of NSF's FY 2012 performance goals have undergone an independent verification and validation review by an external consultant using GAO guidance.[20] More detailed information about NSF's GPRA verification and validation review will be part of the APR. NSF's FY 2012 APR will be included in the agency's FY 2014 Budget Request to Congress, which will be available February 4, 2013 at www.nsf.gov/about/performance.

[17] See www.whitehouse.gov/omb/mgmt-gpra/index-gpra.
[18] OMB Circular A-11, *Preparation, Submission, and Execution of the Budget* (Part 6); see www.whitehouse.gov/omb/circulars_a11_current_year_a11_toc.
[19] See www.nsf.gov/news/strategicplan.
[20] U.S. Government Accountability Office. (April 1998). *The Results Act: An Evaluator's Guide to Assessing Agency Annual Performance Plans*, GAO/GGD-10.1.20; see www.gao.gov/special.pubs/gg10120.pdf.

Figure 4: NSF Strategic and Performance Goals



FY 2012 Progress Toward Strategic and Priority Goals

In FY 2012, NSF tracked progress toward three strategic goals and three Priority Goals. All program activities within the agency were covered by the 15 targets used to monitor the three strategic goals. A list of these targets can be found in Appendix 5 of this report.

Transform the Frontiers. Progress towards this goal's objectives involved measuring a combination of new and pre-existing activities.

- Two new programs worked to establish funding mechanisms more flexible and adaptable to current realities: INSPIRE supports unusually novel, potentially transformative, and interdisciplinary research, while Career-Life Balance investments support greater use of the talents of Americans in all sectors of the population.
- All NSF-funded facilities under construction kept cost variance within 10 percent of targets. All but one construction project kept schedule variance within 10 percent of targets.
- Funding opportunities were screened for possible international implications by the Office of International Science and Engineering.

Innovate for Society. In FY 2012, NSF met the objectives under this strategic goal by the applying new approaches to the design and monitoring of existing portfolios.

- In the Directorate for Engineering, the Division of Industrial and Innovation Partnerships (IIP) continued to develop tools to monitor its portfolio of investments. Baseline data were collected for the number of partnerships made by companies in IIP.
- The Directorate for Education and Human Resources has been leading efforts to establish a single set of evidentiary standards for programs in different parts of the Foundation that have thematic, if not organizational, linkages. In FY 2012, the themes were: K-12 education ready for scale-up, public understanding and communication of science, and innovative learning systems/cyberlearning.

Perform as a Model Organization. Targets to achieve this strategic goal focused in FY 2012 on human resources development, customer service, and technological upgrades.

- Seventy-eight 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.
- A training module was developed for program officers on how to use virtual meeting technology in merit review processes.
- As in previous years, NSF took steps toward achieving "Model EEO Agency" status.
- For the second year, NSF's temporary scientific staff members were included under the same performance management system used for full-time employees.
- The Division for Human Resources Management completed an agency-wide training needs assessment and delivered an action plan for improving NSF's employee management systems.
- The contract to replace NSF's financial system was awarded.

Priority Goal—Undergraduate Programs. This priority goal addresses NSF's long-term core commitment to the role of undergraduate education in engaging and preparing a diverse and highly qualified science and engineering workforce. While many factors influence whether students stay in science, technology, engineering, and mathematics (STEM) majors, one challenge students report is lackluster introductory courses that do not provide the support they need to succeed in STEM classes. Research shows that evidence-based instructional practices lead to improved student learning, making them a useful metric for assessing the impact of educational practices on a well-prepared workforce. In order to encourage and facilitate the use of empirically-based instructional practices in STEM undergraduate education, NSF must first establish baseline information about their use. While the ultimate deadline for this goal is the end of FY 2013, NSF met the interim deadlines for FY 2012. The Priority Goal Group established that institutions of higher education that received NSF funding for STEM education as of September 30, 2012, will be counted among the metrics for this goal.

For this goal, NSF adopted multiple strategies, which cover a wide variety of regular NSF processes such as solicitation development, monitoring system development, data collection, and outreach. Progress toward quantitatively meeting this goal should also contribute to improvement on and better coordination of these NSF processes. For more details, refer to the Priority Goal section of www.performance.gov.

Priority Goal—NSF Innovation Corps. The NSF Innovation Corps (I-Corps) is a set of activities and programs that prepares scientists and engineers to extend their focus beyond the laboratory and broadens the impact of select, NSF-funded basic research projects. While knowledge gained from these projects frequently advances a particular field of science or engineering, some of the research results also show immediate potential for broader applicability and impact in the commercial world. These results may be translated through I-Corps into technologies with near-term benefits for the economy and society. Combining experience and guidance from established entrepreneurs with a targeted curriculum, I-Corps is a public-private partnership program that teaches grantees to identify valuable product opportunities that might emerge from academic research. I-Corps also offers entrepreneurship training to student participants.

In FY 2012, a total of 100 teams were accepted into the six-month program. The completion rate was 93 percent, well above the 80 percent target. For more details, refer to the Priority Goal section of www.performance.gov.

Priority Goal—Access to Digital Products. Digital data are increasingly becoming one of the primary products of scientific research. Access to the digital products of research enhances openness and transparency in the scientific enterprise and enables new types of multi-disciplinary research and education. Therefore, it is increasingly important for NSF to facilitate and encourage access to data and research results. This Priority Goal supports collaborative and multidisciplinary science by enabling data to flow more easily across traditional disciplinary boundaries. While the ultimate deadline for this goal is the end of FY 2013, NSF met the interim target for FY 2012 to convene a cross-agency group that would assess the state of NSF's policies in this area and make recommendations to the Goal Leader. The group determined that many NSF-funded large facilities, which represent their scientific domains, already have established policies for public access to high-value data and software. For example, in earth sciences, the National Center for Atmospheric Research (NCAR) provides the online Community Data Portal, which is a collection of earth science datasets from NCAR and other participating organizations. The portal hosts over 8,000 datasets in over one million files, and has resulted in over 2,000 registered users downloading over four terabytes of data. The Community Data Portal also provides access to five separate high-value software packages for earth science data analysis. The group recommended that future activities towards achieving this goal should shift the focus from large facilities to other types of NSF investments. For more details, refer to the Priority Goal section of www.performance.gov.

Recovery Act Performance Results

In FY 2012, NSF continued implementing our three programs funded through the American Recovery and Reinvestment Act (ARRA): R&RA, EHR, and MREFC. NSF's broad goals for these programs are derived directly from the purposes and principles expressed in the Recovery Act, in that we made long-term investments in basic research, education, and research infrastructure needed "to increase economic efficiency by spurring technological advances in science and health."[21] NSF targets investments that fuel economic growth by yielding new discoveries that will enhance future productivity and help prepare a dynamic U.S. workforce.

Photo credit: L. Phelps, ATST/NSO/AURA/NSF. Image is a rendering of ATST atop the construction site at the Haleakala High Altitude Observatory on Maui, Hawaii.

Funded in part by the American Recovery and Reinvestment Act of 2009, the Advanced Solar Technology Solar Telescope (ATST) will be the largest solar telescope constructed in the world, with unprecedented abilities to view details of the sun. Using adaptive optics technology, ATST will be able to provide the sharpest views ever taken of the solar surface, which will allow scientists to learn even more about the Sun and solar-terrestrial interactions. As the design and planning phase is coming to an end, the project hopes to begin construction before the end of calendar year 2012.

NSF's entire ARRA portfolio of more than 5,000 awards and $3 billion has been obligated since the end of FY 2010. Our key focus for FY 2012 continued to be monitoring awardee performance, including compliance with requirements for quarterly recipient reporting; assessing ARRA lessons learned; and continuing effective awardee communication, outreach, and oversight to ensure the timely expenditure of award funds. ARRA outlays were $2.1 billion as of September 30, 2012. FY 2012 ARRA activities included:

- **Monitoring compliance with ARRA recipient report requirements and enhancing NSF review program**. As noted previously, NSF continued to implement a comprehensive, multi-stage review program for recipient reporting. Our effective program and 99 percent compliance rate over the last eleven reporting quarters firmly establish NSF as a leader on which the accountability and transparency community can rely for government-wide process-improvement recommendations.[22] Figure 5 depicts NSF's recipient reporting results over the past eleven quarters compared to the government-wide average.

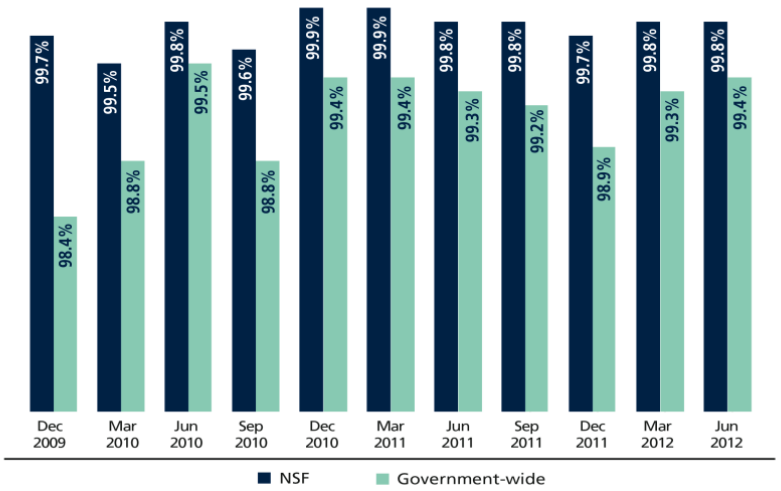
  Also in FY 2012, NSF collaborated with the Recovery Accountability and Transparency Board (RATB) to run our recipient reporting data through the RATB-designed FastAlert system. FastAlert provides agency and oversight officials a one-stop shop for quickly reviewing data sources for adverse information on existing or potential awardees. The RATB expects FastAlert to reduce cost/time in agency manual checks, liability, and improper payments. This effort not only supported the RATB's government-wide fraud, waste, and abuse goals, but also gave NSF a chance to test and

[21] The American Recovery and Reinvestment Act of 2009 is available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_bills&docid=f:h1enr.pdf.

[22] NSF has overseen twelve recipient reporting quarters to date, delivering compliance rates of 99 percent over the last eleven quarters, with several quarters at 99.8 percent.

confirm the adequacy of its internal controls. Ultimately, NSF's data run was successful, disclosing no unexpected or major issues.

Figure 5
NSF RECOVERY ACT REPORTING COMPLIANCE RATES



- **Assessing ARRA "lessons learned."** In FY 2012, NSF focused on identifying and assessing which processes and mechanisms were effective or posed challenges in implementing and administering ARRA programs. Learning what worked and what did not can help to improve transparency and accountability of federal funds. Some of NSF's lessons learned from implementing the Recovery Act are summarized below:
  - *Expenditure monitoring.* Because ARRA required awardees to spend funds quickly, NSF monitored expenditure rates and included an award provision that ARRA awardees must begin spending funds within 12 months of the award date or risk award termination**.** Now, we have begun developing processes and tools to help agency business and program staff monitor awardee expenditures and spending rates for all NSF awards.
  - *Data quality/financial system modernization.* ARRA required NSF to implement an extensive data quality plan to review recipient quarterly reporting data. Now, NSF is implementing system edits to Central Contractor Registration (CCR) verification and zip codes to strengthen our award data. We anticipate applying these lessons learned as we plan our financial system modernization.
  - *Outreach and communication***.** ARRA required an enormous outreach and communication effort. NSF built on our existing culture of communication with award recipients to ensure that all viable communication techniques were used as appropriate. For example, NSF used virtual technology, such as webcasts, during early phases of ARRA implementation; emails and staff phone calls to enhance our recipient reporting and "burn rate" monitoring programs; speaking and participation in external stakeholder meetings in all appropriate instances; and early and continual communications outreach to research administration communities (including through social media) in connection with NSF's implementation of OMB Memo 11-34. NSF will continue to use all technologies and strategies as appropriate in the future.
  - *Workplace flexibilities/increased workload*. Because ARRA represented an unprecedented and unexpected infusion of funds for NSF to obligate by a date certain, the impact on staff workload was substantial. To deal with the increased workload, NSF extended workplace flexibilities, such

as allowing telework on the weekends and earlier work start times for the NSF office most impacted. Recently, NSF implemented a new policy allowing all agency staff to start work at an earlier time. We are considering other flexibilities as we expand our telework program.

The government-wide ARRA lessons learned review will be released by the RATB in FY 2013. In addition to the above, the process of assessing ARRA lessons learned presented an opportunity for NSF management and our Office of Inspector General to think collaboratively about the shared goals of stewardship, accountability, risk management, and effective oversight.

- **Continued communication with awardees to ensure the timely expenditure of ARRA funds**. In FY 2012, NSF concluded its "burn rate monitoring" program launched to implement Article 1(e) of ARRA Terms and Conditions, dated May 2009, which required that ARRA awardees begin making expenditures within the first 12 months of their awards or risk award termination.[23] Throughout the program, no award was terminated for this reason. NSF implemented a multi-level awardee outreach initiative to achieve this success. The initiative connected NSF financial contacts to awardee financial contacts, NSF Program Officers to awardee principal investigators, and senior agency managers to senior research administration personnel to ensure that all NSF and awardee staff were focused on the expenditures issue.

  In FY 2013, NSF will continue to implement our recipient reporting program, working with RATB and the Government Accountability and Transparency Board (GATB) as appropriate. We will continue our enhanced outreach and communication with ARRA awardees. We will also continue to implement OMB M-11-34 to accelerate ARRA expenditures. Finally, we will use ARRA lessons learned to inform NSF-wide management practices, particularly in the area of expenditure monitoring.

Workload and Management Trends

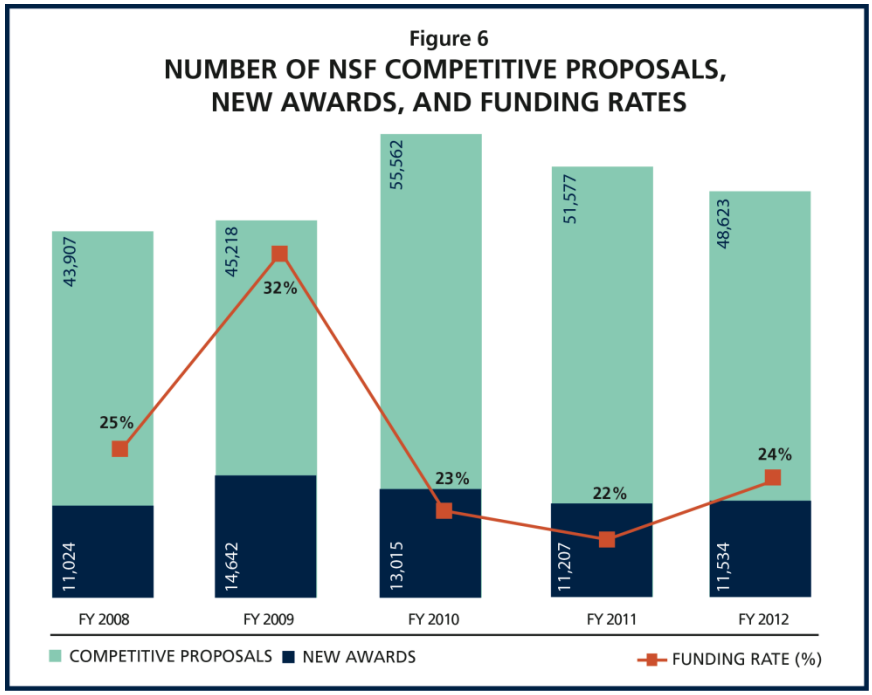
NSF continuously monitors key portfolio, workload, and financial measures to understand short- and long-term trends and to help inform management decisions.

- In FY 2012, the number of competitive proposals reviewed by NSF decreased 6 percent (by 2,954 proposals), to 48,623 (Figure 6). Most of this decrease reflects the drop in the number of proposals received by the Directorate of Biological Sciences (BIO). In an effort to address workload issues, in FY 2012, BIO introduced a pre-proposal step for solicitations to reduce the number of full proposals. At the same time, half of BIO divisions chose to go to one deadline a year. The number of proposals received by BIO dropped by nearly 30 percent, from 7,437 in FY 2011 to 5,271 in FY 2012. Similarly, in the Directorate for Engineering (ENG) a single submission window was put in place by 17 programs in the Division of Chemical, Bioengineering, Environmental, and Transport System (CBET), which resulted in a decrease of over 600 proposals.

- In FY 2012, the number of new awards increased 3 percent, to 11,534. The increase in new awards coupled with a decrease in the number of competitive proposals resulted in an increased funding rate, from 22 percent in FY 2011 to 24 percent in FY 2012. There was an increase of 327 new competitive awards in FY 2012.

[23] NSF ARRA Terms and Conditions, dated May 2009, can be found at www.nsf.gov/pubs/policydocs/arra/arratc_509.pdf

- The average annual award size decreased 2 percent, to $169,217 in FY 2012. The FY 2012 average annual award size is more than 3 percent below the average annual award size of $175,435 of the previous 4-year period, which included funding from ARRA. Adequate award size is important for enabling science of the highest quality and ensuring that the proposed work can be accomplished as planned. Larger award size may also permit the participation of more students and allow investigators to devote a greater portion of their time to conducting research.[24]



- NSF's workforce in terms of full-time equivalents (FTE) was 1,415, unchanged from the previous year. FTE has increased at an average annual rate of 1 percent since FY 2008 while the number of competitive proposals has increased at an average annual rate of 3 percent during this same period (Figure 7).

- There was a minimal increase (18) in the number of active awards FY 2012, in contrast to the increase in FY 2011 of 965.

- Grantees are required to report the status of funds received from NSF on a quarterly basis through the submission of a Federal Financial Report (FFR). For FY 2012, 90 percent of the FFRs were submitted by the due date and 99.91 percent of the FFRs (6,939 of 6,945) were submitted by the end of the reporting period. High FFR submission levels can be attributed to increased emphasis on timely reporting. The high FFR submission rate contributes directly to the overall accuracy and completeness of NSF grant expenses as reported on NSF financial statements.

- NSF's emphasis on grantee cash monitoring has resulted in continual improvement in cash management by grantees, resulting in less governmental risk and improved cash flow for NSF. Unexpended federal cash held by grantees has decreased to $16 million in FY 2012, from a quarterly

[24] See *Report to the National Science Board on the NSF"s Merit Review Process, FY 2011* (NSB-12-28) at http://www.nsf.gov/nsb/publications/2012/nsb1228.pdf.

average of $26 million in FY 2008. During the same 5-year period, NSF payments to grantees have increased by 35 percent.

Figure 7. Workload and Management Trends

	Measure	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	Rate of Change (FY 2012/ FY 2011)	Annual Rate of Change, FY 2008–FY 20 12
Portfolio	Competitive proposal actions	43,907	45,218	55,562	51,577	48,623	-6%	3%
	Competitive award actions	11,024	14,642	13,015	11,207	11,534	3%	1%
	Average annual award size (competitive awards)	$167,300	$172,569	$189,338	$172,533	$169,217	-2%	<1%
	Funding rate	25%	32%	23%	22%	24%	-2% points	25% ***
Workload	Number of employees (FTE, usage)	1,339	1,386	1,424	1,415	1,415	0	1%
	Number of active awards*	48,799	52,858	55,449	56,414	56,432	<1%	4%
	Proposal reviews conducted	248,772	241,712	287,017	262,005	235,654	-10%	-1%
Financial	Cash-on-hand** (in millions)	$26	$26	$19	$21	$16	-24%	-10%
	Number of grant payments	19,481	25,723	22,782	29,214	28,016	-4%	11%
	Federal Financial Reports (FFR) submitted	99.80%	99.60%	99.80%	99.89%	99.91%	<1% point	99.80% ***

* Active Awards include all active awards regardless of whether they received funding during the fiscal year.
** FY 2012 is through the third quarter.
*** Average rate from FY 2008 to FY 2012.

- In FY 2012, NSF conducted a statistical review of FFR expenditures for improper payments. Consistent with prior year results, the error rate noted in the review by an independent consultant was well below the materiality levels defined in OMB standards. NSF intends to continue its grant expenditure sampling process as part of our integrated and comprehensive grant financial monitoring program strategy.

- For FY 2012, the number of NSF grant payments continued to reflect an increase in activity levels compared to FY 2008 and prior fiscal years, primarily due to the increased number of ARRA awards. This increased activity level is gradually diminishing as NSF begins the close-out process for these awards. In January 2013, NSF will begin implementation of the Award Cash Management Service (ACM$). ACM$ will transition NSF awardees from the pooling process for grant payments to providing award level detail at the time of the payment request.

Financial Discussion and Analysis

In FY 2012, NSF upheld its commitment to incorporate performance and accountability within all programs and operations. The agency's leadership is dedicated to improving efficiency while providing useful and significant information to staff and stakeholders, to enable better management and resource allocation decisions in the current environment of fiscal austerity. Through an innovative internal control approach, NSF validated its controls to provide assurance that they are functioning effectively; see discussion on NSF's Internal Control Quality Assurance Program on page I-23.

During the past year, NSF pursued information technology (IT) advancements that will ensure the availability of relevant, reliable, and timely accounting and management information. After a 4-year planning and pre-acquisition phase, in September 2012 NSF awarded a contract to modernize the agency's 25-year-old financial accounting system. The new iTRAK system will increase the agency's capabilities for more informed operational and programmatic decision-making and improve the effectiveness and efficiency of financial and business processes. (For more details, see the discussion on Financial System Strategy on page I-27.) NSF also began development of an Award Cash Management Service (ACM$). The ACM$ will transition NSF awardees from the pooling process for grant payments to an award level process at the time of the payment request.

NSF achieved another year of very low improper payment rates in FY 2012. NSF was one of the first agencies to pilot the use of centralized solutions for preventing improper payments through the Do Not Pay List (DNP); see the discussion on Improper Payments Elimination and Recovery Act of 2010 (IPERA) on page I-26. By implementing the DNP Solution, the agency is integrating the requirements of IPERA with existing policies and procedures for award management.

As responsible stewards of taxpayer dollars, NSF prepares annual financial statements in conformity with generally accepted accounting principles (GAAP) for U.S. federal government 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, 2012 and 2011.

For FY 2012, NSF received its 15th consecutive unqualified audit opinion. The audit report noted no material weaknesses. However, it repeated the prior year significant deficiency on the monitoring of construction type cooperative agreements. NSF management concurs with the overall need to strengthen controls in this area but disagrees with key aspects of the significant deficiency. NSF management will continue to work with the Office of Inspector General and its auditors to reach agreement and resolve the audit findings. A detailed discussion of the independent audit is included in the audit report, which can be found on page II-3. Management's response to the audit report can be found on page II-15.

Understanding the Financial Statements

NSF's FY 2012 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 8 summarizes the changes in NSF's financial position in FY 2012.

Figure 8. Changes in NSF's Financial Position in FY 2012 *(dollars in thousands)*

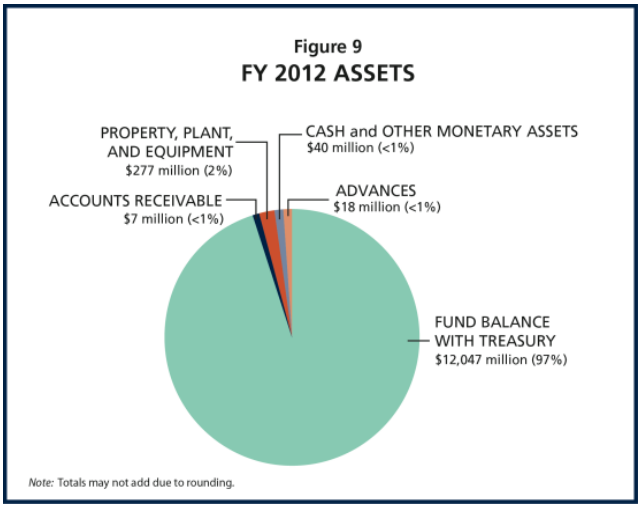
Net Financial Condition	FY 2012	FY 2011	Increase/ (Decrease)	% Change
Assets	$12,388,642	$12,584,734	($196,092)	-1.6%
Liabilities	$543,474	$581,123	($37,649)	-6.5%
Net Position	$11,845,168	$12,003,611	($158,443)	-1.3%
Net Cost	$7,335,657	$7,139,994	$195,663	2.7%

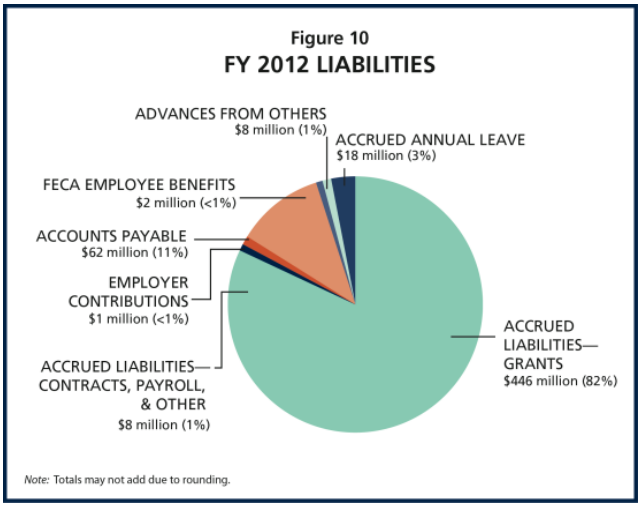
Balance Sheet

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 (PP&E)* account.

In FY 2012, *Total Assets* (Figure 9) decreased 1.6 percent from FY 2011 assets. The bulk of the change occurred in the *Fund Balance with Treasury* account, which decreased by $127.9 million in FY 2012. *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. The FY 2011 decrease is attributed to the spending of ARRA funds by grant recipients. The *Advances* balance also decreased $51.5 million, as the United States Antarctic Program (USAP) contract ceased to be operated on an advanced basis with quarterly expense reporting and is now on a biweekly reimbursable cycle.

NSF's *Total Liabilities* (Figure 10) decreased by 6.5 percent in FY 2012. The majority of this change is related to the decrease in *Accrued Liabilities–Contracts, Payroll, & Other* balance,

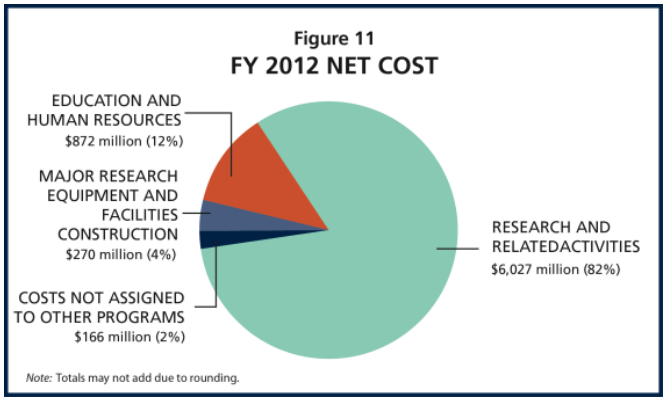




as NSF no longer accrues quarterly for the USAP contract addressed above. *Advances From Others* also decreased as a result of NSF's strides to encourage its partnering agencies to work on a reimbursable basis.

Statement of Net Cost

This statement 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), and Major Research Equipment and Facilities Construction (MREFC) programs. 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 the R&RA, EHR, and MREFC programs and account for 4 percent of the total current year Net Cost of Operations (Figure 11). 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 decreased slightly by 1.3 percent, or $158.4 million, in FY 2012.

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 2012, *Total Budgetary Resources* increased by $225.3 million. *Budget Authority–Appropriation* for the R&RA, EHR, and MREFC accounts were $5,719 million, $829 million, and $167.1 million, respectively. The combined new *Budget Authority–Appropriation* in FY 2012 for the NSB, OIG, and AOAM accounts totaled $318 million. NSF also received funding via warrant from the special earmarked H-1B receipt account in the amount of $129 million, and via donations from foreign governments, private companies, academic institutions, nonprofit foundations, and individuals in the amount of $47.2 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 2012 and 2011, these costs amounted to $333.7 million and $337.2 million, respectively.

Limitations of the Financial Statements

In accordance with the guidance provided in OMB Circular No. A-136, NSF discloses the following limitations of the agency's FY 2012 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 Generally Accepted Accounting Principles (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 $6.7 million at September 30, 2012. Of that amount, $6.5 million is due from other federal agencies. The remaining $184,000 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. In FY 2004, OMB issued M-04-10, *Memorandum on Debt Collection Improvement Act Requirements*, which reminded agencies of their responsibility to comply with the policies for writing off and closing out debt. In accordance with this guidance, NSF has now incorporated the policy of writing 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 (CMIA)

In FY 2012, NSF had no awards covered under Cash Management Improvement Act (CMIA) Treasury–State Agreements. NSF's FastLane system with grantee draws of cash makes the timeliness of payments issued under the Act essentially not applicable to the agency. No interest payments were made in FY 2012.

Systems, Controls, and Legal Compliance

National Science Foundation
FY 2012 Statement of Assurance

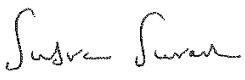
The National Science Foundation (NSF) management is responsible for maintaining effective internal control and financial management systems that meet the objectives of the Federal Managers Financial Integrity Act of 1982 (Integrity Act), as well as related laws and regulations. The agency is required to perform an evaluation of management and financial system internal control as required by Sections 2 and 4 of the Integrity Act.

NSF's internal control program is designed to ensure full compliance with the objectives of the Integrity Act, laws and regulations, and Office of Management and Budget (OMB) guidance, including: (1) OMB Circular No. 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;* and *Conducting an Acquisition Assessment Under OMB Circular A-123*; (2) OMB Circular No. A-127, *Financial Management Systems*; and (3) OMB Circular No. A-130, *Management of Federal Information Resources*.

NSF completed its evaluation and carefully considered the appropriate balance between controls and risk in programs and operations. Based on the results of these evaluations, NSF provides reasonable assurance that as of September 30, 2012, its internal control over programs and operations 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 no system non-conformances were identified under Section 4 of the Integrity Act.

In accordance with Appendix A of OMB Circular A-123, NSF conducted an 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, 2012, 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.

For FY 2012, NSF is providing an unqualified statement of assurance that its internal control and financial management systems meet the objectives of the Integrity Act, as well as related laws and guidance.



Subra Suresh
Director

November 15, 2012

Management Assurances

Federal agencies are subject to numerous legislative and regulatory requirements that promote and support effective internal control. The Integrity Act provides the statutory basis for management's responsibility for and assessment of internal control. In addition, the Chief Financial Officers (CFO) Act of 1990 requires agency CFOs to "develop and maintain an integrated agency accounting and financial system, including financial reporting and internal controls."

The Integrity Act requires federal agencies to establish internal control and financial systems that provide reasonable assurance that the three objectives are achieved: (1) effectiveness and efficiency of operations, (2) compliance with applicable laws and regulations, and (3) reliability of financial reporting.

Agencies are also required to report on the effectiveness of internal control over financial reporting, the safeguarding of assets, and compliance with applicable laws and regulations, in accordance with the requirements of Appendix A of OMB Circular A-123, *Management's Responsibility for Internal Control*. The head of the agency, based on an annual evaluation, provides a Statement of Assurance as to whether the agency has met these requirements.

The NSF Director has provided an unqualified Statement of Assurance for FY 2012. The agency evaluated its management control systems and financial management systems for the fiscal year ending September 30, 2012. This evaluation provided reasonable assurance and formed the basis for the Director to state, in the Statement of Assurance, that the objectives of the Integrity Act were achieved for FY 2012

Highlights from NSF's Internal Control Quality Assurance Program

In FY 2012, NSF's Internal Control Quality Assurance Program had significant accomplishments related to both new and ongoing initiatives. Management's ongoing internal control review for 11 business processes for the period July 1, 2011 through June 30, 2012, determined that the agency's internal control was adequately designed, properly executed, and effective. This was the result of a concerted effort on an ongoing basis to systematically document, test, evaluate, and improve NSF's internal control processes. This process also encouraged standardization of similar processes in use in different parts of the agency.

The growing open government movement emphasizing transparency, collaboration, and participation is supported throughout NSF's internal control reviews and corrective actions. NSF gained efficiencies in time and attendance with the implementation of WebTA, a web-based time and attendance solution that simplifies time keeping with online functionality that allows employees to request leave and premium pay and to donate leave. WebTA, which is nearly paperless, has streamlined the request process and enhanced transparency in the collection, delivery, and use of workforce information. Time is saved with a default timesheet that automatically pre-populates time entries for each pay period, reducing transaction errors and manual processing.

NSF's Integrated Approach for Monitoring Internal Control

NSF implements the Committee of Sponsoring Organizations of the Treadway Commission (COSO) integrated framework to monitor internal control. NSF's internal control model for monitoring internal control consists of planning, documenting, evaluating, testing, reporting, and remediation. According to COSO, an effective approach to monitoring includes an assessment/reporting of results, as well as follow-up for any corrective action plans. Figure 12 displays and describes NSF's internal control monitoring model.

Internal control is the key to accountability and transparency in reporting. NSF has a mature internal control program monitored by management and strives for continuous improvement.

Figure 12
NSF'S INTERNAL CONTROL MONITORING MODEL

PLAN: Use a top-down approach to determine what documentation will be necessary.

DOCUMENT: Provides the basis and support for management's assessment of internal controls.

EVALUATE: Describes how NSF identifies, assesses and classifies internal control deficiencies; as a result of testing.

TEST: Focus on the requirements for testing controls to ensure things are functioning properly.

REPORT: Focus on procedures for reporting; compliant with laws and regulation reporting requirements.

REMEDIATE: Identify and compile identified deficiencies, develop corrective action plans, and monitor improvements.

Conference Review

NSF conducted a thorough review of policies and controls associated with conference-related activities and expenses as prescribed in OMB Memorandum M-11-35, *Eliminating Excess Conference Expense Spending and Promoting Efficiency in Government.* NSF management conducted a review of all conference types to determine if action was needed to mitigate the risk of inappropriate spending practices with regard to conference, approval of conference-related activities, and expenses. Simultaneously, the OIG performed a conference audit of staff retreats.

The internal control team (review) and the OIG (audit) worked jointly to conduct an NSF-wide data call to eliminate duplication of efforts and gain efficiencies. Other tasks performed jointly included standardization related to conference definitions and conference types, combined town hall meetings and sharing of data. These efforts allowed NSF to complete the review and audit efficiently. Although there were no significant deficiencies identified in the review or the audit, NSF plans to address steps to improve the planning and execution and to strengthen transparency and accountability for conference activities.

The United States Antarctic Program Property, Plant, & Equipment

During the FY 2012 internal control testing period, the United States Antarctic Program (USAP) contract transitioned to a new contractor. Transactional testing on additions, deletions, and transfers of real property and capital equipment was limited to transactions prior to June 30, 2012, all of which were from the previous contractor. Although recommendations to improve business process documentation were made during the control design assessment and process walk-through with the new contractor, there were no deficiencies identified in the design of the controls.

Acquisition Assessment

In FY 2012, NSF completed an acquisition assessment utilizing the guidelines and template developed by the Office of Federal Procurement Policy (OFPP), in consultation with the Chief Acquisition Officers Council. The OFPP template design supported a comprehensive and standardized assessment for entity level reviews and was aligned and integrated with the agency's existing internal control review process. This allowed NSF to conduct entity- and process level reviews of the acquisition function using a systematic methodology.

NSF has included performance-based elements in some recent contracts. These elements include performance measures and award fee arrangements. All are hybrid contracts with use of time and materials, cost, and/or fixed price structures. NSF plans to continue emphasizing performance-based contracts, strategic sourcing, and strategies to save money.

Included in the annual contracts management review was a review of the charge card process. Testing, interviews, and walk-throughs were conducted to monitor and assess controls and to ensure that transactions were properly authorized, processed accurately, and the data was valid and complete. The review was conducted in accordance with the OMB Circular A-123 Appendix B; no significant deficiencies were identified for FY 2012.

Information Technology Assessments

NSF's information technology review was performed in accordance with the National Institute of Standards and Technology (NIST) Special Publication 800-53. The FY 2012 IT review consisted of testing the Awards, eJacket and Financial Accounting System to validate the operation and design effectiveness of 52 NIST controls. No significant deficiencies were identified.

In accordance with OMB Circular A-127, *Financial Management Systems*, NSF applied the risk assessment tool as directed. NSF's Financial Accounting System remains at the moderate risk level. There were no significant deficiencies identified and the agency is in substantial compliance with the Federal Financial Management Improvement Act (FFMIA). NSF's ongoing goal is to improve operational processes and implement new technological developments. NSF's strategy to replace its aging financial system to a fully integrated financial management solution is discussed in the "Financial System Strategy" section.

Improper Payments Elimination and Recovery Act of 2010

The Improper Payments Information Act of 2002, as amended by IPERA and OMB Circular A-123, Appendix C, *Management's Responsibility for Internal Control: Requirements for Effective Measurement and Remediation of Improper Payment*, require agencies to review all programs and activities, identify those that are susceptible to significant erroneous payments, and determine an annual estimated amount of erroneous payments made in those programs. From FY 2010 to FY 2011, NSF received relief from the annual reporting due to the very low improper payment rates reported in its *FY 2009 Agency Financial Report.* However, during this relief period, NSF remained vigilant and continued risk-based grant expenditure sampling for improper payments in support of the NSF post-award grant monitoring program. These efforts were successful in ensuring that NSF's program remained low risk.

In FY 2012**,** NSF conducted a statistical review of its FY 2011 Federal Financial Report transactions received from grant recipients. Consistent with prior year results, the occurrence of NSF improper payments continues to be well below the significant standard of improper payments, which is defined by OMB as exceeding $10 million and 2.5 percent of total outlays.

In addition, in compliance with IPERA and Circular A-123, NSF evaluated its grants and contracts oversight processes. The agency determined that it was not cost-effective to establish a formal Recapture Audit Program. NSF is leveraging its existing oversight policies and procedures to meet the intent of OMB's requirements on improper payments. Details of NSF's IPERA reporting can be found in Appendix 2.

NSF has been actively participating in OMB's Do Not Pay (DNP) initiative to reduce improper payments. The agency's goal is to incorporate the DNP solution fully into its pre-award review process for all grants and cooperative agreements. NSF provided OMB its most recent plan for implementing the DNP Solution in mid-September 2012. The DNP Solution complements NSF's existing policies and procedures for award management, and the agency has already begun incorporating the new functionality into its award management process. NSF is also automating the reviews and centralizing the pre-award verification. This will create efficiency gains by reducing the workload for manual verification.

Financial System Strategy

NSF's financial system goals are to increase capabilities for more informed operational and programmatic decision-making, improve effectiveness and efficiency of financial and business processes, and enhance financial and business accountability, integrity, and compliance. In an effort to achieve these goals, NSF is modernizing its financial management capabilities with a commercial-off-the-shelf (COTS) core financial management system and key interfaces hosted in a shared service environment. This effort is known as iTRAK.

Strategic Overview

The CFO Act assigns clear responsibilities for planning, developing, maintaining, and integrating financial management systems within federal agencies. As depicted in the current system diagram on page I-29, NSF currently maintains a core accounting system, Financial Accounting System (FAS), and various grants management systems to support NSF's mission. Financial systems strategies for the future include:

1) Implementing iTRAK Phase 1, a COTS core financial management solution hosted in a shared services environment in accordance with OMB Memorandum M-10-26, *Immediate Review of Financial Systems IT Projects*, and compliant with Federal Financial System guidance including A-127, *Financial Management Systems*, and government-wide accounting and reporting requirements.

2) Implementing future iTRAK phases including integration of Acquisition, Property, and Budget formulation systems with the COTS core financial system (upon funding availability).

3) Transition from the pooling method of grant payments to a grant-by-grant method.

These strategies support NSF financial management system goals of increasing capabilities for more informed operational and programmatic decision-making, improving effectiveness and efficiency of financial business processes, and enhancing financial and business accountability, integrity, and compliance.

Ongoing Financial System Initiatives

To achieve these strategic goals, NSF continues to make substantial progress in financial systems modernization and improvement efforts in pursuit of its targeted financial management systems framework.
Major efforts include:

1) *Implement COTS Core Financial System*

   iTRAK will modernize NSF's current financial management environment and will provide an integrated financial management and business solution. The use of a Shared Service Provider (SSP) will allow for a more cost effective financial solution and services through economies of scale. The project successfully completed activities related to the planning and acquisition phases of the NSF Project Management Lifecycle and will move into the implementation phase in FY 2013.

   To support NSF stakeholders and improve access to reliable and consistent financial data, NSF is currently assessing user reporting requirement needs, eliminating redundant and obsolete financial reports, and modernizing financial reporting capabilities. iTRAK will enable NSF to achieve process efficiencies and economies of scale in financial management operations and the provision of timely, accurate data for NSF stakeholder decision-making.

2) *Implement Future iTRAK Phases*

   Through new functional capabilities and business process automation and standardization through integration of Acquisition, Property, and Budget formulation systems with the COTS core financial system, iTRAK will help to improve NSF's operational excellence and enable efficient, effective execution of financial activities and business operations. To fully realize these benefits, NSF plans to integrate other financial applications with iTRAK to provide seamless transactions and data. These applications include Acquisition, Property and Budget formulation systems that are planned to be integrated with iTRAK in later phases and as resources permit.

3) *Transition from Pooling Method of Grant Payments to Grant-by-Grant Method*

   In preparation for transitioning to iTRAK, NSF is developing a new system to award payments and support associated post award processes. This initiative is known as the Award Cash Management Service (ACM$) and will be implemented by January 2013. By changing to this payment method, NSF's business processes will better align with the functionality in a COTS financial system; allow for greater transparency and increased efficiencies; and tighter controls on the drawdown of funds, including contingency funds.

   ACM$ will provide grantees and financial staff the ability to submit cash and adjustment requests, as well as access information on detailed payments and award balances at the grant level. ACM$ offers the benefit of making the payment request functionality more in line with university accounting practices and will replace both the cash request and Federal Financial Report functionality that is currently done in the agency's grant management system, FastLane.

Financial Management Systems Framework

Figure 13 compares NSF's current Financial Accounting System (FAS) and iTRAK, NSF's future financial management and reporting solution. In September 2012, a system implementation contract was awarded to Accenture Federal Services, LLC. The new system is expected to go live by October 1, 2014.

Figure 13
NSF'S FINANCIAL MANAGEMENT SYSTEM