

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 As stated in NSF’s FY 2011–2016 strategic plan, *Empowering the Nation Through Discovery and Innovation*, our vision is a nation that capitalizes on new concepts in science and engineering and provides global leadership in advancing research and education.²

NSF is the only federal agency dedicated to the support of non-biomedical research and education across all fields of science and engineering, and our mission and vision underscore the critical role that NSF plays in addressing the nation’s most pressing challenges. NSF-funded research and education projects have fueled many important innovations, which, in turn, have stimulated economic growth and improved the quality of life and health for all Americans. Our role in the U.S. science and engineering enterprise is so central that we are regarded by many as the “innovation agency.”³

Among the many advances that NSF has supported in recent years include technology-based innovations that spur economic prosperity; understanding mitigation of and adaptation to climate change; developing sustainable approaches to the use of energy and natural resources; and transforming undergraduate education to prepare tomorrow’s leading scientists. Our investments integrate research and education to support the development of a world-class scientific and engineering workforce and nurture the growth of a scientifically and technologically aware public—one that can engage fully in a 21st century life that increasingly relies on technology to meet challenges and leverage opportunities.⁴

As part of our focus on improving the future for all Americans, since 1952 NSF has funded nearly 44,000 Graduate Research Fellows.⁵ 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, and some have been honored as Nobel laureates. To date, 196 Nobel Prize winners have received NSF support at some point in their careers, including 5 of the FY 2011 winners.⁶

We achieve our mission by making awards and managing a portfolio of the highest quality research and education projects that further our strategic goals and reflect our national priorities. In doing so, NSF is visionary, enabling 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 inclusive, seeking and including 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 outlined in NSF’s FY 2011–2016 strategic plan—*Transforming the Frontiers*, *Innovating for Society*, and *Performing as a Model Organization*. Our pursuit of these goals can be assessed through our success in achieving our performance goals, which include measureable targets for our near-, mid-, and long-term actions. Figure 5

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

² NSF’s strategic plan is available at <http://www.nsf.gov/news/strategicplan/index.jsp>.

³ See Analytic Perspectives, Research and Development from *The President’s FY 2012 Budget* at www.whitehouse.gov/sites/default/files/omb/budget/fy2012/assets/topics.pdf.

⁴ See NSF’s FY 2012 Budget Request to Congress at www.nsf.gov/about/budget/fy2012.

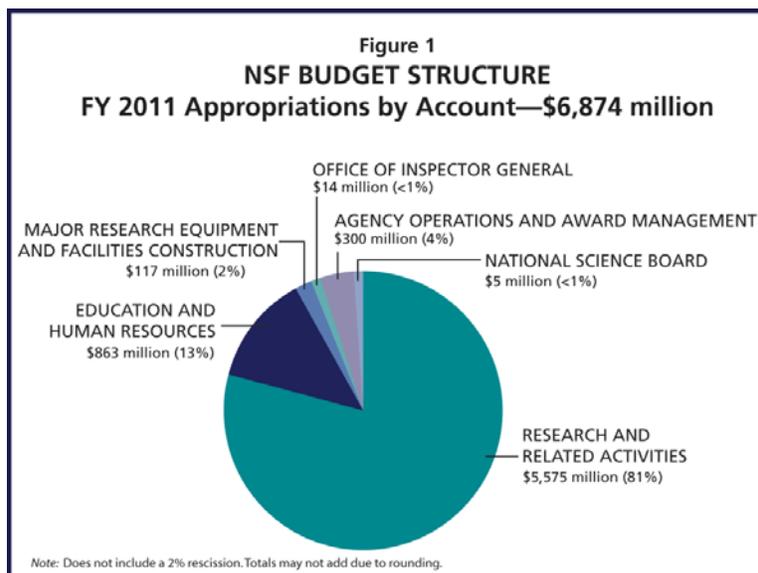
⁵ For more information about the NSF Graduate Research Fellowship Program see www.nsfgrfp.org.

⁶ See www.nsf.gov/news/news_summ.jsp?cntn_id=100683.

(page I-11) depicts our strategic and performance goals, which were developed in FY 2011 as the road map for achieving the NSF mission and vision.⁷

Achieving the NSF Mission

NSF is funded primarily through six congressional appropriations, which totaled \$6,874 million in FY 2011 (Figure 1).⁸



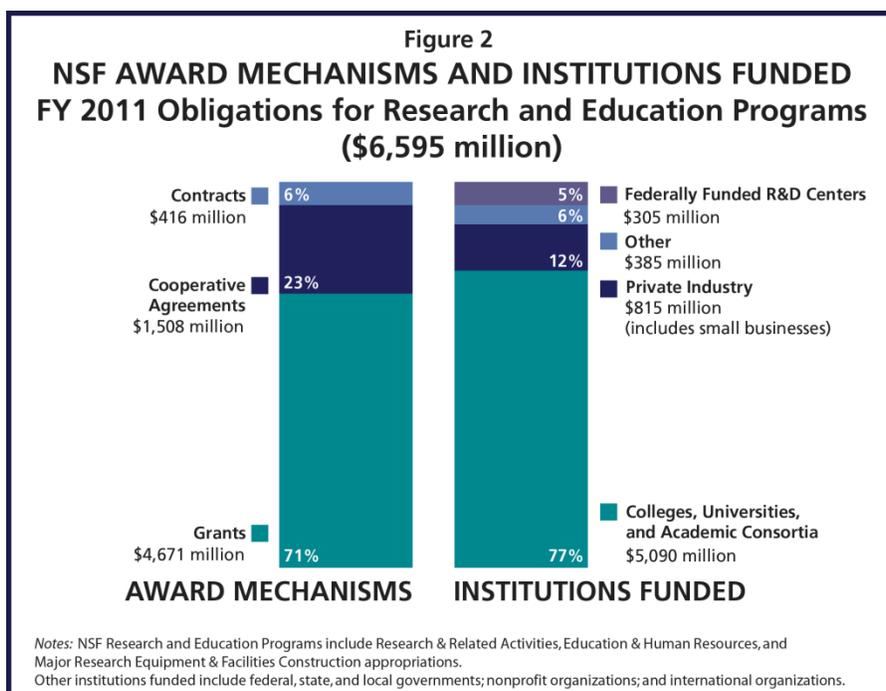
- NSF's largest appropriation is Research and Related Activities, which accounted for 81 percent of the agency's FY 2011 funding. This account supports basic research and education activities at the frontiers of science and engineering, including NSF's strategic investments in high-risk and transformative research.
- The Education and Human Resources appropriation supports activities that ensure a diverse, competitive, and globally engaged U.S. science, technology, engineering, and mathematics workforce and a scientifically literate citizenry.
- The Major Research Equipment and Facilities Construction (MREFC) appropriation supports the construction of unique national research platforms and major research equipment that enable cutting-edge research.
- The Agency Operations and Award Management appropriation supports NSF's administrative and management activities.
- Funding for the operation of the Office of Inspector General (OIG) and for the National Science Board (NSB) is provided in two separate appropriations.

⁷ The NSF strategic plan details the agency's mission and vision; describes our core values, strategic and performance goals, targets and core strategies; and outlines the evaluation and assessment mechanisms designed to ensure that we achieve our mission and vision. A more detailed discussion of the NSF strategic plan is included in the Performance discussion that begins on page I-8.

⁸ In Figure 1, appropriations of \$6,874 million plus Trust Funds (\$53 million) and H1-B Nonimmigrant Petitioner Receipts (\$105 million) equals \$7,032 million as shown in the Statement of Budgetary Resources.

In FY 2011, 90 percent of research funding was allocated based on competitive merit review. The merit review process involved more than 42,300 members of the science and engineering community who serve as panelists and proposal reviewers.⁹

The majority of NSF's FY 2011 obligations directly supported programmatic activities, with most (94 percent) funded through grants or cooperative agreements (Figure 2).¹⁰ 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 (e.g., research centers, multi-use facilities). Contracts are used to acquire products, services, and studies (e.g., program evaluations) required primarily for NSF or other government use.



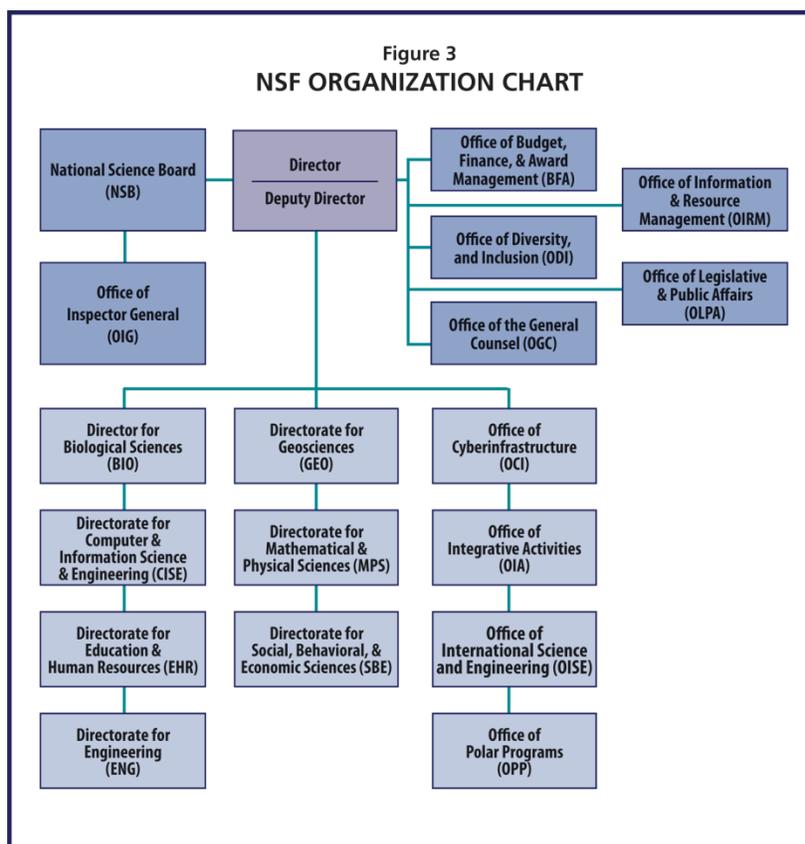
In FY 2011, NSF made awards to 1,875 institutions in 50 states, the District of Columbia, and 4 U.S. territories. These institutions employ America's leading scientists, engineers, and educators and train the leading-edge innovators of tomorrow. In total, NSF awards directly involved an estimated 276,000 senior researchers, postdoctoral associates, other professionals, graduate and undergraduate students, and K-12 students and teachers. As shown in Figure 2, 77 percent of NSF awards are to academic institutions, including colleges, universities, and academic consortia. Awards are also provided to Federally Funded Research and Development Centers (FFRDCs) and private industry, including small businesses. Other recipients include federal, state, and local governments; nonprofit organizations; and international organizations. A small number of awards are for research in collaboration with other countries, which has value to the U.S. scientific enterprise.

⁹ NSF does not require merit review for certain kinds of proposals, including proposals for international travel grants and some conferences, symposia, and workshops. 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 2010* at www.nsf.gov/nsb/publications/2011/nsb1141.pdf.

¹⁰ See page I-15 for a discussion of FY 2011 proposal actions, awards, and funding rate.

Organizational Structure

NSF is an independent federal agency headed by a Director appointed by the President and confirmed by the U.S. Senate.¹¹ 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.¹² 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 FTE.¹³ NSF also regularly recruits visiting scientists, engineers, and educators as rotators who work at NSF for up to four years.¹⁴ The blend of permanent staff and rotators, which infuse new talent and expertise into the agency, is reflective of our core values and integral to carrying out 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/orgchart.jsp). In addition to the agency's headquarters 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).

¹¹ Biographies of the Director and Deputy Director, also appointed by the President and confirmed by the Senate, are available at www.nsf.gov/od.

¹² For additional information see the NSB website at <http://www.nsf.gov/nsb>.

¹³ Full-time equivalents (FTE).

¹⁴ As of September 2011, temporary rotator appointments generated 175 full-time equivalents under the Intergovernmental Personnel Act.

Management Challenges

In FY 2011, the NSF Office of Inspector General (OIG) identified six major management and performance challenges facing the agency: Ensuring proper stewardship of Recovery Act funds,¹⁵ improving grant administration, strengthening contract administration, becoming a model organization for human capital management, encouraging the ethical conduct of research, and effectively managing large facilities.¹⁶ OIG also identified two emerging challenges: Implementing the Open Government Directive (OGD) and planning for the next NSF headquarters. Management's report on the significant activities undertaken in FY 2011 to address these challenges is included as Appendix 3B. The report also discusses planned activities for FY 2012 and beyond. Among activities reported are the following:

- *To ensure proper stewardship of Recovery Act funds:* We continued to implement a robust, comprehensive, and multi-stage review program for recipient reporting. This process has matured over the eight reporting quarters, receiving program recognition from the Office of Management and Budget (OMB) and the Recovery Accountability and Transparency Board (RATB) and contributing process-improvement recommendations government-wide. We delivered a 99 percent compliance rate over the last six reporting quarters with several quarters reaching 99.9 percent compliance. 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.
- *To improve grant administration:* We issued new NSF–OIG operating principles for audit resolution and established the Stewardship Collaborative to monitor/improve the process and jointly address outstanding and emerging issues. We modified the Award Monitoring and Business Assistance Program (AMBAP) risk assessment and focused attention on small, non-traditional institutions with the least experience in managing federal funds. We increased the number of AMBAP site visits and subjected all institutions identified as managing higher risk awards and not receiving a scheduled AMBAP Site Visit to an AMBAP Desk Review. We developed and beta-tested *Research.gov* Award Manager, an award management tool providing access to accurate, timely, and reliable administrative, financial, and award data from multiple NSF IT systems. We also continued planning/pre-acquisition for *iTRAK*, a single state-of-the-art, fully integrated financial management/property solution.
- *To strengthen contract administration:* We prepared a Corrective Action Plan (CAP) for the significant deficiency on contract monitoring of cost reimbursement contracts. In addition, we updated the contracting manual to ensure that vendors have required disclosure statements in place prior to the award of cost reimbursement contracts. We also executed a modification to extend the USAP contract through March 31, 2012, to ensure continuity of operations during the source selection phase of the procurement.
- *To become a model organization for human capital management:* We implemented the first set of performance plans for rotators (IPAs), appointed under the Intergovernmental Personnel Act, who are serving in senior executive service positions. We established a mandatory training policy, which requires all new executives, managers, and supervisors to take 32 hours of training during their first year, 16 of which must be NSF-specific. We developed and implemented seven NSF Academy courses aimed at enhancing leadership and management skills for all executives, including rotators.

¹⁵ NSF received \$3.0 billion under the American Recovery and Reinvestment Act of 2009 (Recovery Act or ARRA).

¹⁶ OIG's memorandum on FY 2011 management challenges can be found in NSF's *FY 2010 Agency Financial Report* (Appendix 3A) at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf11003&org=NSF. The OIG's memorandum on FY 2012 management challenges can be found in Appendix 3A of this report.

We also continued to address the issue of succession planning at NSF. The Division of Human Resource Management completed a review of the succession plans of Directorates and Offices and developed scenarios for key management positions based on internal bench strength and plans for rotator recruitments. We also completed several workforce planning-related studies for key NSF divisions and offices to help identify future staffing needs, management models, full-time equivalent (FTE) requirements, skills/competency needs, and, in some cases, a transition plan for aligning current resources to the future model.

- *To encourage the ethical conduct of research:* As part of NSF's response to the America Competes Act, we strengthened our understanding and adherence to 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. We also gave presentations that included information on responsible conduct of research at various conferences, seminars, and orientation meetings.
- *To effectively manage large facilities:* We ensured that all projects were on time, on budget, and meeting performance expectations by participating in construction and final design reviews. We continued NSF Programs/Large Facilities Office-established practices for regular monitoring of all open construction projects funded through the MREFC appropriations account. We also assessed performance of awardees by conducting Business Systems Reviews (BSR) and related post-BSR monitoring activities on several MREFC projects, including the Cornell High Energy Synchrotron Source (CHESS); the Network for Earthquake Engineering Simulation (NEES); the Alaska Research Vessel, *Sikuliaq*; and EarthScope.

With respect to the emerging challenges:

- *To effectively implement the Open Government Directive (OGD):* We explored promising prize/challenge candidates, which included three challenges sponsored by the Directorates of Engineering (ENG) and Computer and Information Science and Engineering (CISE)—CISE Ignite; CISE/ENG Robotics, and CISE/ENG commercialization challenge and a hand-writing recognition challenge sponsored by the Directorate for Biological Sciences (BIO). In addition, we announced the Office of Legislative and Public Affairs (OLPA) International Science and Engineering Visualization Challenge. We also created a Data Task Force to explore issues of open data access and required that a Data Management Plan be included in proposals submitted to NSF.
- *To effectively plan for the next NSF headquarters:* We awarded a competitive procurement for Technical Support Services, which include project management, architecture, and engineering services; technology project management; relocation services; communications; and budget support. The procurement also added of six full-time contractor staff to the Future NSF project team.

Future Challenges and Opportunities: OneNSF

Earlier this year, NSF Director Subra Suresh introduced a new visionary concept for the agency—*OneNSF: NSF will be an agency that works seamlessly in a well-integrated way across organizational and disciplinary boundaries*. The principles underlying *OneNSF* are embedded in the agency's *FY 2012 Budget Request to Congress*:

- Support fundamental research in every disciplinary area;
- Address complex multidisciplinary challenges of national and global significance;
- Spark greater innovation and opportunity for scientific discoveries in the NSF grantee community;

- Create new networks and infrastructure for the nation to address complex scientific issues and grand challenges;
- Improve organizational efficiency; and
- Catalyze human capital development and talent for the science and engineering workforce of the 21st century.

OneNSF strives to create new knowledge, stimulate discovery, address complex societal problems, and promote national prosperity through a variety of mechanisms. It provides an investment framework that aligns with NSF's strategic goals and includes both focused investments and broader areas of emphasis. For example, in FY 2012, under the *OneNSF* framework NSF is poised to support an array of programs that foster linkages across the organization including the following:

- Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21) is a new portfolio that builds on NSF's long history of providing leadership for cyberinfrastructure and computational science for the U.S. academic science and engineering community. CIF21 will develop and deploy comprehensive, integrated, sustainable, and secure cyberinfrastructure to accelerate research and education and new functional capabilities in computational and data-intensive science and engineering, thereby transforming our ability to effectively address and solve the many complex problems facing science and society.
- The Science, Engineering, and Education for Sustainability (SEES) portfolio consists of programs that spark innovations for tomorrow's clean energy solutions with a cross-disciplinary approach to sustainability science. SEES is designed to foster innovative insights about the environment-energy-economy nexus that will increase the effectiveness of our energy and management policies in adapting to and mitigating the impacts of climate change and improve our capabilities for rapid response to extreme events.
- Advanced Manufacturing holds tremendous potential for significant short-term and long-term economic impact by promising entirely new classes and families of products that were previously unattainable. NSF will focus investment on several emerging opportunities including cyber-physical systems, advanced robotics research, scalable nanomanufacturing, sensor and model-based smart manufacturing, educational activities to support training the next generation of product designers and engineers, and industry-university cooperation.
- A new emphasis on research and development that strengthens the development of K-12 teachers and undergraduate faculty in science, technology, engineering, and math (STEM) will focus on new lines of research and development needed for rapid improvement in the preparation and continued professional learning of current and future math and science teachers.



Photo Credit: Grace Chui

Scratch is a programming language that has made it easy for more than one million children to create and share their own interactive stories, animations, games, music, and art. NSF supports ongoing Scratch collaborations. One such "ScratchEd" project is designing an innovative model for professional development of teachers, who use Scratch to help their students learn computational thinking. NSF supports Scratch workshops and events that have impact worldwide and facilitates virtual sharing of ideas, lesson plans, and curriculum units. For more information see http://info.scratch.mit.edu/About_Scratch.

Performance

This discussion of NSF's FY 2011 performance management activities focuses on the agency's efforts related to the Government Performance and Results Act (GPRA), the American Recovery and Reinvestment Act (ARRA or Recovery Act), and management workload metrics.

Government Performance and Results Act

As a federal agency, NSF is subject to the Government Performance and Results Act of 1993 and related performance reporting guidance issued by OMB.¹⁷ In 2011, Congress passed the GPRA Modernization Act of 2010 which refined GPRA and established additional requirements.¹⁸ In mid-FY 2011, NSF released a new strategic plan, *Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years (FY) 2011–2016*.¹⁹ The new plan fundamentally reframes NSF's strategic goals. These three goals, described in more detail below, lay out a path toward both longer-term outcomes and the more immediate impacts that NSF's investments can generate.

- *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.

As shown in Figure 4, the three strategic goals map directly to a set of performance goals that will inform priorities over the life of the strategic plan.

GPRA Modernization Act of 2010

In FY 2011, the GPRA was updated with the passage of the GPRA Modernization Act of 2010. This law revises existing requirements for agencies' strategic planning, performance planning, and performance reporting processes and institutes a new framework for setting and reporting on progress towards federal and agency priority goals. Other provisions of the law formally establish a government-wide Performance Improvement Council, a performance website for reporting, and agency Chief Operating Officers (COO) and Performance Improvement Officers (PIO). In FY 2011, NSF named its COO and PIO, concluded its FY 2010–FY 2011 Priority Goal, and began selecting Priority Goals for FY 2012–2013.

The following discussion of NSF's performance goals and results summarizes information available to date. NSF's *FY 2011 Annual Performance Report* (APR) will provide a 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 2011 performance goals have undergone an independent verification and validation review by an external consultant using GAO guidance.²⁰ More

¹⁷ OMB Circular A-11, *Preparation, Submission, and Execution of the Budget* (Part 6); see www.whitehouse.gov/omb/circulars_all_current_year_all toc.

¹⁸ See www.gpo.gov/fdsys/pkg/PLAW-111publ352/pdf/PLAW-111publ352.pdf and www.whitehouse.gov/omb/mgmt-gpra/index-gpra.

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.

detailed information about NSF's GPRA verification and validation review will be part of the APR. NSF's FY 2011 APR will be included in the agency's *FY 2013 Budget Request to Congress*, which will be available on February 6, 2012, at www.nsf.gov/about/performance.

Figure 4: NSF Strategic and Performance Goals



Strategic Outcome Goals

In FY 2011, NSF set 16 performance goals. Some are new, reflecting either the novel ideas in NSF's new strategic plan or the fact that measurement capabilities can only now be brought to bear in pre-existing areas of interest (Goal 3 and Goals 6–14 in Figure 5). Some goals are unchanged from previous years, reflecting deeply ingrained priorities (Goals 4 and 16). Other goals are natural follow-ons to activities that began in previous years (Goals 1, 2, and 13). The 16 performance goals cover all program activities within the agency. Results for five goals are available at this time. Figure 5 provides a high level summary of the results available to date. A few key points are:

- NSF worked to achieve a mixture of goal types in FY 2011. This approach was recommended by the 2009 Advisory Committee for GPRA Performance Assessment, which said, "Consider an assessment framework that uses multiple measures and methods, applied over various time scales. Use both quantitative and qualitative evidence."²¹
- NSF continued to monitor the well-established quantitative performance measures known as dwell time (Goal 16) and construction cost and schedule variance (Goal 4). NSF exceeded its dwell time goal of making 70 percent of proposal decisions within 6 months. Results for the cost and schedule variance goal will be reported in the APR.
- Some FY 2011 performance goals continue activities that began in previous years. For example, Goal 1, an analysis of NSF's investments in potentially transformative research, reviewed funds spent in

²¹ This report is available at www.nsf.gov/pubs/2009/nsf09068/nsf09068.pdf.

FY 2010, which were themselves the subject of a performance goal in that fiscal year, and Goal 2, NSF's STEM Workforce Priority Goal, was a 2-year effort that began in FY 2010.

- The majority of FY 2011 goals were new because NSF's new strategic plan introduced impact-oriented goals that could not be measured with existing measures or techniques. For example, Goals 7–10 sought to establish baseline measurements of new research portfolios that cut across organizational boundaries, specifically industrial and innovation partnerships, public understanding and communication of science and engineering, the development of research-based innovative learning systems, and programs that promote partnerships that support the development of learning technologies. In other cases, a preexisting portfolio was baselined with new data or methods (e.g., Goal 3 focused on identifying the number of new program activities with international implications and Goal 6 focused on identifying the number and types of industrial and innovation grantee partnerships).
- Two of the six *Perform as a Model Organization* goals, Goals 12 and 13, are direct responses to the human resource management challenges identified by the Office of Personnel Management and NSF's Office of the Inspector General. Goal 12 focused on the development of performance plans for temporary staff appointed under the Intergovernmental Personnel Act (IPA); nearly all IPA employees filed performance plans in FY 2011. Goal 13 focused on establishing a pilot to use OPM's 360-degree evaluation instrument to provide feedback to NSF leaders and managers on skills and abilities; results for Goal 13 are incomplete at the time of this report.



Photo credit: A Royer, A Doud, M Rose, and Bin He; University of Minnesota

NSF-funded researchers have developed a unique brain-computer interface that allows humans to use thoughts to control the flight of a virtual helicopter in real time. Electrical signals from the scalp are used to control the helicopter's movements. A brain-wave based system offers those with nervous system disorders and spinal cord injuries the potential to improve their quality of life and to participate in society. Healthy individuals may also benefit by harnessing their thoughts to control multiple activities.

STEM Workforce Priority Goal

In the President's FY 2011 Budget Request, NSF set the following Priority Goal: "By the end of 2011, at least six major NSF science, technology, engineering and mathematics (STEM) workforce development programs at the graduate, postdoctoral, or early career level have evaluation and assessment systems providing findings enabling program re-design or consolidation for more strategic impact." An analysis of NSF's progress towards this goal is under review and will be made public in the APR. Even without that analysis, NSF can report that its programs have begun to benefit from participation in the Priority Goal. For example, programs that fund postdoctoral fellows are working together to develop a common assessment and evaluation framework that will support evidence-based decision-making within and enable cooperation among programs.

NSF's Performance, Assessment, and Evaluation Framework

NSF is reviewing its performance, assessment, and evaluation framework, in keeping with the administration's commitment to establishing an evaluation infrastructure that complements and integrates efforts to strengthen performance measurement and management. The NSF Strategic Plan places special emphasis on testing and refining new approaches to assessment and evaluation. Efforts that took place in FY 2011 include:

- Progress toward NSF's STEM Workforce Priority Goal, including seizing unanticipated opportunities for program improvement (see preceding section).

- Sustained NSF support for the multi-agency data infrastructure for monitoring and analyzing investments in science and engineering research and education. (Information about the STAR METRICS project is available at www.starmetrics.nih.gov.)
- Establishment of an NSF-wide capability for assessment and evaluation planning and support. In its first year this resource has: (1) expanded the analytical infrastructure at NSF, specifically, development and release of new assessment tools for use by NSF staff in portfolio analysis and outcome assessment, which will facilitate data-driven portfolio management and priority-setting; (2) begun to foster an agency-wide culture that values assessment and evaluation as decision-making tools; (3) coordinated and facilitated cross-cutting thematic evaluations; (4) introduced evaluation plans and mindsets into new activities and programs in their planning stages; and (5) supported testing of new processes for Committees of Visitors' (COV) outcome assessments.
- Development of directorate-specific activities.
- Systematic efforts to improve evaluation and monitoring activities in STEM education and workforce programs.

Figure 5. Status of NSF's FY 2011 GPRA Performance Goals

Strategic Goal	Performance Goal	Status to Date
Transform the Frontiers	Goal 1: Potentially Transformative Research. Produce an analysis of NSF's FY 2010 investments in activities undertaken to foster potentially transformative research.	Achieved
	Goal 2: STEM Workforce (Priority Goal). Ensure that NSF STEM workforce development programs at the graduate, professional, or early career level participate in evaluation and assessment systems.	◇
	Goal 3: International Implications. Identify number of new NSF program solicitations, announcements, and Dear Colleague Letters with international implications.	◇
	Goal 4: Construction Project Monitoring. Keep negative cost and schedule variance at or below 10 percent for all MREFC facilities under construction.	Target: 100% Q3 Result: 100%
	Goal 5: Data Management Practices at Large Facilities. Determine current data management practices at NSF-funded facilities.	Achieved
Innovate for Society	Goal 6: IIP Grantees' Partnerships. Industrial & Innovation Partnerships (IIP): Identify the number and types of grantees' partnerships.	Achieved
	Goal 7: Public Understanding and Communication. Identify number of programs that fund activities that address public understanding and communication of science and engineering.	◇
	Goal 8: K-12 Components. Identify number of programs that fund activities with K-12 components.	◇
	Goal 9: Innovative Learning Systems. Identify number of programs that fund the development of research-based innovative learning systems.	◇
	Goal 10: Partnerships for Learning Technologies. Identify number of programs that fund activities that promote partnerships that support development of learning technologies.	◇
Perform as a Model Organization	Goal 11: Model EEO Agency. Attain essential elements of a model EEO program, as defined in EEOC requirements.	◇
	Goal 12: IPA Performance Plans. Include temporary staff appointed under the Intergovernmental Personnel Act (IPAs) under NSF's performance management system.	Achieved
	Goal 13: 360-degree Evaluation Instrument. Pilot use of OPM's 360-degree evaluation instrument to provide feedback to NSF leaders and managers on skills and abilities.	Target 1 met
	Goal 14: Staff Developmental Needs. Pilot process for assessing and	Target 1 met

Figure 5. Status of NSF's FY 2011 GPRA Performance Goals

Strategic Goal	Performance Goal	Status to Date
	addressing developmental needs.	
	Goal 15: Grant-By-Grant Payments. Gather functional requirements for changes in current system processes that will accommodate the transition to a grant-by-grant payment method.	◇
	Goal 16: Dwell Time. Inform applicants whether their proposals have been declined or recommended for funding within six months of deadline, target date, or receipt date, whichever is later.	Achieved Target: 70% Result: 78%

Note: ◇ Indicates results will be reported in the APR with the FY 2013 Budget Request.

Recovery Act Performance Results

In FY 2011, NSF continued implementation of our three ARRA programs—Research and Related Activities (R&RA), Education and Human Resources (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."²² NSF targets investments that will fuel economic growth by yielding new discoveries that will enhance productivity for many years to come and will contribute to the preparation of a dynamic U.S. workforce.

NSF's entire ARRA portfolio of more than 5,000 awards and \$3 billion was obligated by the end of FY 2010. Our key focus for FY 2011 was monitoring awardee performance, including compliance with requirements for quarterly recipient reporting; providing ARRA information to stakeholders and improving the accessibility to and quality of ARRA data; and increasing awardee communication, outreach, and oversight to ensure the timely expenditure of award funds. ARRA expenditures were \$1.38 billion as of September 30, 2011. FY 2011 ARRA activities included:

- **Monitoring awards for progress in accordance with the NSF ARRA program plans.** In addition to the high-risk and potentially transformative awards, the FY 2011 R&RA program oversaw the implementation of the research infrastructure and instrumentation programs—Major Research



Photo credit: Benjamin Massey, R/V SIKULIAQ Project Shipyard Inspector.

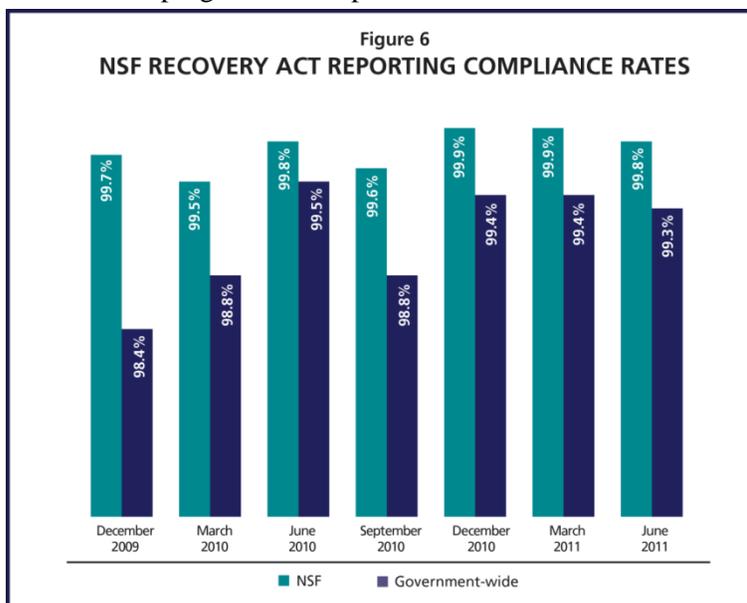
Funded in part by the American Recovery and Reinvestment Act of 2009, construction of the NSF R/V SIKULIAQ is well underway at Marinette Marine Corporation in Marinette, Wisconsin. Construction of the research vessel will create more than 150 jobs locally while building a long-term national asset for the U.S. oceanographic research community. SIKULIAQ is designed to support high latitude arctic research in sea ice up to 2.5-feet thick. The vessel is currently scheduled to embark on its first research mission in October 2012.

²² 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.

Instrumentation (MRI) and Academic Research Infrastructure (ARI) —which entailed early stage monitoring of awardee planning for acquisition of shared scientific instrumentation and, in many cases, planning, design, and construction of laboratory facilities. NSF Program Officers also monitored the progress of the EHR and MREFC programs,²³ assessing whether educational targets were met and if MREFC projects were proceeding within budget and on time.²⁴ These results will be reported in the APR.

- **Ensuring that stakeholders had timely access to ARRA-information.** In FY 2011, we worked closely with the government-wide ARRA implementation effort, providing accessible information to the White House, Congress, and the NSB, as well as to other members of the STEM community including expenditure data, award information, programmatic updates and more. We continued to

promote Research Spending and Results to the STEM community, which allows the public to search for and download NSF ARRA award information. We also contributed ARRA-related stories to *U.S. News & World Report* and produced five new videos for Science360.gov's ARRA Report, which highlighted interesting ARRA-funded discoveries. All of these efforts were designed to increase transparency and public understanding of our work.



- **Continued communication with awardees to ensure the timely expenditure of ARRA funds.**

We continued monitoring compliance with the ARRA award term and condition requiring awardees to spend funds by the anniversary date of their award. In FY 2011, no award was terminated for this reason. NSF implemented a multi-level awardee outreach initiative in order to achieve this result, connecting NSF financial contacts directly 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.

- **Monitoring compliance with ARRA recipient report requirements and enhancing NSF review program.** As noted previously, we continued to implement NSF's comprehensive, multi-stage review program for recipient reporting. Our effective program and 99 percent compliance rate over the last seven reporting quarters firmly establish NSF as a leader that the accountability and transparency community can rely on for government-wide process-improvement recommendations.²⁵ Figure 6 depicts NSF's recipient reporting results over the past seven quarters as compared to the government-wide average.

²³ The EHR ARRA program includes the Math Science Partnership Program, the Robert Noyce Scholarship Program and the Science Masters Program, and the MREFC portfolio includes the Advanced Technology Solar Telescope (ATST), the Ocean Observatories Initiative (OOI) and the Alaska Region Research Vessel (ARRV), as well as the ARRA-funded Airborne Observation Platform that is part of the National Ecological Observatory Network (NEON).

²⁴ See the NSF FY 2012 Budget Request for the most recent information on ARRA MREFC targets.

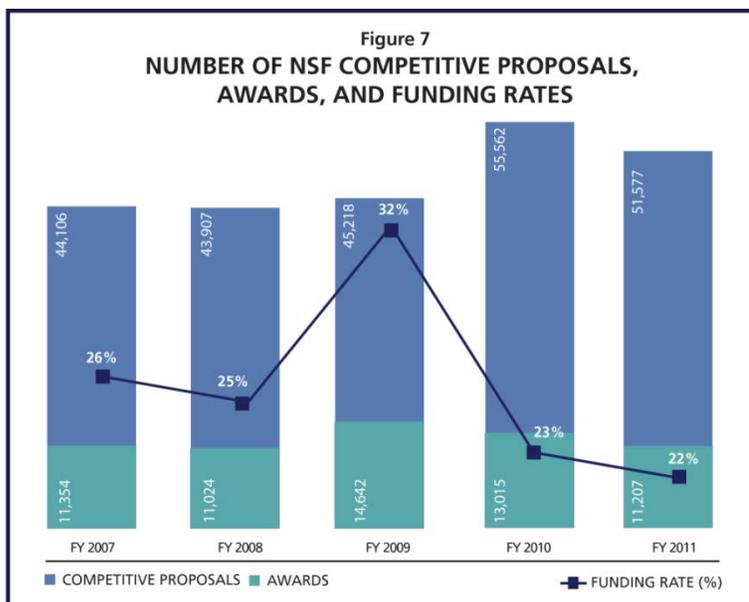
²⁵ NSF has overseen 8 recipient reporting quarters to date, delivering compliance rates of 99 percent over the last seven quarters, with several quarters at 99.9 percent.

In FY 2012, NSF will continue to implement our recipient reporting program interacting with the Recovery Accountability and Transparency Board (RATB) and Government Accountability and Transparency Board (GATB). We will continue our enhanced outreach and communication with ARRA awardees. We will also expand our expenditure rate monitoring to respond to requirements and guidance from OMB, the RATB, and Congress and to ensure that the purposes of ARRA are fulfilled. In addition, 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 2011, the number of competitive proposals reviewed by NSF remained at historically high levels. After seeing nearly 56,000 proposals in FY 2010, nearly 52,000 proposals were either awarded or declined by NSF in FY 2011. Even with this noteworthy 7 percent reduction from FY 2010, the number of actions remained 17 percent and 14 percent, respectively, above pre-Recovery Act FY 2008 and FY 2009 levels (see Figure 7).



- The decrease of 1,808 in new competitive awards made in FY 2011—nearly 14 percent—reflects the higher number of new awards made in FY 2009 and FY 2010 as a result of Recovery Act funding.
- The FY 2011 funding rate of 22 percent is down 1 percentage point from the prior year and 10 percentage points below the FY 2009 funding rate of 32 percent, which reflected the overall level of investment made possible by the Recovery Act. As shown in Figure 7, the FY 2011 funding rate is below pre-Recovery Act funding rates of 26 percent and 25 percent in fiscal years 2007 and 2008, respectively.
- The average annual award size decreased by nearly 9 percent in FY 2011, to \$172,533. This compares to a nearly 7 percent average annual increase in award size from FY 2007 to FY 2010.
- NSF's workforce in terms of full time equivalents (FTE) decreased slightly, from 1,424 in FY 2010 to 1,415 in FY 2011. This is in contrast to the 3 percent average annual increase in FTE from FY 2007 to FY 2010.
- Workload as measured by the number of active awards continued to increase in FY 2011, by 2 percent. However, the number of proposal reviews conducted decreased 9 percent.

Figure 8. Workload and Management Trends

Measure		FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	Rate of Change (FY 2011/ FY 2010)	Annual Rate of Change (FY 2011/ FY 2007)
Portfolio	Competitive proposal actions	44,106	43,907	45,218	55,562	51,577	-7%	4%
	Competitive new awards	11,354	11,024	14,642	13,015	11,207	-14%	-0.3%
	Average annual award size (competitive awards)	\$157,943	\$167,300	\$172,569	\$189,338	\$172,533	-9%	2%
	Funding rate	26%	25%	32%	23%	22%	-1% point	-4***
Workload	Number of employees (FTE, usage)	1,310	1,339	1,386	1,424	1,415	-0.6%	2%
	Number of active awards*	47,778	48,799	52,858	55,449	56,414	2%	5%
	Proposal reviews conducted	248,335	248,772	241,712	287,017	262,005	-9%	1%
Financial	Cash-on-hand** (in millions)	\$33	\$26	\$26	\$19	\$21	11%	-9%
	Number of grant payments	19,074	19,481	25,723	22,782	29,214	28%	13%
	FCTR/FFRs submitted	99.70%	99.80%	99.60%	99.80%	99.89%	<1% point	<1% point***

* Active awards include all active awards regardless of whether they received funding during the fiscal year.

** FY 2011 is through the third quarter.

***Percentage point change from FY 2007.

- 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). NSF has increased its emphasis on collecting the reports following the change in the FFR due date from 40 to 30 days after the end of the quarter. For FY 2011, 99.9 percent (6,937 of 6,944) of the FFRs due were submitted by the end of the reporting period. High FFR submission levels are directly related to the overall accuracy and completeness of NSF grant expenses as reported on NSF financial statements.
- NSF has increased emphasis on grantee cash monitoring in order to improve cash management by grantees, resulting in less governmental risk and improved cash flow for NSF. Unexpended federal cash held by grantees has decreased to \$21 million in FY 2011, from a quarterly average of \$33 million in FY 2007. This decrease has been achieved at the same time NSF payments to grantees have increased by 28 percent over the last 5 years.

In FY 2011, NSF conducted its annual statistical review of FFR expenditures as reported by grant recipients and a separate statistical review of expenditures reported for Recovery Act awards. Consistent with prior year results, the error rate noted in the review of all awards by an independent consultant was well below the materiality levels as defined in OMB standards. Of particular note was that no reporting errors were discovered during the review of Recovery Act awards. NSF intends to continue its grant expenditure sampling process as part of its integrated and comprehensive grant financial monitoring program strategy.

- For FY 2011, 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 Recovery Act awards. This increased activity level should gradually diminish throughout FY 2012 and beyond as NSF begins the closeout process for these awards.

Financial Discussion and Analysis

In these challenging budgetary times, the federal government has turned to Chief Financial Officers to offer solutions that will enable agencies to serve the American people more effectively. NSF has responded by building on business services that work smarter, better, and more efficiently. One way we have done this through additional risk management analysis of our operations. Effective risk management helps us to better set priorities while avoiding unnecessary costs. For example, as part of its internal control program, NSF performs risk-based internal control assessments that cover a range of business processes. These assessments are integrated with system reviews to gain efficiencies. NSF has also developed new tools to facilitate award management and the monitoring of expenditure rates. The agency's move towards modernizing its financial systems and contracting and grant management processes has allowed us to make strides towards improving the availability and transparency of financial information with the result of operating more efficiently. During FY 2011, NSF moved forward with the planning and acquisition of a new financial management system (see discussion on "Financial System Strategy" on page 1-25). In addition, our current award oversight activities are based upon risk assessments of funding. The risk assessment process is consistently reviewed based on results and experience.

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 for use, 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, 2011 and 2010. For FY 2011, NSF received its 14th consecutive unqualified audit opinion. The audit report noted no material weaknesses. In addition, the report no longer includes the prior year significant deficiency related to the monitoring of cost reimbursement contracts. This is largely the result of the agency's efforts to obtain incurred cost audits for high-risk contracts to ensure the reasonableness and accuracy of costs paid on contracts. However, the audit report includes a new significant deficiency related to cooperative agreements with budgeted contingency amounts. Although management does not concur with the significant deficiency, NSF will continue to work towards reaching agreement and resolving the concerns reported. A detailed discussion of the independent audit is included in the audit report which can be found on page II-3.

Understanding the Financial Statements

NSF's FY 2011 financial statements and notes are presented in accordance with OMB Circular No. 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 9 summarizes the changes in NSF's financial position in FY 2011.

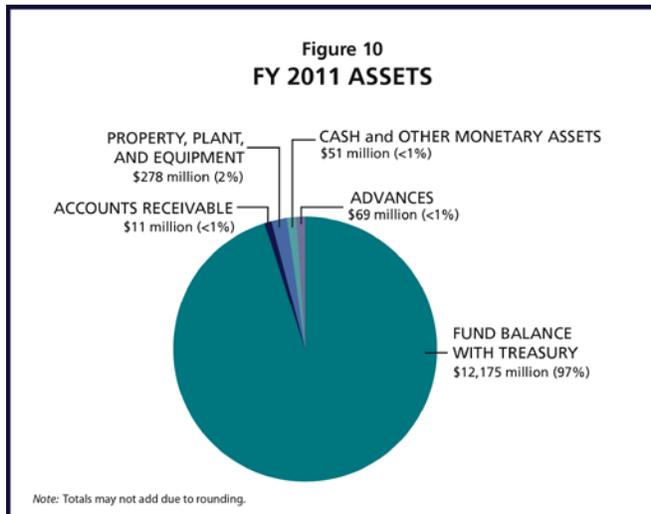
Figure 9. Changes in NSF's Financial Position in FY 2011 (dollars in thousands)

Net Financial Condition	FY 2011	FY 2010	Increase/ (Decrease)	% Change
Assets	\$12,584,734	\$12,804,423	(\$219,689)	-1.7%
Liabilities	\$581,123	\$596,010	(14,887)	-2.5%
Net Position	\$12,003,611	\$12,208,413	(\$204,802)	-1.7%
Net Cost	\$7,139,994	\$6,895,106	\$244,888	3.6%

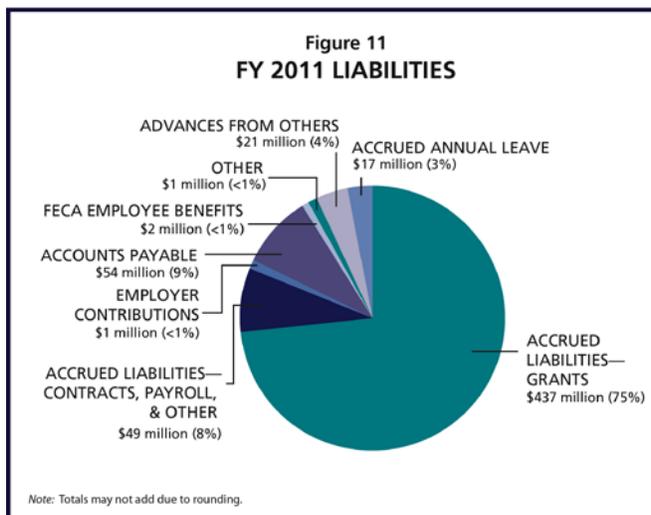
Balance Sheet

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 2011, *Total Assets* (Figure 10) decreased 1.7 percent from FY 2010 assets. The bulk of the change occurred in the *Fund Balance with Treasury* account, which decreased by \$283.6 million in FY 2011. *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.



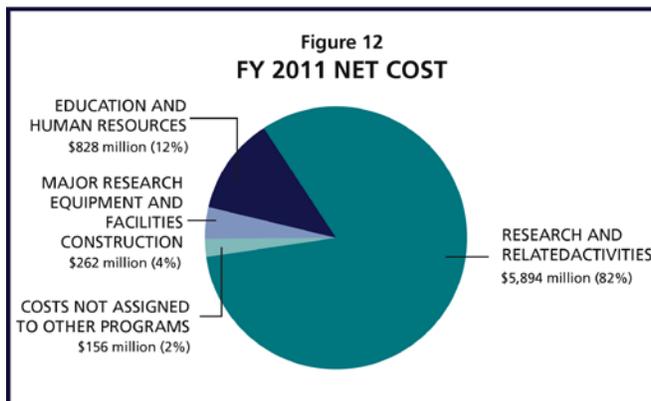
NSF's *Total Liabilities* (Figure 11) decreased by 2.5 percent in FY 2011. The majority of this change is related to NSF's strides to encourage its partnering agencies to work on a reimbursable basis, reducing the related *Advances from Others* liability.



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 95 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 5 percent of the total current year Net Cost of Operations (Figure 12). 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 1.7 percent, or \$204.8 million, in FY 2011.

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 2011, *Total Budgetary Resources* decreased by \$610.8 million due to ARRA funding appropriated in the prior fiscal year. New *Budget Authority-Appropriation* for the R&RA, EHR, and MREFC accounts were \$5,575.0 million, \$862.8 million, and \$117.3 million, respectively. The combined new *Budget Authority-Appropriation* in FY 2011 for the NSB, OIG, and Agency Operations and Award Management (AOAM) accounts totaled \$318.5 million. NSF also received funding via warrant from the special earmarked H-1B receipt account in the amount of \$104.8 million and via donations from foreign governments, private companies, academic institutions, nonprofit foundations, and individuals in the amount of \$53.1 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 2011 and 2010, these costs amounted to \$337.2 million and \$312.3 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 2011 financial statements, which appear in Chapter II 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 \$10.9 million at September 30, 2011. Of that amount, \$10.7 million is due from other federal agencies. The remaining \$186,000 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 2011, NSF had no awards covered under CMIA Treasury–State Agreements. NSF's FastLane system with grantee draws of cash makes the timeliness of payments issue under the Act essentially not applicable to the agency. No interest payments were made in FY 2011.

Systems, Controls, and Legal Compliance

Management Assurances

The Federal Managers Financial Integrity Act of 1982 (Integrity Act or FMFIA) requires federal agencies to conduct ongoing evaluations and report on the adequacy of internal accounting and administrative control. The head of the agency is required to provide an annual statement of assurance that obligations and costs are in compliance with the requirements of applicable laws and regulations; federal assets are safeguarded against fraud, waste, and mismanagement; transactions are accounted for and properly recorded; and financial management systems conform to standards, principles, and other requirements to ensure that managers have timely, relevant, and consistent financial information for decision-making purposes. The FY 2011 evaluation results reflected in the Statement of Assurance on the following page support an unqualified assertion for the year. NSF had no reportable conditions for FY 2011.

The Federal Financial Management Improvement Act of 1982 (FFMIA) requires that agencies implement and maintain financial management systems that comply substantially with the federal financial management system requirements, applicable federal accounting standards, and the U.S. Government Standard General Ledger (SGL) at the transaction level. The agency head makes an annual determination about whether the financial systems are substantially compliant with FFMIA. To meet this requirement, NSF performed tests of compliance with FFMIA, Section 803(a), which determined that the agency's financial systems are substantially compliant.

Highlights from NSF's Internal Control Quality Assurance Program

The NSF Internal Control Quality Assurance Program has evolved from several years of implementation to its third year of an unqualified statement of assurance for a full scope. FY 2011 has been a robust year for internal control reviews; reviews included ten business processes, the United States Antarctic Program property, plant, and equipment activities, the charge card process, and the acquisition process. In addition, there was the Federal Information Security Management Act of 2002 review as well as other reviews related to the information technology.

A variety of tests were performed to determine whether controls supporting the business processes are in place and functioning effectively with respect to the processing of transactions, grant awards, and the safeguarding of assets during the period July 1, 2010 through June 30, 2011. Testing controls validated the operating and design effectiveness of internal controls and provided support that the controls are functioning effectively to meet the control objectives, which addresses relevant financial statement assertions. Observations, testing, interviews, and walkthroughs with NSF personnel were the basis for these results.

To maximize efficiencies and eliminate duplication of efforts, NSF utilized the comprehensive Internal Control Quality Assurance Program to integrate the Federal Managers Financial Integrity Act of 1982, as implemented through OMB Circular A-123, and the more focused financial requirements contained in Appendix A. The key components of the NSF Internal Control Quality Assurance Program include the Program Governance and Control Activity Assessment Tool (CAAT). Taken as a whole, the Program Governance and CAAT help comprise an effective Internal Control Program. Overseen by NSF's Accountability and Performance Integration Council also serving as the agency's Senior Assessment Team, the NSF Internal Control Quality Assurance Program incorporates a multi-year review cycle to ensure that all assessable units undergo detailed internal control reviews.



National Science Foundation FY 2011 Statement of Assurance

The National Science Foundation (NSF) management is responsible for establishing and maintaining effective internal control and a financial management system that meets the objectives of the Federal Managers Financial Integrity Act of 1982 (Integrity Act) and the Office of Management and Budget (OMB) Circular A-123, *Management's Responsibility for Internal Control*.

NSF managers continually monitor and improve the effectiveness of management controls associated with their programs. This continuous monitoring and other periodic evaluations provide the basis for the annual assessment and report on management's controls, as required by the Integrity Act. Based on the results of these evaluations, NSF provides reasonable assurance that as of September 30, 2011, its internal controls 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 controls under Section 2 of the Integrity Act and no system non-conformances were identified under Section 4 of the Integrity Act.

In addition, NSF is leveraging the established OMB Circular A-123 and the Integrity Act assessment methodologies to assist in assessing the applicable entity-wide controls, documenting the applicable processes, and identifying and testing the key controls applicable to the American Recovery and Reinvestment Act funding and the Open Government 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, 2011, 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 the internal controls.

For fiscal year 2011, NSF is providing an unqualified statement of assurance that its internal controls and financial management systems meet the objectives of the Integrity Act.

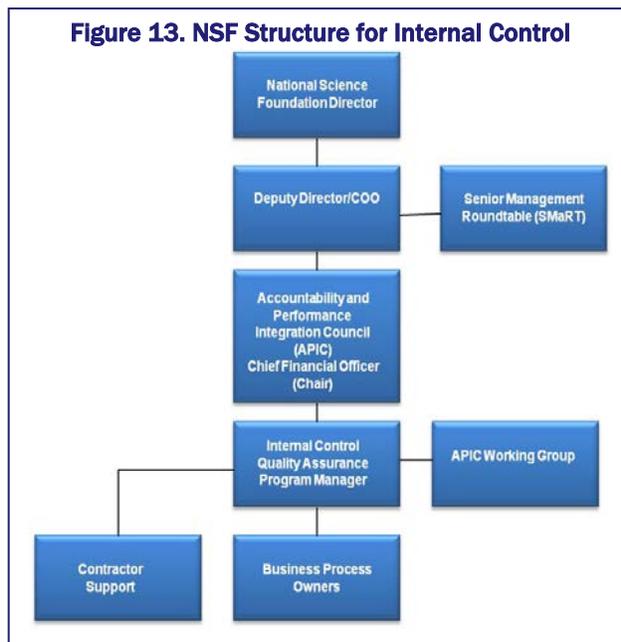
A handwritten signature in black ink, appearing to read 'Subra Suresh', is positioned above the printed name.

Subra Suresh
Director

November 15, 2011

The Accountability and Performance Integration Council

The Accountability and Performance Integration Council (APIC) works to foster an organizational environment that supports an agency-wide awareness of internal control that will ensure efforts are on-going throughout the year in order to meet the responsibilities for documenting, assessing, monitoring, and correcting internal control issues. Internal control applies to program, operational, and administrative areas, as well as accounting and financial management. APIC reports to and provides findings from the agency-wide review to the Deputy Director/Chief Operating Officer (COO). The COO chairs the Senior Management Roundtable (SMaRT), the body which provides executive level consideration of management and accountability and related issues, drawing on the work of an ad hoc working group. The chart on the right depicts the NSF structure for internal control.



Management's Responsibility for Internal Control

OMB A-123 requires agencies to annually assess the condition of internal controls within the agency by identifying key controls within key business processes, conducting entity level and transaction level testing and reporting to OMB whether adequate internal controls in financial reporting, operations, and program activities exist. NSF implemented an innovative internal control approach that enables an enterprise-wide review – an approach that helps ensure internal control is not limited to organizational components with financial touch points.

NSF's approach integrates all aspects of OMB Circular A-123, including Appendices A, B and C with related governing authorities including the Improper Payments Information Act as amended, the FMFIA as amended, and OMB Circular A-127. Such integration enabled NSF to realize a streamlined, consistent and reliable internal control program with a reduced risk of duplicative efforts and wasted resources. The internal control approach leveraged varied data collection techniques including conducting interviews, administering surveys and facilitating working sessions to widen the lens, helping to ensure that mission critical areas – that may not have a financial impact – were given adequate attention and consideration.

The ultimate goal of testing key controls is to validate that the controls are functioning effectively to meet the control objectives which address a relevant financial statement assertion. In order to perform testing efficiently, test plans were developed for each business process to document planned testing procedures and to gain evidence to support the operating effectiveness of each control. In determining how extensively a key control is tested (e.g., sample size or type of test performed), NSF considered the complexity of the key control, how often the control is performed, and whether the control is manual or automated. The assessment of control design and operating effectiveness for the FY 2011 key business processes resulted in no significant deficiencies or material weakness to report.

The United States Antarctic Program Property, Plant, & Equipment

NSF and the Raytheon Polar Services Company (RPSC) have a multi-year contract in which RPSC is responsible for acquiring, maintaining, and performing a physical inventory of the United States Antarctic (USAP) property, plant, & equipment (PP&E). NSF relies upon RPSC to maintain all related source documentation and record amounts for the PP&E activities it conducts. The USAP PP&E Business Process was tested to validate the operating and design effectiveness of internal controls around NSF capital property, budget reporting, property acquisition, and Antarctic Infrastructure & Logistics Division oversight of capital equipment. Based on observations, testing, interviews, and walkthroughs with RPSC and NSF personnel there were no deficiencies noted.

Charge Card Review

NSF developed procedures in support of its compliance with OMB Circular A-123 Appendix B, Guidance on Improving the Accountability and Effectiveness of Federal Government Charge Card Programs (Appendix B). Appendix B of OMB Circular A-123 prescribes policies and procedures to agencies regarding how to maintain internal controls that reduce the risk of fraud, waste, and error in government Charge Card Program. As a result, a review was conducted to ensure charge cardholders, approving officials, administrative officers and program coordinators are following the policies and procedures set by the NSF Charge Card Program Management Plan prepared by NSF's Agency Program Coordinator in January 2011. The results of the review determined there are no non-compliant issues or reportable conditions to report.

Assessment of Recovery Act Funds

NSF has established and maintained adequate internal controls to ensure that reported results regarding the expenditure of Recovery Act funds and the outcomes achieved are accurate, verifiable, and reported. The assessment of Recovery Act funds was conducted in parallel with ongoing business process internal control reviews. The internal control review of the Recovery Act funds determined the NSF is in compliance with the Recovery Act requirements of transparency and accountability. Unnecessary delays and overruns are avoided and funds are used for authorized purposes and potential for fraud, waste, error, and abuse are mitigated.

Acquisition Assessment

In FY 2011, NSF incorporated the four cornerstones outlined in the U.S. Government Accountability Office (GAO) *Framework for Assessing the Acquisition Function at Federal Agencies* into the acquisition and program management reviews, self-assessments, and other internal control-related review and analysis practices. The GAO framework is a tool to evaluate specific acquisition actions, contracts, compliance with contracting laws and regulations and a source for assessment questions. NSF integrated the GAO template for acquisition and program management with existing internal control processes and practices to ensure efficient internal control assessments of the acquisition activities in support of the annual assurance statement requirements. The four cornerstones of the GAO assessment framework are: Organizational Alignment and Leadership, Policies and Process, Human Capital, and Knowledge and Information Management. NSF evaluated controls at the entity, process, and transaction levels; performed risk assessments; tested and focused on key acquisition activities and programs within the four cornerstone areas. NSF documented assessed risk, tested, and has no reportable conditions to report.

Information Technology Assessments

NSF reviewed the internal controls for information technology (IT) in five domains: access control, contingency planning, configuration management, segregation of duties, and security management. NSF leveraged the Federal Information Security Management Act (FISMA) review to gain efficiencies for

testing activities and documenting the controls which support NSF operations and assets. The assessment consisted of a comprehensive review of policies, procedures and operational controls, including financial system controls. Overall, NSF's IT controls are effective in maintaining a secure IT environment. NSF's integrated secure operations and continuous monitoring verify effective IT security controls are in place.

In FY 2010, a risk assessment of NSF's financial system determined it to be at moderate risk. During FY 2011, there were no system changes to NSF's Financial Accounting System and no additional compliance with OMB Circular A-127, *Financial Management Systems* requirements, therefore, NSF's financial system assessment remains at moderate risk for FY 2011. OMB Circular A-127 prescribes policies and standards in developing, operating, evaluating, and reporting on financial management systems.

In accordance with the requirements of FFMIA, management reports on its implementation and maintenance of financial management systems to substantially comply with federal financial management systems requirements, applicable federal accounting standards, and the U.S. Government SGL at the transaction level. NSF's financial statements are prepared with information generated by the core financial system consistent with OMB Circular A-136, *Financial Reporting Requirements* and the agency's financial systems provides timely and reliable financial information.

Improper Payments Elimination and Recovery Act of 2010

NSF has historically shown that improper payments have not been a problem for the agency and the related risk is low. The Improper Payments Information Act (IPIA) of 2002 and OMB Circular A-123, Appendix C, *Management's Responsibility for Internal Control: Requirements for Effective Measurement and Remediation of Improper Payments*, 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. In FY 2009, NSF conducted a statistical review of its FY 2008 Federal Financial Report transactions received from grant recipients. Consistent with the results of previous reviews, the occurrence of NSF improper payments continued to be well below the significant standard of improper payments, which is defined by OMB guidance as exceeding \$10 million and 2.5 percent of total outlays. As a result, OMB renewed NSF's relief from the annual IPIA reporting for FY 2010 and FY 2011. The next report will be prepared in FY 2012. During this relief period, NSF has continued to perform annual statistical sampling of grant expenditures, including payments made under the Recovery Act.

The IPIA was followed by the Improper Payments Elimination and Recovery Act (IPERA) in July 2010 and a series of OMB memoranda, including an update to Circular A-123, which established new requirements for agencies on improper payments. The IPERA complements the implementation of agency efforts to reduce and recover improper payments. NSF has worked with its OIG and OMB to implement the requirements by: (1) determining that NSF does not have high priority programs, which are defined as programs that have a higher impact on improper payments, and (2) developing a quarterly high-dollar improper payments report to the OIG.

The IPERA also expanded the types of programs that are required to conduct payment recapture audits. A Payment Recapture Audit is a review and analysis of an agency's or program's accounting and financial records, supporting documentation, and other pertinent information supporting its payments that is specifically designed to identify overpayments. The IPERA requires agencies to report on actions taken to perform recapture audits annually beginning in FY 2011. If an agency determines that performing recapture audits is not cost-effective, then it needs to justify the determination. In compliance with IPERA and Circular A-123, NSF evaluated its grants and contracts oversight processes and determined that it was not cost-effective to establish a formal Recapture Audit Program. NSF submitted its plan for meeting the requirements of recapture audits on January 14, 2011, to OMB and NSF's Office of Inspector General

(OIG), including the reasons for a cost-effective determination. On September 29, 2011, NSF sent a follow-up to OMB reiterating its determination. NSF is leveraging its existing oversight policies and procedures to meet the intent of OMB's requirements on improper payments.

Financial System Strategy

NSF is implementing an agency-wide strategic initiative to replace its aging financial system to a fully integrated financial management solution. *iTRAK* will replace the current Financial Accounting System (FAS) which is now over 20 years old and is becoming technically and functionally outdated. *iTRAK* will provide NSF with state-of-the-art, user-friendly financial management capabilities that ensure stewardship of agency resources in support of excellence in science and engineering research and education. NSF is modernizing its financial management capabilities with a commercial-off-the-shelf (COTS) core financial management system and key interfaces in a hosted environment. This solution will increase the agency's ability to make more informed operational and programmatic decisions, improve effectiveness and efficiency of financial and business processes, and enhance financial and business accountability, integrity, and compliance.

The *iTRAK* strategy incorporates the guidance contained in OMB Memorandum M-10-26, *Immediate Review of Financial Systems IT Projects*, and the project has been scoped to meet the following guiding principles set forth in the memo: (1) split projects into smaller, simpler segments with clear deliverables, with overall implementation not to exceed 24 months and (2) focus on most critical business needs first. The following functional areas were determined by NSF management and leadership to be within scope: core financials (general ledger, budget execution, payment management, receivables, costing, and reporting); key interfaces; and data readiness.

To ensure compliance with OMB Memorandum M-10-26, NSF will also implement a COTS system that is compliant with Federal Financial System guidance and requirements, including OMB Circular A-127, *Financial Management Systems*, and the Tax Increase Prevention and Reconciliation, Government-wide Accounting and Reporting Program (*TIPRA, GWA*). Currently, NSF is in the Planning and Acquisition phase of the project and expecting to award an implementation contract in FY 2012. Planning activities have included:

- set-up the project governance structure, which includes the *iTRAK* co-leads, *iTRAK* Program Management Office (PMO), and an *iTRAK* Advisory Group;
- conducted market research to understand industry best practices, available software options, and associated costs;
- developed a communications plan and conducted stakeholder outreach activities that include an *iTRAK* website, *iTRAK* newsletter, town hall meetings, and stakeholder questionnaire;
- documented as-is business processes; developed to-be business processes and requirements; documenting interfaces;
- developed a data clean-up strategy; executed data clean-up tasks for existing NSF Financial Accounting System (FAS) data to prepare for migration to the new system;
- developed the business case and performed an alternatives analysis for implementing *iTRAK*;
- submitted the OMB Exhibit 300 budget requests for FY 2010–FY 2013;
- developed the acquisition strategy and all associated documents for the acquisition package, which include the Acquisition Plan, Evaluation Plan, Independent Government Cost Estimate (IGCE), and the Statement of Work (SOW).

As NSF moves into the implementation phase in FY2012, activities will include continuing data clean-up; awarding the *iTRAK* Indefinite Delivery/Indefinite Quantity (IDIQ) contract and first Task Order; developing a new account code structure; beginning implementation of COTS financial system by performing configuration workshops and a gap analysis; conducting conference room pilots; beginning development of interfaces to NSF and federal systems; and continuing stakeholder outreach and communication activities.

Financial Management Systems Framework

In the current environment, core functionality (general ledger, funds management, receivables, and cost accounting) is provided in a single module within the FAS. *iTRAK* modernizes NSF's current financial management environment by providing an integrated financial management and business solution. In the future environment, core functionality will include general ledger, funds management, receivables, and costing as well as payments management. *Research.gov* will be integrated with the payments management module of the COTS core financials application. The COTS core financials application will also include a reporting module. Systems integrated with FAS in the current environment will be integrated with the COTS Core Financials application in the future environment.

iTRAK will automate labor-intensive manual business processes and will comply with revised OMB Circular A-127 requirements mandating use of COTS systems for core financials and adoption of standard government business practices and requirements. *iTRAK* will enable NSF to achieve process efficiencies and economies of scale in financial management operations and the provision of timely, accurate financial data for decision-making. The use of a shared service provider (SSP) will allow for more efficient operations and

maintenance as costs will be shared among SSP customers. This will also help ensure that the system remains up to date with all federal financial system requirements. Integration of the property, acquisition, and budget formulation systems with the COTS core financials application will occur in later phases after successful implementation of core financials and key interfaces. A high-level conceptual system interface architecture that highlights general *iTRAK* system boundaries appears in Figure 14.

