MANAGEMENT'S DISCUSSION AND ANALYSIS

AGENCY PROFILE

Mission and Vision

The National Science Foundation (NSF) is the steward of the nation's science and engineering enterprise. As an independent agency created by Congress in 1950, its mission is to promote and advance scientific progress in the United States by supporting all fields of fundamental science and engineering. Unlike other research agencies that focus on specific missions such as defense or health, NSF is the only federal agency responsible for the overall health of science and engineering across all disciplines. Its unique vision is articulated in the fiscal year (FY) 2003–2008 Strategic Plan, which guided FY 2006 activities, and in the FY 2006–2011 Strategic Plan, which was delivered to Congress on September 29, 2006, and will guide the agency in the future:[1] "Enabling the Nation's Future Through Discovery, Learning and Innovation: NSF investments—in people, in their ideas, and in the tools they use—will catalyze the strong progress in science and engineering needed to establish world leadership and secure the nation's security, prosperity, and well-being."

The Public Benefits of a Strong Science and Technology Enterprise

U.S. investments in science and technology have long driven economic growth and improved the quality of life for successive generations. Science and technology have generated new knowledge and industries, created new jobs, provided new sources of energy, developed new modes of communication and transportation, and improved medical care. This process of scientific discovery and innovation has been critical to increasing the nation's productivity and sustaining economic growth. Today, more nations follow our lead in investing in science and technology, so the United States, in keeping with the President's American Competitiveness Initiative, must maintain its leadership in scientific discovery and new technologies in order to remain globally competitive.

NSF plays a critical role in fostering research of the highest quality—research that will generate important discoveries and new technology. As the FY 2006 research highlights on the following page and throughout this report clearly demonstrate, this work has a positive impact on the nation. For example, NSF supported research efforts in the physical sciences, social and economic sciences and engineering research related to the catastrophic flooding in the southeastern United States, including one study that determined how and why numerous levees failed. The results will allow engineers to improve their plans for repairs. Also, NSF-supported researchers devised an ultra-tiny electrical valve (or diode) that is composed of only a single molecule and is a thousand times smaller than current valves. This research could lead to a whole new era of miniaturization in electronic components.

Despite its small size, NSF has had an extraordinary impact on the nation's scientific knowledge and capacity. NSF has funded the groundbreaking research of 174 Nobel Prize winners and thousands of other distinguished scientists and engineers.[2] The remarkable progress in science and engineering that has defined the United States since World War II reflects the strength of our basic research enterprise. Moreover, not since World War II have advances at the frontiers of knowledge been more critical for national security. Advanced capability in materials science research, sensors and sensor network

[1] NSF's current Strategic Plan, *Investing in America's Future: Strategic Plan FY 2006–2010*, is available at www.nsf.gov/pubs/2006/nsf0648/NSF-06-48.pdf. The FY 2003–2008 Strategic Plan is available at www.nsf.gov/pubs/2004/nsf04201/FY2003-2008.pdf.

[2] See www.nsf.gov/news/news_summ.jsp?cntn_id=108098&org=NSF&from=news for a list of the Nobel laureates who have received NSF support.

architecture, genomics, cyber-security, and data mining, as well as knowledge of human and social dynamics, have a direct impact on present and future homeland security systems and capacity.

FY 2006 Research Highlights

The following are some results reported by NSF-supported researchers in FY 2006:

- Conducted extensive on-site research in and around New Orleans following Hurricane Katrina, and published an analysis explaining how and why numerous levees failed, allowing engineers to improve plans for repairs
- Observed the astronomical results of a two-galaxy smashup and announced the first "direct detection" of the mysterious, invisible "dark matter" that is a major component of the universe but neither emits nor reflects light
- Provided novel telecommunications and computerized early-warning systems that gave critical information to separate teams fighting a dangerous outbreak of wildfires in California
- Issued advance warning of the increased risk of a potentially lethal microbe called Hantavirus that has plagued the Four Corners area of the southwest United States
- Launched a major, multiyear program to record and study dozens of dying languages – those spoken by only a few people and doomed to disappear completely soon – so that knowledge will not be lost to humanity
- Compiled a forecast indicating that the next 11-year sunspot cycle, with its associated "solar storms" that can damage key communications satellites and cause widespread blackouts in power grids, will be at least 30 percent stronger than the last
- Showed that there is a direct link between the number of species in an ecosystem and its ability to survive environmental and other threats
- Uncovered a new method of detecting and identifying cancer genes by mathematically analyzing the output of "gene chips," and tested the method successfully in lung cancer cases
- Undertook a wholesale reevaluation of high-school advanced placement courses in math and science, which are now in drastic need of updating to give students the information and insight they will need in college
- Discovered and characterized a "super glue" produced by bacteria that is completely waterproof and three to five times stronger than any commercial adhesive available – capable of withstanding a pull of five tons per square inch
- Unearthed a remarkable fossil – unlike anything else ever discovered in the region – that is the oldest example of a creature that inhabited the evolutionary gap between fish and land animals
- Devised an ultra-tiny electrical valve (or diode) that is made of only a single molecule – a thousand times smaller than its current counterparts – thus raising the possibility of an entirely new era of miniaturization in electronic components
- Determined that infants less than one year old have an innate sense of numbers, which they are able to employ many months before they are even able to talk – much less do arithmetic.
- Produced the first computer simulation of the workings of every atom in a virus, the first time any complete life form has been mapped in its entirety
- Sent a new, high-altitude research plane, built to fly miles above commercial jets, on its first successful science missions to examine the contents and activity of atmosphere at new heights
- Constructed a new generation of two-legged robots that can walk like human being

For more information on the research results described here, see www.nsf.gov/discoveries/.

NSF Leadership in U.S. Academic Basic Research

Figure 1 Federal Support for Research and Development

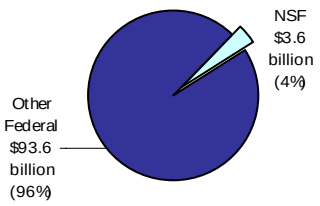
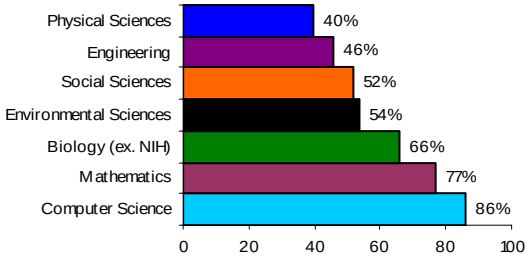


Figure 2. NSF Support as a Percent of Total Federal Support of Academic Basic Research in Selected Fields

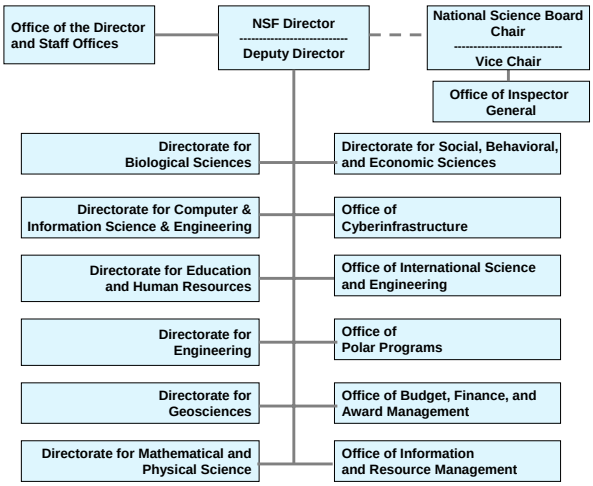


The support of academic research is critical to sustaining future generations of world-class scientists and engineers who will develop the ideas and research tools needed to address the challenges we face now and in the future. Although NSF represents only 4 percent of the total federal research and development (R&D) budget, it is the second largest funding source for R&D at colleges and universities. In fact, NSF is the primary source of federal academic support for basic research in many fields, including computer science, environmental sciences, mathematics, social sciences, and nonmedical biology (see Figures 1 and 2).[3] Although NSF does not directly fund medical research, its support benefits medical science and related industries, leading to advances in diagnosis, regenerative medicine, drug delivery, and pharmaceutical design and processing. NSF-supported fundamental research in physics, mathematics, and high-flux magnets led to the development of magnetic resonance imaging, which is widely used in medicine today.

Organizational Structure

NSF is funded primarily by congressional appropriations and is headed by a Director who is appointed by the President and confirmed by the Senate. NSF has seven directorates and three program offices organized by disciplinary area and programmatic activity, in addition to two management offices that are responsible for business and operations (see Figure 3). A description of each directorate and office can be found in Appendix 1. A 24-member National Science Board (NSB), also appointed by the President with the consent of the Senate, meets about six times a year to establish overall policy. NSB serves the President and Congress by acting as an independent advisory body on policies related to the U.S. science and engineering enterprise.

Figure 3.
National Science Foundation Organization



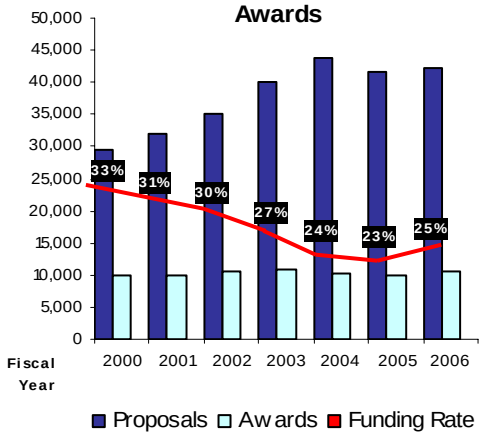
[3] Source for Figures 1 and 2: NSF/SRS/R&D Statistics Program, *Survey of Federal Funds for Research and Development: FY 2002–2004.*

The NSF workforce includes about 1,400 full-time staff; roughly 85 percent are permanent employees and the rest are "rotators." To complement the permanent workforce, NSF regularly recruits visiting scientists, engineers, and educators who are leaders in their fields. These rotators usually spend one to three years with the agency. Recruiting active researchers and educators to fill rotating assignments infuses new talent and expertise into NSF and is integral to the mission of supporting the entire spectrum of science and engineering research and education and advancing the frontiers of discovery and learning.[4] NSF currently has about 180 rotators, as well as contractors engaged in commercial administrative activities.

How NSF Works

NSF directly supports scientists, engineers, and educators through their home institutions (usually colleges and universities). With the exception of polar operations, NSF does not maintain its own facilities or laboratories. In FY 2006, NSF received 42,377 proposals, a 1.6 percent increase over the previous year. A total of 10,450 new awards were funded to more than 1,700 colleges, universities, and other public institutions throughout the country (see Figure 4). Nearly 90 percent of NSF funding was allocated through a merit-based competitive process that is recognized throughout the government as the gold standard for the responsible use of public funds.[5] Each year, 42,000 members of the science and engineering community serve as panelists and proposal reviewers under the merit review process.

Figure 4.
Number of NSF Proposals and Awards



In FY 2006, NSF awards directly involved an estimated 170,000 people, including senior researchers, postdoctoral associates, teachers, and students from kindergarten through graduate school. NSF's investment portfolio is a rich mix of programs and partnerships that reach broad and diverse segments of the science and engineering research and education community, as well as the general public. The following are examples of projects funded by NSF in FY 2006; to see others, visit the NSF website at www.nsf.gov.

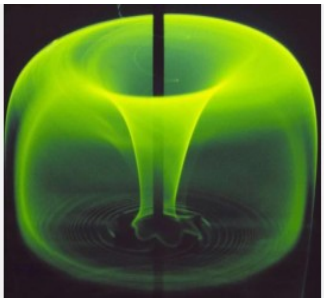
▶ Sequencing the maize (corn) genome has been considered a daunting task because of its size and complexity. With two smaller plant genomes—rice and the model laboratory plant *Arabidopsis*—now complete, a team of university and private research scientists is analyzing the 2.5 billion bases of the maize genetic code. This team has been awarded a total of $32 million from NSF, the Department of Agriculture, and the Department of Energy (DOE) to sequence the maize genome. The award is another step in using genomics to transform the plant sciences and help researchers increase yields, reduce inputs, and develop more disease-resistant varieties, as well as improve the growth and development of other related grass crops such as wheat and barley. This project will provide an essential

[4] Temporary appointments are made under the Intergovernmental Personnel Act (IPA), funded through program accounts, or under the Visiting Scientists, Engineers, and Educators (VSEE) Program, funded through administrative accounts. Appointments are counted as federal full-time-equivalent staff. In October 2006, NSF staff included 135 IPAs and 42 VSEEs.

[5] For additional information about NSF's merit review process, see *Report to the National Science Board on NSF's Merit Review Process, FY 2005*, at www.nsf.gov/publications/pub_summ.jsp?ods_key=nsb0621.

overview of the structure and function of genes that define the corn plant, which ranks among the world's major grain crops and dominates U.S. agriculture. Corn is not only grown for food and feed, but it is also the source of a variety of processed foods: Literally thousands of products in the typical supermarket contain corn. In addition, it is an important raw material for many industrial products including rubber, plastics, fuel, and clothing.

▶ NSF awarded $75.3 million for five new Engineering Research Centers (ERCs) that will develop cross-disciplinary programs to advance technologies to address major societal problems and provide the basis for new industries. Scientists and engineers from a variety of disciplines collaborate on broad-based high-risk engineering research, developing fundamental knowledge and test beds for emerging technologies. The ERCs also provide rich educational and research environments for preparing new generations of engineering leaders. The five centers will pursue breakthroughs in synthetic biology, fluid power, air monitoring, drug manufacturing, and technologies for older adults and people with disabilities. In the image at left, a fluorescent dye injected into a tank of stirred liquid creates a pattern that resembles a green apple. The demonstration, conducted by Rutgers researchers from the NSF Engineering Research Center for Structured Organic Composites, shows how liquids mix in a typical pharmaceutical manufacturing operation. This research will help enhance drug quality while reducing the cost of developing and manufacturing new drugs. *(Image courtesy of M. M. Alvarez, T. Shinbrot, and F. J. Muzzio, Rutgers University, Engineering Research Center for Structured Organic Composites)*



▶ NSF awarded nearly $12 million to the California Institute of Technology (Caltech) for the development of software to analyze neutron-scattering experiments. Neutron scattering looks at the position and motion of the atoms that make up materials, molecules, and condensed matter at various temperatures and pressures to analyze their stability. This work could affect the design of new materials for a huge variety of applications in transportation, construction, electronics, and space exploration. According to project leader Brent Fultz, Professor of Material Science and Applied Physics at Caltech, the research will eventually show how new materials can be optimized for mechanical strength, electrical conductivity, energy storage, and resistance to corrosion. Using data from facilities such as DOE's new Spallation Neutron Source (SNS) in Oak Ridge, Tennessee, this project will integrate new materials theory with high-performance computing. The image at right shows Rick Martineau of Los Alamos National Laboratory conducting a final inspection of an SNS component before it is shipped. *(Image courtesy of Leroy N. Sanchez, Los Alamos National Laboratory)*

▶ NSF awarded a $1.8 million grant to the College Board to redesign Advanced Placement (AP) courses in biology, chemistry, physics, and environmental science. Studies have shown that U.S. high school students continue to fall farther behind other nations in their ability to apply scientific concepts and skills, and the percentage of U.S. undergraduates earning degrees in science and engineering is far below that of other competitive nations. AP students are an important exception. Research indicates that U.S. students who take AP math and science courses have a higher level of proficiency than students from all other nations. AP students are also much more likely to major in science, technology, engineering, and mathematics (STEM) disciplines

than students who are first exposed to college-level math and science courses in college. Changes to the AP science program will reflect the latest research on how students learn. The redesign will emphasize depth of understanding so that students will be better equipped to navigate complex content and to transfer their knowledge during assessments. *(Image credit: AbelStock)*

The President's Management Agenda

NSF's leadership and commitment to making government more effective are demonstrated by its ratings on the President's Management Agenda (PMA) scorecard (see Figure 5). In the fourth quarter of FY 2006, NSF was one of only five agencies to achieve "Green" status in four or more of the five primary initiatives. NSF also achieved "Green" status and progress ratings for the *Eliminating Improper Payments* initiative.[6]

Figure 5.
President's Management Agenda Scorecard

	Baseline	Status	Progress
	Sept. 30, 2001	Sept. 30, 2006	
Strategic Management of Human Capital	R	G	G
Competitive Sourcing	R	R	R
Improving Financial Performance	G	G	G
Expanded E-Government	Y	G	G
Budget and Performance Integration	R	G	G

Notes:

In FY 2006 Q4, NSF also received green status and progress ratings for the Eliminating Improper Payments initiative.

Green (G) indicates success; Yellow (Y), mixed results; and Red (R) unsatisfactory. Ratings are issued quarterly by OMB.

▶ NSF maintained its "Green" status in *Strategic Management of Human Capital* for the second consecutive year. Several key initiatives contributed to continued success in this area. The Administrative Function Study, which is addressing the changing nature of work in the program directorates, is in the early stages of implementation. Workforce and staff planning initiatives are helping to give leaders the tools they need to make better informed decisions on human capital, ultimately leading to a workforce that complements NSF's dynamic and unique staffing needs. In the Division of Human Resources Management (HRM), NSF is implementing a new integrated Service Team approach that focuses on partnering with program directorates to plan and anticipate human capital requirements. This approach will also emphasize coordination and communication within HRM and between HRM and NSF customers to improve responsiveness and reduce processing time. Further, a Learning Management System, called AcademyLearn, is being implemented to improve the coordination of training and development opportunities and to facilitate better connections between those opportunities and the needs of NSF organizations.

▶ NSF continues to be rated "Red" in *Competitive Sourcing.* In FY 2006, NSF completed its first public-private competition to strengthen technical and administrative support services within the Office of Budget, Finance, and Award Management. The competition was specifically tailored to address a concern identified in the *FY 2004 Financial Statement Audit Report*, which called for resources dedicated to improving post-award monitoring of grant, contract, and cooperative agreement activities. NSF continues to work with the Office of Management and Budget (OMB) to consider other potential opportunities for competitive sourcing.

[6] For more information on PMA and NSF's scorecard, see www.ExpectMore.gov, www.whitehouse.gov/results, and www.whitehouse.gov/results/agenda/scorecard.html.

▶ NSF has maintained its "Green" rating in *Improving Financial Performance* since 2001, when it was the only agency to receive a baseline "Green" rating. In FY 2006, NSF maintained consistently high scores on the Chief Financial Officers (CFO) Council Metric Tracking Scorecard and consistently earned "Green" ratings for the accuracy and timeliness of financial reporting on the Treasury Department's Financial Management Scorecard. In addition, NSF transformed its Cost and Performance Integration Work Plan into a "Next Steps Budget and Performance Integration (BPI) and Financial Performance Combined Work Plan." The centerpiece of this plan is the integration of the standards for BPI and Financial Performance, since these standards focus directly on information for agency reporting and decision making.

To improve the management and monitoring of travel funds, NSF implemented a new Guest Travel System that improves funds control, automates important reporting processes, and provides real-time information in specific areas. NSF also completed the initial development of a facilities tracking system that provides management and staff with improved real-time financial reporting capability, capturing specific facility data throughout the agency by life-cycle phase. This information will ultimately link directly to the related budget process.

NSF senior managers continue to meet at least quarterly to review integrated financial and performance information that covers all major areas of responsibility. The Enterprise Information System (EIS), the Financial Accounting System (FAS), and Report.web make financial, budgetary, awards, and performance data (including the Program Assessment Rating Tool, or PART) widely accessible in various formats to all NSF employees. Managers use this information to make decisions relating to budget priorities and business processes.

▶ NSF has successfully maintained its "Green" rating in *Expanded e-Government (e-Gov)* for five consecutive years. NSF is a federal leader in the use of information technology, actively promoting simpler, faster, more accurate, and less expensive electronic business solutions. Virtually all of NSF's business interactions with the external grantee community have been conducted electronically since 2000. The agency is actively engaged in supporting numerous e-Gov initiatives. NSF is a Grants.gov partner agency, co-chaired the Grants Management Line of Business (GMLoB) task force, and currently co-leads the GMLoB, which is using a consortium-based approach to develop service centers around functional and grant-type competencies. In FY 2006, OMB selected NSF as one of three initial consortia leaders. In FY 2006, NSF posted 100 percent of funding opportunities on Grants.gov Find and 75 percent of discretionary grant application packages on Grants.gov Apply. FastLane, NSF's flagship application, is an interactive real-time system that is used to conduct business with the grantee community over the Internet and interfaces with Grants.gov. Enhancements to the Electronic Jacket System (e-Jacket), a web-based application designed to process proposals electronically, provide more customer-friendly capabilities, enhanced accessibility, and a streamlined workflow, thereby resulting in significant efficiency and productivity savings.

Security of information technology (IT) systems remains a management priority of the highest importance. NSF has continued to make enhancements to an already strong security program by incorporating new guidance and best practices into its IT environment. All major NSF systems have current certification and accreditation. The IT environment is aggressively monitored, and an automated enterprise vulnerability management tool has been implemented to streamline compliance with security policies and reduce risk. Annual security awareness training is mandated and tracked for all users of NSF IT resources, and training is updated to reflect new privacy and security risks. The FY 2006 Federal Information Security Management process recognized NSF's established information security program and the proactive review of security controls and areas to improve. NSF uses a plan of action and milestones to monitor the implementation of enhancements to further strengthen the IT security program.

Recognizing that there are always risks, NSF continues to monitor and enhance its security program and integrates security into all of its business practices.

▶ NSF maintained its "Green" status for *Budget and Performance Integration.* This year's efforts have emphasized improvements to tracking the costs of large facility projects, upgrades to the EIS, and direct links between budget line items and the FAS. A major activity under this initiative is evaluating programs using PART. NSF is the only agency that has received the highest rating of "Effective" in all of its PART program evaluations from OMB. Of the nearly 800 federal programs that have been evaluated by PART, only 15 percent have been rated as effective. NSF's successful PART results reflect a diligent staff and a competitive awards process that helps ensure relevance, quality, and performance, which are key components of the Administration's R&D Criteria.

Meeting Future Opportunities and Challenges

NSF is well positioned to maximize the opportunities and face the challenges of the future. The President's American Competitiveness Initiative (ACI) outlines a 10-year doubling of investments in NSF and other agencies that are the principal supporters of the physical sciences and engineering. To fulfill its ACI obligations, NSF will direct its funding toward generating fundamental discoveries that produce valuable and marketable technologies, providing world-class facilities and infrastructure that will transform research and enable discovery, and helping the nation's STEM workforce prepare for the 21st century while improving the quality of math and science education in U.S. schools. With a new strategic plan in place beginning in FY 2007, NSF will direct its efforts toward two new crosscutting objectives: "To Inspire and Transform" and "To Grow and Develop."

As it pursues these activities, NSF will seek partners and nurture cooperation among government, industry, and academia. With discoveries emerging in many countries, it is essential that U.S. scientists and engineers have the opportunity to interact with other top researchers, to lead major international collaborations, and to have access to the best research facilities throughout the world. With offices in Paris, Tokyo, and Beijing (the Beijing office was established earlier this year), NSF can more effectively participate in the international arena and facilitate education initiatives that will help build greater capacity for multinational collaboration. As the lead federal agency for the National Nanotechnology Initiative, NSF will continue to provide critical support for efforts in fundamental nanoscale science and engineering. As the lead federal agency for the International Polar Year project that runs from March 2007 to March 2009, NSF will head an interagency, international effort to understand the Earth's extreme latitudes at scales from the global to the molecular. Of highest priority is the support of frontier research that meets pressing national needs in security, energy, the environment, and health.

The successful achievement of NSF's strategic outcome goals in FY 2006 and in past years reflects a continuing commitment to excellent, results-oriented management and stewardship. The PMA scorecard and PART results, which are among the best in government, clearly demonstrate this commitment. NSF has an established record of success in leveraging its agile, motivated workforce, management processes, and technological resources to enhance productivity and effectiveness. The agency is also recognized within government for its financial management and electronic business acumen. Historically, about 95 percent of NSF's budget supports the conduct of research and education, with administrative overhead accounting for only about 5 percent.

The ongoing quest for organizational excellence will direct management's focus to a number of opportunities and challenges. The rise in multidisciplinary collaborative projects, international activities, and major research facility projects has increased the complexity of the workload, and although NSF's budget has increased 70 percent over the past 10 years, staffing has increased less than 10 percent. In

addition, meeting new external administrative, oversight, and accountability requirements is an additional burden on limited staffing and funding resources. This year's establishment of a new internal control process to meet OMB's revised A–123 guidance was a major undertaking that will continue for the next 2 years as NSF works toward achieving an unqualified management assurance. In addition to being one of the initial three consortia leaders in the GMLoB, NSF will remain actively engaged in supporting numerous other e-Gov activities, including e-Human Resources, the Integrated Acquisition Environment, e-Authentication, and the Lines of Business initiatives.

In FY 2002, NSF embarked on a Business Analysis study to address the fundamental challenges it faces as it becomes a fully integrated organization with increased capabilities for working both inside and across traditional disciplinary and organizational boundaries. The study was concluded in FY 2006. It identified desired outcomes that are influencing current operational strategies and supported several PMA initiatives. Specifically, it supported the update to NSF's 2003–2008 Strategic Plan; continued the implementation of a number of improvements in the Merit Review and Award Management and Oversight processes; completed the study phase of the Administrative Function Study and moved into the implementation phase; and continued designing the Target Enterprise Architecture, which, when implemented, will allow NSF to better monitor its IT investments and overall project and risk management. The Business Analysis team has prepared final reports that NSF can use to further implement study findings.

MEASURING PERFORMANCE [7]

NSF's leadership in advancing the frontiers of science and engineering research and education is demonstrated, in part, through internal and external performance assessments. The results of our performance assessment process provide our stakeholders and the American taxpayer with vital information about the return on our investments. In FY 2006, performance assessment at NSF was guided by the Government Performance and Results Act of 1993 (GPRA),[8] OMB's Performance Assessment Rating Tool (PART),[9] and NSF's FY 2003–2008 Strategic Plan.[10]

Assessing Long-Term Research

GPRA requires federal agencies to develop a strategic plan, establish annual performance goals, and report annually on the progress made toward achieving these goals. GPRA and PART pose a special challenge to agencies like NSF, which are involved in long-term science and education research. It is often not possible to link outcomes to annual investments because results in basic research and education can be unpredictable. Science and engineering research projects can generate discoveries in an unrelated area, and it can take years to recognize discoveries and their impact. Assessing the impact of advances in science and engineering is inherently retrospective and is best performed using the qualitative judgment of experts. The use of external experts to review results and outcomes is a common, longstanding practice in the academic research and education community. NSF's use of such panels, such as the Committees of Visitors (COVs) and Advisory Committees (ACs), pre-dates GPRA and has been recognized as a valid quality assessment by GAO and others.

NSF has used COVs and ACs for more than 20 years. These experts conduct independent assessments of the quality and integrity of our programs. On broader issues, NSF often uses external third parties such as the National Academies for outside review. We also convene external panels of experts for special studies. A schedule of NSF's program evaluations can be found in Appendix 4a and a list of the external evaluations completed in FY 2006 can be found in Appendix 4b.

OMB's approval of an alternative format for NSF performance assessment allowed us to develop a multilayer assessment approach, integrating quantitative metrics and qualitative reviews. The Advisory Committee for GPRA Performance Assessment (AC/GPA), composed of experts in various disciplines and fields of science, engineering, mathematics, and education, provides advice and recommendations to the NSF Director regarding NSF's performance under GPRA. As the reporting and determination of results for performance goals are inherently governmental functions, NSF makes the final determination on achievement using AC/GPA findings as one critical input.

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[7] This discussion presents highlights of NSF's FY 2006 GPRA performance goals, results, and pertinent issues. For a detailed discussion of each of NSF's FY 2006 GPRA performance goals and PART measures, see Chapter II.

[8] For more information about GPRA, visit www.whitehouse.gov/omb/mgmt-gpra/gplaw2m.html.

[9] For more information about PART, visit www.ExpectMore.gov.

[10] NSF's FY 2003–2008 Strategic Plan is available at www.nsf.gov/pubs/2004/nsf04201/FY2003-2008.pdf. NSF's current strategic plan, *Investing in America's Future: Strategic Plan FY 2006-2011*, is available at www.nsf.gov/pubs/2006/nsf0648/NSF-06-48.pdf.

This year, the AC/GPA met on June 22 and 23, 2006, to review a collection of over 900 outstanding accomplishments—or "highlights"—compiled by NSF program officers. In prior years, the AC/GPA, which includes experts in statistics and performance assessment, has had thorough discussions about the sampling technique used for compiling the highlights. The approach is a type of nonprobabilistic sampling, commonly referred to as "judgmental" or "purposeful" sampling, designed to identify notable examples and outcomes resulting from NSF's investments.

The aggregate of notable examples and outcomes collected can, by itself, demonstrate significant agency-wide achievement in the strategic outcome goals. It is possible, although unlikely, that the AC could incorrectly conclude that NSF failed to show significant achievement due to the limited set of highlights when, in fact, we actually achieved our goals. That is, the committee could conclude that NSF did not show sufficient achievement based on over 900 distinct accomplishments while, if time permitted, reviewing hundreds or thousands more would add enough data to show sufficient total results. The inverse, however, could not occur. If a subset of highlights were sufficient to show significant achievement, adding more results would not change that outcome. Therefore, the limitation imposed by using a "judgmental" sample is that there is a possibility, though small, that significant achievement *would not* be sufficiently demonstrated while a larger sample would show otherwise.

In addition, the AC/GPA had access to all award abstracts, investigator project reports, and three years of COV reports (COV reports are prepared every three years), to give a full picture of the NSF portfolio. Moreover, the process of assessment by NSF's external advisory committee is itself assessed by an independent, external management consulting firm. A more detailed discussion of the validation and verification of GPRA and PART data appear later in this chapter and in Chapter II.

FY 2006 GPRA Goals and Results

NSF's FY 2003–2008 Strategic Plan outlines four overarching strategic outcome goals—*Ideas, Tools, People,* and *Organizational Excellence. Ideas, Tools,* and *People* are program-oriented goals focused on the long-term results of NSF's investments in science and engineering research and education. The *Organizational Excellence* goal is focused on administrative and management activities. In FY 2006, for the fifth consecutive year, NSF achieved all four strategic outcome goals. NSF also tracks 22 other annual performance goals that include performance measures from the PART evaluations and goals related to the effectiveness and efficiency of the agency's operations. In FY 2006, NSF achieved 15 of 22 (68 percent) annual performance goals. In the past five years, achievement of the annual performance goals has ranged from 63 percent in FY 2003 to 88 percent in FY 2004. Overall, NSF achieved 73 percent of its FY 2006 GPRA performance goals, down from the 86 percent achievement rate in FY 2005.

One of the most significant issues that has been raised in customer satisfaction surveys conducted by NSF is the amount of time it takes to process proposals. NSF's time-to-decision (dwell time) performance goal—to inform at least 70 percent of applicants about funding decisions within six months of receipt of a proposal—focuses on the efficiency of the agency's operations. In FY 2006, all six time-to-decision goals were met, including the agency-wide goal. In light of the increasing complexity and number of proposals received by NSF and the relative constancy of the number of staff handling the review of these proposals, this goal is an ambitious one for the agency, as it is increasingly difficult to maintain dwell time while performing quality merit review.

Among the annual performance goals achieved in FY 2006 were increasing the number of graduate students funded through NSF's three flagship graduate student programs and goals related to the Nanoscale Science and Engineering Program and to the Nanotechnology Network. Seven annual performance goals were not achieved in FY 2006: five addressed broadening participation in the science and engineering research community by underrepresented groups and by institutions from outside the top

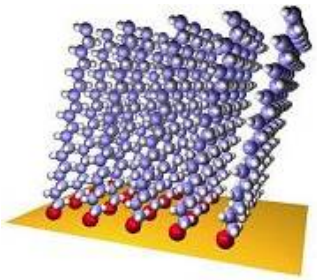
100 funded by NSF. The other two goals that were not achieved addressed the construction of large research facilities. For a more detailed discussion of each of NSF's FY 2006 GPRA performance goals, see Chapter II. Selected FY 2006 performance goals are presented in Figure 6 below.

Figure 6. **Selected FY 2006 Performance Goals and Results**

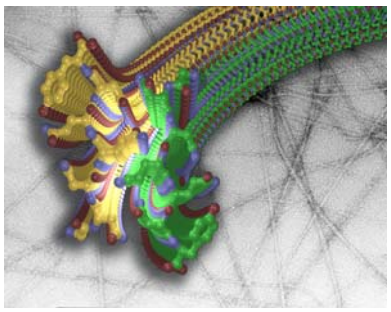
Strategic Outcome Goals	Results
IDEAS: Advancing the frontiers of science and engineering ensures that America maintains its global leadership. Investments in Ideas build the intellectual capital and fundamental knowledge that drive technological innovation, spur economic growth, increase national security, and improve the quality of life for humankind around the globe.	● FY 2002 ● FY 2003 ● FY 2004 ● FY 2005 ● FY 2006
TOOLS: State-of-the-art tools and facilities are essential for researchers working at the frontier of science and engineering. Investments in Tools, including a wide range of instrumentation, multi-user facilities, distributed networks, and computational infrastructure, as well as the development of next-generation research and education tools, are critical for advancement at the frontier.	● FY 2002 ● FY 2003 ● FY 2004 ● FY 2005 ● FY 2006
PEOPLE: Leadership in today's knowledge economy requires world-class scientists and engineers and a workforce that is scientifically, technically, and mathematically strong. Investments in People aim to improve the quality and reach of science, engineering, and math education and enhance student achievement.	● FY 2002 ● FY 2003 ● FY 2004 ● FY 2005 ● FY 2006
ORGANIZATIONAL EXCELLENCE: NSF is committed to excellence and results-oriented management and stewardship. NSF strives to maintain an agile, innovative organization that fulfills its mission through leadership in state-of-the-art business practices. *(Note: This goal was established in FY 2004.)*	● FY 2004 ● FY 2005 ● FY 2006
Annual Performance Goals	**Results**
TIME-TO-DECISION (Dwell Time): Inform applicants about funding decisions within six months of receipt for 70 percent of proposals. One of the most significant issues raised in customer satisfaction surveys is the amount of time it takes NSF to process proposals. Considering the complexity and volume of proposals received by NSF and the relative constancy of the number of staff to handle the review and recommendation of proposals, this is an ambitious goal for NSF as a whole, as it is increasingly difficult to maintain dwell time while performing quality merit review. This measure is a proxy for efficiency.	● FY 2002 ● FY 2003 ● FY 2004 ● FY 2005 ● FY 2006
GRADUATE FELLOWSHIPS—BROADENING PARTICIPATION: Increase the number of applicants for the Graduate Research Fellowship Program from groups that are underrepresented in the science and engineering workforce. (*Note:* This goal was established in FY 2004.) **Explanation of results**: Although the number of applicants from groups that are underrepresented in the science and engineering workforce did not increase from FY 2005 to FY 2006, the percentage of these applicants did increase. In FY 2005, NSF received 9,133 applications, of which 1,013, or 11.09 percent were from groups that are underrepresented in the science and engineering workforce. In FY 2006, the number of applicants was only 8,162, of which 929, or 11.38 percent, were from those groups. There was a surge of applicants following the increase of the stipend to $30,000 in FY 2004, which lowered the success rate. The FY 2006 data suggest a decline in the number of applicants that is consistent with the community's awareness of the reduced success rate for this program. These trends are mirrored in the underrepresented populations. NSF will continue to encourage proposals from these groups.	● FY 2004 ● FY 2005 ■ FY 2006
KEY: ● Goal was achieved. ■ Goal was not achieved.	

Recent Performance Highlights

The success and impact of NSF's programs in achieving important discoveries is illustrated in the following examples. Additional examples can be found in Chapter II and on NSF's website at www.nsf.gov/discoveries/.

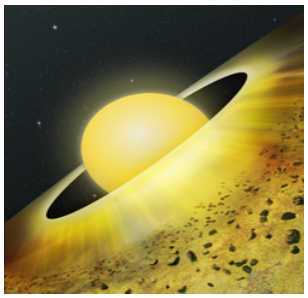


▶ **A Novel Approach to Storing Hydrogen:** Developing alternative fuels for transportation is key to achieving greater energy self-sufficiency in the United States. Hydrogen-fueled cars offer a potential option but there are major challenges in efficiently storing and distributing the fuel. Researchers at the University of Washington's Engineered Biomaterials Engineering Research Center have formed a start-up company that is tackling these issues. Asemblon, Inc., was initially created to produce and market a biomaterials-related invention that has applications in biotechnology, molecular electronics, and other areas. The firm discovered that this new type of material—composed of novel self-assembled monolayers—also has significant potential for hydrogen storage. It allows hydrogen to be chemically stored and released to generate energy when it is needed. Once hydrogen has been released, the material can be recycled and reused for hydrogen production. Asemblon has established a separate division aimed at optimizing hydrogen storage capacity and release, through its patented process, and ultimately marketing the products. The image above illustrates how self-assembling materials align to enable hydrogen storage. *(Image by Dan Graham, Asemblon, Inc.)*



The three-dimensional structure of an amyloid fibril protein has been determined. Amyloid fibrils are associated with diseases including Parkinson's and Alzheimer's. *Credit: Michael Sawaya, Rebecca Nelson, Melinda Balbirnie, and David Eisenberg, University of California, Los Angeles.*

▶ **Zipped Structure May Explain Protein Clumping in Brain Disorders:** After years of intense research, David Eisenberg and his team at the University of California, Los Angeles (UCLA), along with international colleagues, have discovered the three-dimensional structure of a miniscule—yet mighty—region of a protein that forms amyloid fibrils, deleterious rope-like structures in the brain. The researchers determined that a region of these fibril-forming proteins forms two sheets that "zip together." This coupling occurs along a self-guided track and squeezes out water molecules to form a dry, persistent structure that helps account for the tenacity of fibril buildups. This abnormally dry, zipped-up protein is completely insoluble. In people with Alzheimer's disease, for example, the buildup of fibrils in the brain is commonly referred to as plaque. Determining the molecular structure of fibrils, a feat that had eluded researchers for decades, will ultimately help medical researchers understand and devise treatments for the more than two dozen human diseases associated with fibrils, including Alzheimer's, Parkinson's, and Huntington's diseases, as well as so-called prion diseases like mad cow.

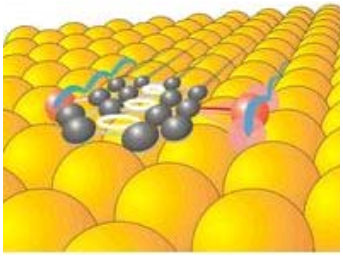


▶ **Astronomers See First Stages of Planet-Building around Nearby Star:** Future interstellar travelers might want to detour around the star system TW Hydrae to avoid a messy planetary construction site. Researchers at the Harvard-Smithsonian Center for Astrophysics have discovered that the gaseous disk surrounding TW Hydrae holds vast swaths of pebbles extending outward for at least one billion miles. These rocky chunks should continue to grow in size as they collide, combine, and eventually coalesce to form planets. The

researchers used NSF's Very Large Array to measure radio emissions from TW Hydrae. They detected radiation from a cold, extended dust disk suffused with centimeter-sized pebbles, something no one had seen before. Such pebbles, created as dust collects into larger and larger clumps, are a prerequisite for planet formation, a process that takes millions of years. The image above is an artist's conception of a dusty disk around the young star TW Hydrae. *(Image courtesy of Bill Saxton, NRAO/AUI/NSF.)*

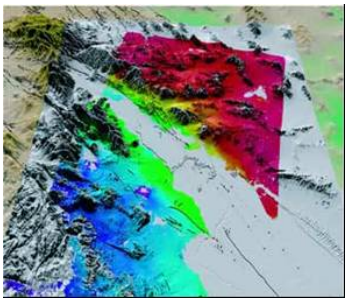
U.S. symposium participants. *Credit: Beverly Hartline.*

▶ **International Physics Young Ambassador Symposium:** More than 100 "physics young ambassadors" between the ages of 10 and 16 from 21 countries on five continents, winners of the International Physics Talent Search, met in Taipei, Taiwan, to share the physics experience. The International Physics Talent Search was part of the World Year of Physics 2005 (WYP2005), proclaimed to celebrate the centennial year of three of Einstein's major discoveries. Ending on New Year's Day 2006, the symposium was the final event of WYP2005. The Talent Search implemented its goal of promoting physics awareness by allowing girls and boys to earn points through physics—drawing posters to illustrate the laws of physics, discovering that household items can demonstrate physical principles, teaching classmates about physics, or performing laboratory experiments. At the symposium, the young ambassadors listened to and met with distinguished physicists, presented posters and talks on their work, and exchanged experiences with participants from other countries. The impact of the event on the participants was beyond measure, as attested to by the comments from parents who participated in the Symposium. Travel to Taipei for U.S. participants and for those from several less developed countries was supported by the Office of Multidisciplinary Activities and the Divisions of Physics and Materials Research in the Mathematical and Physical Sciences Directorate (which also supported the U.S. Physics Talent Search) and by the Office of International Science and Engineering.



Propelled by two sulfur (red) atoms as feet, DTA "walks" across the surface setting step in front of step and never veering off course. *Credit: Ludwig Bartelis, UC–Riverside.*

▶ **Walking Molecule Provides a Key to "Molecule Memory":** University of California Riverside professor Ludwig Bartels and his team have designed and simulated a molecule that can "walk" across a flat surface in a straight line. Indeed, 9,10-dithioanthracene (DTA), as the molecule is known, can walk for more than 10,000 steps on molecular appendages that act as feet. Such a DTA "nano-walker" could form the basis of a molecular memory 1,000 times more compact than current computer memory devices. That, in turn, could make it important to the nascent field of "molecular computing." The new concept of molecular propulsion may also have far reaching benefits for the development of surface nano-robots, with applications ranging from information storage to the control of surface chemical reactions. The molecule design and simulations were done using one of the TeraGrid's supercomputers located at the San Diego Supercomputing Center.

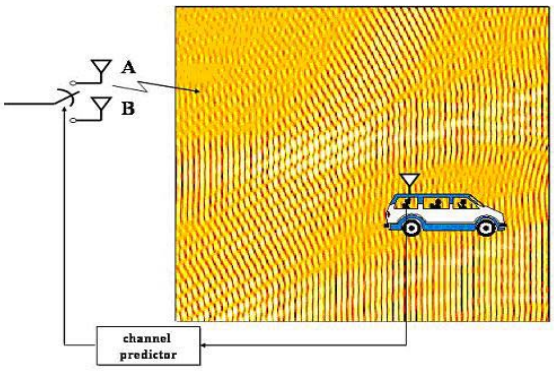


▶ **San Andreas Fault Set for the "Big One":** Yuri Fialko of the Scripps Institution of Oceanography at the University of California, San Diego, the recipient of a GEO CAREER award in 2004, has produced a new depiction of the earthquake potential of the San Andreas Fault's highly populated southern section. The new study indicates that the fault has been stressed to a level sufficient for an earthquake of magnitude 7 or greater and that the risk of a large earthquake in this region may be increasing faster than

researchers had believed. Fialko used remote sensing techniques like GPS and satellite radar data, geologic records, and seismic data to observe strain buildup along the southern part of the fault. He found evidence that the southern San Andreas has accumulated about six to eight meters of slip "deficit." If released at one time, this would result in a magnitude 8 earthquake, roughly the intensity of the 1906 San Francisco earthquake. Fialko also found that the two sides of the fault, the North American tectonic plate and the Pacific plate, exhibit different structural characteristics. The Pacific plate is more rigid than its neighbor. This research is important not only for long-term hazard planning in the densely populated region of Southern California, but also for providing new, precise analyses and methods to help earthquake scientists discover how faults operate. In the image above, surface deformation from radar interferograms across the Salton Sea shows movement of the San Andreas Fault. *(Image courtesy of Dr. Yuri Fialko.)*

▶ **U.S.-French Collaboration Sparks Multiple Successes:** International study programs can improve communications in more ways than one. Andy Klein is a case in point. As a graduate student at Cornell, an NSF grant enabled him to participate in a collaboration between Cornell University and two French institutions: the French National Institute for Telecommunications and Supélec. There Klein was immersed in cutting-edge research on some of the most difficult problems in wireless communications—extending range and reliability. In particular, he worked on ways to counteract the "multipath" distortion that results when electromagnetic waves reflect off different surfaces. That phenomenon is perhaps most familiar as the cause of "ghost" images on TV sets with antennas. Klein and colleagues published jointly submitted papers, and Klein soon earned his doctorate. The work will allow portable, personal communication devices to communicate successfully in a wider range of environments and permit longer battery life. The experience produced ideas that Klein used in his thesis. But it also created another kind of communication: "The nontechnical aspects of the collaboration were perhaps even more rewarding," Klein says, "since I was presented with a fresh perspective on how research can be conducted, from funding issues to topic selection. This alternate perspective gave me a reference point through which to better judge aspects of the American research system—a system for which I now have even more appreciation." In the photo above, Andy Klein works with Pierre Duhamel of Supélec in Paris. Andy has recently taken a postdoctoral position at Supélec. *(Photo courtesy of Andy Klein.)*

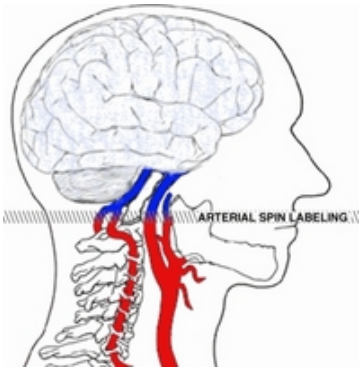
▶ **New Tools Improve Quality of Service for Wireless Customers:** Researchers have developed a suite of adaptive tools that can improve both the capacity and quality of wireless communication service. Channels change rapidly in mobile radio communications; most transmitters and receivers today are not optimized for the channel conditions they encounter from instant to instant. Accordingly, the devices fail to exploit the full potential of the wireless channel. The new adaptive tools predict information about a fading wireless channel—information that allows more efficient use of power and frequency. By collaborating with an industry partner, the researchers were able to validate the tools using realistic modeling and field measurements. In 2005, more than one billion consumers worldwide owned and used wireless



New wireless communication tools will improve the quality of service for consumers. *Credit: Alexandra Duel Hallen.*

telephones—the majority of them being in North America, Western Europe, and the Asia-Pacific region. The tremendous growth in demand for wireless communication capacity has created a need for new transmission and receiving methods to enhance quality of service for users.

▶ A New Method for Measuring Effects of Stress on the Brain:
John Detre and his colleagues at the University of Pennsylvania are developing and testing improved functional magnetic resonance imaging (fMRI) methods for visualizing human brain function. As in conventional fMRI studies, these methods estimate the amount of neural activity at any given point in the brain by measuring how fast the blood is flowing there—quantities that turn out to be closely linked. But unlike conventional studies, which measure the blood flow by indirect means, Detre and his coworkers are measuring blood flow directly with a technique called continuous arterial spin labeling (CASL). In effect, they magnetically "tag" the water molecules in blood on its way to the brain. As a demonstration, the researchers used CASL on individuals subjected to mental stress in the form of a demanding mental arithmetic task. They detected an increase in blood flow in the right prefrontal cortex, which is where such tasks are carried out. Moreover, they found that the change continued even after the task was completed, suggesting that the effects of a transient mental stressor are more persistent than commonly thought. Improvements in perfusion MRI for measuring changes in brain function could yield sensitivity superior to conventional fMRI methods for measuring prolonged cognitive or emotional states such as those imposed by mental stress.



The continuous arterial spin labeling (CASL) method is very similar to positron emission tomography (PET) scanning but does not require injections or radioactivity. To measure blood flow in the brain, the technique uses a functional magnetic imaging (fMRI) magnet to "tag" water molecules in the patient's blood, which then serve as a natural contrast agent. *Credit: University of Pennsylvania School of Medicine.*

▶ The Importance of Fungi-Plant Symbiosis: A new technique that was originally developed to understand Arctic mushrooms has begun to shed light on ecosystems around the world—and could be applied to improve farming practices. The research began with the well-known symbiosis between mushrooms and other soil fungi, and certain plants. When nitrogen is scarce, the fungi will transport the vital nutrient from the soil to the plant roots and receive plant sugars in return. The challenge for scientists is to measure this process. To meet this challenge, John E. Hobbie and Erik A. Hobbie, working at the NSF-funded Arctic Long Term Ecosystem Research site at Toolik Lake, Alaska, developed a new method based on the measurement of nitrogen isotopes. Using it, they found that between 61 and 86 percent of the nitrogen in the plants is provided by the fungi, and between 8 and 17 percent of the plants' photosynthetic carbon is provided to the fungi for growth and respiration. Because this kind of fungi-plant relationship is quite widespread in nature—and because nitrogen scarcity is quite common—this approach should help interpret ecological observations at many other research sites, and could even have application to agriculture. Shown in the photo above left are K–12 educator Tracy Alley and researchers working on a study plot at the Toolik Field Station LTER in Alaska, with the camp and the Brooks Range in the background. *(Photo courtesy of Tracy Alley.)*

▶ **Native American Students Work to Improve Community Environment:** Oglala Lakota College (OLC), on South Dakota's Pine Ridge Reservation, is using NSF funding to improve its curriculum in science, technology, engineering, and mathematics education, with an emphasis on environmental sciences and related analytical fields. The project's impact on the enrollment of American Indian students has been significant, particularly in information technology, where student enrollment has quadrupled in the past four years. The project has had a similar impact on academic achievement. In Calculus I, for example, the rate of successful completion has grown from 21 percent before the project started to approximately 70 percent in recent years. Currently, 14 American Indian students are involved in undergraduate research projects. The program's graduates, highly skilled scientists and technicians, work in their communities, contributing to the economic growth of the reservation. The college's Lakota Center for Science and Technology, developed through support from NSF's Tribal Colleges and Universities Program (TCUP) and other sources, received EPA certification and is now employing OLC graduates to perform water quality analyses for the reservation's water and sewer agencies. The TCUP project is also engaged in preparing the next generation of K–12 teachers for reservation schools, as well as working with current K–12 teachers to improve their knowledge and skills in areas such as robotics. The robotics project will be implemented in about six area schools this academic year. Shown in the photo on the upper left are students in the Oglala Lakota College robotics project. *(Photo Credit: Mike Fredenberg.)*

PART Evaluations

In 2002, OMB developed the PART, a systematic method for assessing the performance of program activities across the federal government. Each year, about 20 percent of an agency's programs must undergo PART review. For the 2006 budget year, three NSF programs were assessed: Polar Tools, Facilities, and Logistics; Research Institutions; and Research Collaborations. For the 2007 budget year, two programs were assessed: Fundamental Science and Engineering and Federally Funded R&D Centers. All received the highest "Effective" rating. Of the nearly 800 programs that have been evaluated government-wide by PART, only 15 percent have been rated as effective. Moreover, all of NSF's priority areas and programs under the FY 2003–FY 2008 Strategic Plan that have undergone PART evaluation have been rated as effective. These outstanding results reflect the fact that NSF's competitive awards process helps ensure quality, relevance, and performance, which are key components of the Administration's R&D Criteria.

The improvement plans for NSF's FY 2006 PART evaluations include ensuring increased timeliness of yearly project reports from investigators and assessing potential improvements to the merit review process. In the past year, NSF has made changes to its FastLane project reports tracking system to provide notification to all investigators that annual reports are due 90 days in advance of the 12-month anniversary date or expiration date of the award. NSF has also convened focus groups and gathered recommendations on improvements to the merit review system.[11]

[11] For more information about NSF's PART programs and related improvement plans, see Chapter II and www.whitehouse.gov/omb/expectmore/index.html.

Data Verification and Validation

For the seventh consecutive year, NSF engaged an independent, external firm, IBM Global Business Services (IBM), to assess the validity of the data and reported results of the agency's GPRA performance goals and to verify the reliability of the methods used to collect, process, maintain, and report data for these performance measurement goals. The verification and validation review was based on guidance from GAO's *Guide to Assessing Agency Annual Performance Plans (GAO/GGD-10.1.20)*. IBM documented the process used to collect, process, maintain, and report on data for nine quantitative goals that were being reviewed for the first time and documented any changes to processes and data for those goals undergoing an updated review. IBM assessed the accuracy of NSF's performance data and reported outcomes of performance goals and indicators as well as reviewed system controls to confirm that quality input results in quality output.

Since achievement of NSF's long-term strategic outcome goals is assessed by an external panel of experts, IBM was engaged to assess and observe the AC/GPA process to verify and validate that the process is sufficiently reliable to yield a valid conclusion on NSF's achievement for these nonquantitative goals. To provide a thorough and complete assessment, NSF provided IBM staff with unrestricted access to the AC/GPA meetings, performance information, NSF staff, and committee members. IBM's final report included the following[12]:

> *At the end of FY 2006, we were able to verify the reliability of the AC/GPA process and performance data. Further, based on the strength of these processes, we validate the reasonableness of the AC/GPA's conclusion that NSF had demonstrated significant achievement in all the indicators for the Strategic Outcome Goals of Ideas, Tools, and People and the Merit Review indicator for the Organizational Excellence Goal.*
>
> *Of the 22 other GPRA and PART performance goals we reviewed, we were able to verify the reliability of the processes and validate the accuracy or reasonableness of the results for 21 goals. We were able to partially verify the reliability of the process that NSF uses for the reporting of the remaining PART goal. For the majority of the reviewed goals, we can verify that NSF relies on sound business processes, system and application controls, and manual checks of system queries to produce valid and accurate results.*
>
> *Based on this comprehensive review, IBM has confidence in the systems, policies, and procedures used by NSF to generate the described performance measures. We strongly believe that NSF continues to take concerted steps to improve the quality of their systems and data on a yearly basis.*

Integration of Budget, Performance, and Cost

NSF's FY 2003–2008 Strategic Plan established a framework that aligned and integrated NSF's performance goals with programmatic activities and budget.[13] As shown on the Strategic Goal Structure chart (Figure 7), all programmatic activities are aligned to an "investment category" and one of the four strategic goals—*Ideas*, *Tools*, *People*, and *Organizational Excellence*. Budgetary resources, obligations, and expenditures can be tracked and the full programmatic costs can be identified. (See the following discussion on *Organizational Excellence*, which explains the allocation of overhead to develop the full

[12] *IBM: NSF Government Performance and Results Act (GPRA) and Program Assessment Rating Tool (PART) Performance Measurement Validation and Verification, FY 2006 Final Report*, October 23, 2006, pages 1 and 2.

[13] NSF's FY 2005 and FY 2006 Budget Requests are available at www.nsf.gov/about/budget/.

cost of programs.) For the past two years, NSF has received a successful "Green" rating for ongoing efforts in the PMA Budget and Performance Integration initiative.

NSF's Statement of Net Cost[14] reports the full cost of each of the strategic goals of *Ideas*, *Tools*, and *People* and the 10 primary programmatic activities (the investment categories) that are associated with these three strategic goals. These investment categories, along with NSF's priority areas,[15] are the primary programs that have undergone OMB PART review.

Figure 8 shows NSF's FY 2006 obligations for the four strategic outcome goals: $2.83 billion for *Ideas;* $1.47 billion for *Tools;* $1.04 billion for *People;* and $314 million for *Organizational Excellence.* NSF's *Organizational Excellence* goal focuses on administration and management; its portfolio supports operational costs such as staff compensation and benefits, administrative travel, training, rent, IT business systems, the OIG and the NSB. In the Statement of Net Cost, these *Organizational Excellence* operational costs have been allocated to the 10 investment categories aligned to *Ideas*, *Tools*, and *People* in order to identify the full cost of NSF's primary programs. Figure 9 shows the FY 2006 obligations for *Ideas*, *Tools*, and *People* with *Organizational Excellence* allocated to the 10 investment categories by congressional appropriation.

Figure 7.

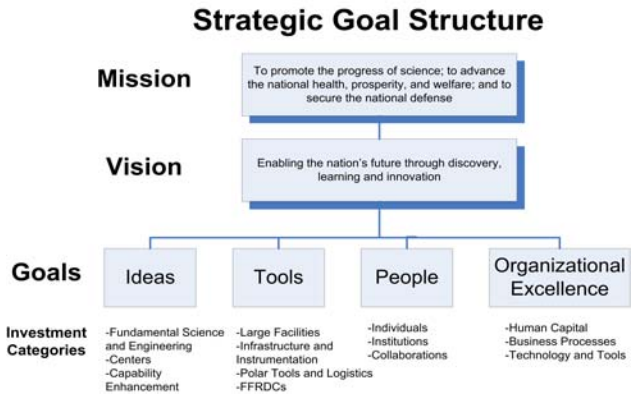


Figure 8.

*See Figure 10, second note.

It is important to note that this view of how NSF deploys its budget does not reflect the fact that NSF investments often serve multiple purposes. For example, research projects in programs categorized under *Ideas* commonly provide funds that involve graduate students. They contribute, therefore, to the *People* strategic outcome goal as well. These indirect investments are important to the attainment of the NSF's goals, and Program Officers are expected to take such potential contributions into account when making awards. The synergy attained across the four strategic goals attests to the real strength of the NSF process.

[14] For more information about the Statement of Net Cost, see Financial Statement Note 14.

[15] NSF's FY 2006 priority areas are Biocomplexity in the Environment, Nanoscale Science and Engineering, Mathematical Sciences, and Human and Social Dynamics.

Figure 9.

FY 2006 Support of NSF's Strategic Outcome Goals and Investment Categories By Appropriation

(Obligations in Millions of Dollars)

	R&RA*	EHR*	MREFC*	S&E*	NSB*	OIG*	**TOTAL**
IDEAS							
Fundamental Science & Engineering	2,322.1	51.7	0.0	108.9	1.7	5.1	2,489.5
Centers	257.4	0.0	0.0	11.8	0.2	0.5	269.9
Capability Enhancements	107.5	116.1	0.0	10.3	0.2	0.5	234.5
TOOLS							
Large Facilities	339.7	0.0	220.7	25.8	0.4	1.2	587.8
Infrastructure & Instrumentation	405.6	15.0	0.0	19.3	0.3	0.9	441.0
Polar Tools, Facilities & Logistics	302.4	0.0	13.1	14.5	0.2	0.7	330.8
FFRDC's	185.2	0.0	0.0	8.5	0.1	0.4	194.2
PEOPLE							
Individuals	365.3	172.8	0.0	24.7	0.4	1.1	564.4
Institutions	38.1	108.7	0.0	6.7	0.1	0.3	154.0
Collaborations	27.8	334.2	0.0	16.6	0.3	0.8	379.7
TOTAL	$4,351.0	$798.5	$233.8	$247.1	$3.9	$11.5	$5,645.8 **

Notes:

* NSF has six congressional appropriations: Research & Related Activities (R&RA), Education and Human Resources (EHR), Major Research Equipment and Facilities Construction (MREFC), Salaries and Expenses (S&E), Office of Inspector General (OIG), and National Science Board (NSB).

** Base obligation of $5,645.8M plus Donation Account ($28.4M), H1-B Nonimmigrant Petitioner Receipts ($99.4M), Reimbursable Authority ($100.5M), and appropriation with expired obligation authority in FY 2006 ($3.9M) equals total obligations incurred as shown on the Statement of Budgetary Resources ($5,878.0M).

FFRDC: Federally Funded Research and Development Centers

Totals may not add due to rounding.

MANAGEMENT ASSURANCES

The *Federal Managers' Financial Integrity Act of 1982* (FMFIA) is implemented by *the Office of Management and Budget (OMB) Circular A-123: Management's Responsibility for Internal Control* (A-123). A-123 was revised in December 2004 to update agency requirements related to the three objectives of internal control: compliance with laws and regulations, reliability of financial reporting and the efficiency and effectiveness of operations. Revisions included additional requirements for documenting the review and assessment of entity-wide controls and controls over financial reporting, including the documentation of decision making, of the major business processes and controls, and of the results of control reviews themselves. Guidance recommended convening a Senior Assessment Team (SAT) to implement the requirements and a Senior Management Council (SMC) to provide oversight to such implementation. Circular A-123 implemented a top down approach to achieve a well-integrated control framework across each agency, including financial controls as one subcomponent of entity-wide controls. A-123 Appendix A implemented an additional set of requirements, effective for FY 2006, to be applied to the review and assessment of financial controls. Efficiency and effectiveness of operations are considered throughout the review processes.

The National Science Foundation (NSF) designated the Accountability & Performance Integration Council (APIC) to serve as its SAT and the already standing Senior Management RoundTable (SMaRT) to serve as its SMC for A-123 purposes. APIC is chaired by the Chief Financial Officer and includes four Assistant Directors/Office Heads, the Chief Human Capital Officer, the Chief Information Officer, and the General Counsel. APIC reports to the Chief Operating Officer (COO). SMaRT includes all Assistant Directors and Office Heads and is chaired by the NSF Deputy Director (DD), who currently also serves as NSF's COO. Throughout the implementation process, APIC provided regular updates to the Office of Inspector General through the Audit Coordinating Committee and obtained feedback from the auditors of NSF's financial statements, as well.

FY 2006 was a period of major implementation related to A-123 revisions for all federal agencies, and for NSF a year of reinforcing and strengthening internal controls and noting opportunities for future improvements. FY 2007 is slated as a year for continuing implementation, including the development of ongoing A-123 education and control rationalization directed toward continual improvement of operations as guided by A-123 and A-123 Appendix A.

During FY 2006, APIC led the review of entity-wide controls according to requirements set in the A-123, including a review of management structures and policy in place to ensure compliance with major laws and regulations. Several areas for improvement included increased documentation and dissemination of agency-wide policies and procedures, including written delegations. Although these are well understood in practice, A-123 emphasizes the need for updating written guidance. APIC also conducted the review of controls over financial reporting according to requirements set forth in A-123 Appendix A, including consideration of additional laws and regulations affecting financial reporting. Senior management will continue to work on integrated workflow charting and control descriptions in order to incorporate material and non-material key business subprocesses into its control documentation. This will allow for more extensive, end-to-end, assessments of the efficiency and effectiveness of operations. Both of these reviews included consideration of efficiency and effectiveness of operations. The results of NSF's assessment of the adequacy of internal controls entity-wide, including financial controls, are reported here in the agency's *FY 2006 Performance and Accountability Report*, consistent with the provisions of the Reports Consolidation Act of 2000.

NSF adopted a scope limitation for the financial control review to allow NSF to better ensure implementation of all A-123 Appendix A requirements over a several year period. This was a strategic option offered by OMB to all agencies. Adopting this strategy precludes NSF from reaching a level of *full*

assurance regarding controls for FY 2006, but better ensures that NSF will have in place the internal control infrastructure necessary to reach and maintain a level of full assurance in the near future. Based on the reviews conducted throughout FY 2006, APIC and SMaRT, with concurrence of the COO/DD, recommended a statement of limited assurance to the NSF Director for FY 2006. The recommendation noted that management found no evidence of material weakness in either financial controls or entity-wide controls, and reflected the testing of all key controls for FY 2006. The recommendation also noted that NSF internal controls meet the provisions of FMFIA, as implemented by A-123, including compliance with *OMB Circular A-127: Financial Management Systems* and the following laws and regulations:

- National Science Foundation Act of 1950, as amended;
- Annual Appropriation Law;
- Government Performance and Results Act of 1993;
- Clinger-Cohen Act of 1996;
- Federal Information Security Management Act of 2002;
- Chief Financial Officers Act of 1990, as amended;
- Federal Financial Management Improvement Act of 1996;
- Improper Payments Act of 2002;
- Single Audit Act of 1984, as amended; and
- Inspector General Act of 1978, as amended.

In the FY 2006 Independent Auditors' Report, NSF received an unqualified opinion on its financial condition, with no material weaknesses. NSF's statement of assurances follows.

NSF Statement of Management Assurances

The National Science Foundation is responsible for establishing and maintaining effective internal control and financial management systems that meet the objectives of the Federal Managers' Financial Integrity Act (FMFIA), and OMB Circular A-123, *Management's Responsibility for Internal Control.* These objectives are to ensure:

- Effective and efficient operations,
- Compliance with applicable laws and regulations, and
- Reliable financial reporting.

For Fiscal Year (FY) 2006, the National Science Foundation is providing a qualified statement of assurance that its internal controls and financial management systems meet the objectives of FMFIA. The qualification is due to a scope limitation related to its first-year implementation of Appendix A of OMB Circular A-123, as described in paragraph 3.

The National Science Foundation conducted its evaluation of internal control over the effectiveness and efficiency of operations and compliance with applicable laws and regulations in accordance with OMB Circular A-123. Based on the results of this evaluation, the National Science Foundation identified no material weaknesses under Section 2 of FMFIA and no system nonconformances under Section 4 of FMFIA. The National Science Foundation provides reasonable assurance that its internal controls over the effectiveness and efficiency of operations, and compliance with applicable laws and regulations, as of September 30, 2006, were operating effectively and no material weaknesses were found in the design or operation of these internal controls.

The National Science Foundation also conducted its assessment of internal control over financial reporting in accordance with the requirements of Appendix A of OMB Circular A-123. A limited number of processes that could potentially impact financial reporting were not included in the initial scope of the assessment. These excluded processes will be included during the FY 2007 and FY 2008 implementation of Appendix A. Other than the scope limitation covering those processes that were not tested, the National Science Foundation provides reasonable assurance that the internal controls over financial reporting as of June 30, 2006, were operating effectively and no material weaknesses were found in the design or operation of these internal controls.

Arden L. Bement, Jr.

November 8, 2006

FINANCIAL DISCUSSION AND ANALYSIS

NSF is proud of its record of achievement in the federal financial management arena. It is our goal and commitment to provide excellence in financial management to our stakeholders with the focus on the highest quality of business services. We honor that commitment by preparing annual financial statements in accordance with United States general accepted accounting principles (GAAP) for federal government entities and subjecting the statements to an independent audit to ensure their integrity and reliability in assessing the performance. For FY 2006, NSF received an unqualified opinion that the financial statements were fairly stated in all material respects.

In the FY 2006 Auditor's Report, the two prior year reportable conditions were repeated: post-award oversight for high risk grants and cooperative agreements and, contract monitoring. With respect to post-award oversight, we have made significant progress in the last year. Significant time was invested in the design, planning and implementation of a desk review program. NSF will continue to conduct desk reviews to enhance post-award monitoring. With respect to the contract monitoring reportable condition, the quarterly expenditure reviews of our major contractors by management were completed but not in time for the auditors to fully assess the overall impact of the corrective actions. For further discussion, see Chapter III, Management's Response to the Independent Auditor's Report.

NSF's CFO Five-Year Financial Management Plan supports the President's Management Agenda (PMA) by establishing key components to accomplish our financial management strategic goals. These forward-focused components are: high quality accountability support for NSF's strategic goals; effective stewardship and accountability to maximize the public resources provided to NSF; quality business services to our external and internal customers; efficient delivery of operations, transactions and outreach through e-systems; new and improved business practices through the development of constructive partnerships; and proactive leadership in all endeavors.

While NSF has accomplished much under the current CFO Five-Year Management Plan, we are now focusing our efforts to meet the new financial management goals that are in the updated CFO Five-Year Management Plan that will be implemented in FY 2007. These new goals provide us with the framework to improve upon the record of achievement we have accomplished so far in the areas of financial management and reporting, financial systems, awards management, customer service and a productive workforce.

Understanding the Financial Statements

NSF's FY 2006 financial statements and notes are presented in the format required for the current year by *OMB Circular No. A-136, Financial Reporting Requirements* dated July 24, 2006, which supersedes *OMB Bulletin No. 01-09, Form and Content of Agency Financial Statements,* dated September 25, 2001, and OMB memoranda, specifically *M-04-20, FY 2004 Performance and Accountability Reports and Reporting*, dated July 22, 2004. 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. The following table (*Figure 10*) summarizes the significant changes in NSF's financial position during FY 2006.

Figure 10.

Significant Changes in NSF's Financial Position in FY 2006

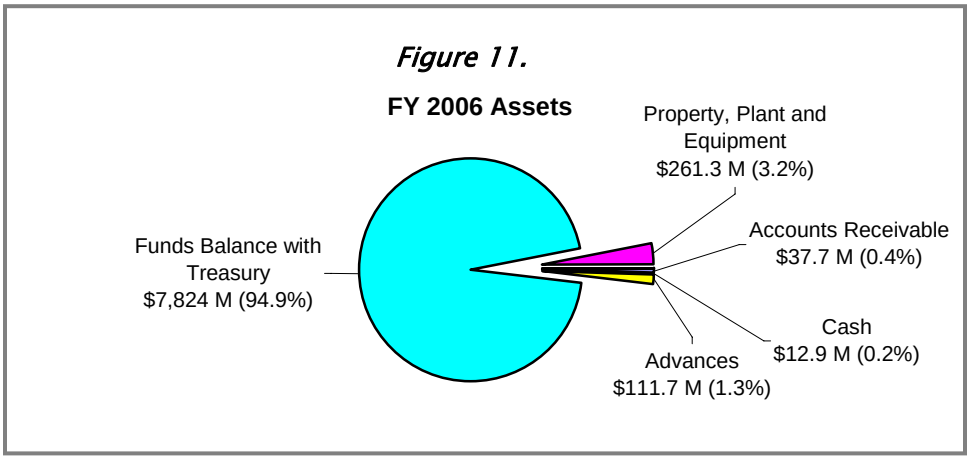
(Dollars in Thousands)

Net Financial Condition	FY 2006	FY 2005	Increase/ (Decrease)	% Change
Assets	$8,247,611	$8,075,059	$172,552	2%
Liabilities	$441,720	$377,543	$64,177	17%
Net Position	$7,805,891	$7,697,516	$108,375	1%
Net Cost	$5,595,761	$5,408,174	$187,587	3%

The following is a brief description of the nature of each required financial statement and its relevance. Certain significant balances or conditions are explained to help clarify their relationship to NSF operations.

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). Three line items consisting of *Fund Balance with Treasury; Property, Plant and Equipment;* and *Advances* represent 99 percent of NSF's current year assets (*Figure 11*). *Fund Balance With Treasury* is funding available through the Department of Treasury accounts from which NSF is authorized to make expenditures and pay amounts due. *Property, Plant and Equipment* comprises capitalized property located at NSF headquarters and NSF-owned property in New Zealand and Antarctica that supports the U.S. Antarctic Program (USAP). *Advances* are funds advanced to NSF grantees, contractors, and other government agencies.

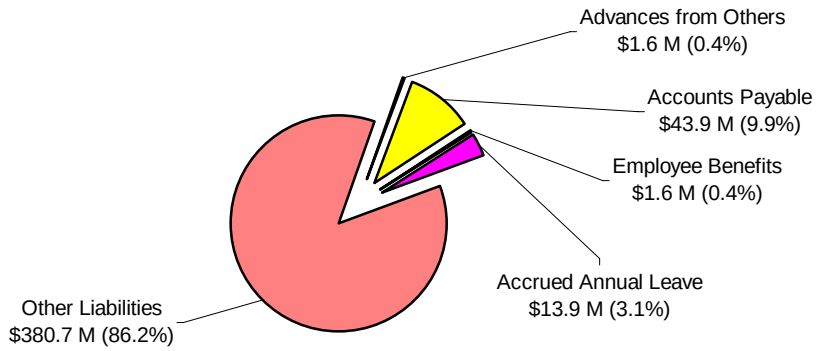
Figure 11.



Three line items, *Accounts Payable, Accrued Liabilities* (*Other Liabilities), and Accrued Annual Leave* represent 99 percent of NSF's current year liabilities (*Figure 12*). *Accounts Payable* includes liabilities to NSF vendors for unpaid goods and services received. *Accrued Liabilities* are amounts recorded for NSF's grants and contracts for which work has been completed and payment has not been made, as well as accrued payroll and benefits. *Accrued Annual Leave* represents annual leave earned by NSF employees but not yet taken.

Figure 12.

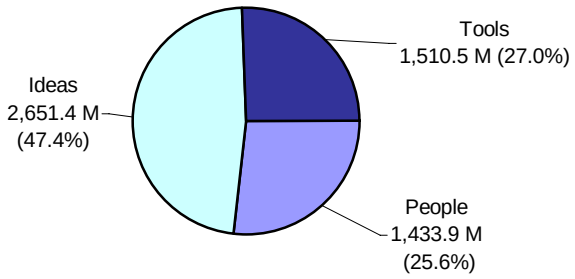
FY 2006 Liabilities



Statement of Net Cost: This statement presents the annual cost of operating NSF programs. Gross cost less any offsetting revenue for each NSF program is used to arrive at the net cost of specific program operations. *Intragovernmental Earned Revenues* are recognized when these related program or administrative expenses are incurred and deducted from the full cost of the programs to arrive at the net cost of operation.

Figure 13.

FY 2006 Net Cost



Note: Included in Ideas, Tools, and People, is the approximately 6 percent of NSF's total funding that is devoted to Salaries & Expenses, the National Science Board and the Office of Inspector General for the administration and management costs addressed by NSF's Organizational Excellence strategic goal.

Approximately 94 percent of all current year NSF costs incurred were directly related to the support of our *Ideas, Tools,* and *People* programs (*Figure 13*). Costs were incurred for indirect general operation activities (e.g., salaries, training, activities related to the advancement of NSF information systems technology, and activities of the NSB and the OIG). These costs were allocated to NSF's investment categories under *Ideas, Tools, and People*, and account for six percent of the total current year *Net Cost of Operations*. These administrative and management activities are the focus of our *Organizational Excellence* strategic goal.

Statement of Changes in Net Position: This statement presents the accounting items that caused the net position section of the Balance Sheet to change from the beginning to the end of the reporting period. NSF's Net Position increased to $7.8 billion in FY 2006—an increase of one percent—due to the increase in *Unexpended Appropriations and Cumulative Results of Operations. Unexpended Appropriations* is affected mainly by *Appropriations Received* and *Appropriations Used*, with minor impact from *Appropriation Transfers* from the U.S. Agency for International Development (USAID) and *Other Adjustments*, which include appropriation rescissions and cancellations. In FY 2006, NSF separated its Earmarked Funds portion of *Cumulative Results of Operations* based on new OMB A-136 guidance issued this fiscal year. See footnote 13 in Section III – Notes to the Principal Financial Statements for further details.

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 2006, new *Budgetary Authority* for Research and Related Activities, Education and Human Resources, Major Research Equipment and Facilities Construction, the combined National Science Board, OIG and Salaries & Expenses were $4,331 million, $797 million, $191 million and $262 million, respectively. *Total Budgetary Resources* increased by 3.1 percent and *Net Outlays* increased by 2.6 percent in FY 2006. The *Net Outlays* reported on this statement reflects the actual cash disbursed for the year by Treasury for NSF obligations; it is reduced by the amount of Distributed Offsetting Receipts.

Statement of Financing: This statement illustrates the relationship between *Net Obligations* derived from NSF's budgetary accounts and the *Net Cost of Operations* reported on the *Statement Of Net Cost,* which is derived from NSF's proprietary accounts. The statement is structured to first identify total resources classified by obligations, and then other adjustments are made to those resources based on how additional items financed those resources or contributed to net cost. *Total Resources Used to Finance Activities* are only resources that have been obligated and are derived from information provided on the Statement of Budgetary Resources. *Total Resources Used to Finance Items Not Part of Net Cost of Operations* consists mainly of an adjustment to undelivered orders of the agency that are reflected in net obligations but not part of *Net Cost of Operations*. *Components Requiring or Generating Resources in Future Periods* adjusts for future funded expenses that are recognized in *Net Cost of Operations* but resources will not be provided until subsequent periods.

Stewardship Investments: Stewardship investments are NSF-funded investments that yield long-term benefits to the general public. NSF investments in research and education yield quantifiable outputs, including the number of awards made and the number of researchers, students, and teachers supported or involved in the pursuit of discoveries in science and engineering and in science and math education. Stewardship investments from FY 2005 to FY 2006 showed incremental increases in research activities in support of NSF's overall mission as reported in monetary investments. The decrease in the number of people directly involved in NSF-supported activities in FY 2006 primarily reflects the phase down of support for the Math and Science Partnership Program.

Limitations of the Financial Statements

In accordance with the revised guidance *OMB Circular No. A-136, Financial Reporting Requirements*, we are disclosing the following limitations of NSF's FY 2006 financial statements, which are in Chapter III of this report. The 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 U.S. 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.

Budgetary Integrity: NSF Resources and How They Are Used

NSF is funded primarily through six Congressional appropriations that totaled $5.6 billion in FY 2006.[16] Other FY 2006 revenue sources included $100.5 million in reimbursable authority, $8.0 million in appropriation transfers from other federal agencies, $105.3 million in H-1B collections and $31.4 million in donations to support NSF activities. As shown in the Statement of Net Cost, NSF made investments in fundamental research and education through ten investment categories linked to the agency's three mission-oriented strategic outcome goals of *Ideas, Tools, and People*.[17] These investment categories, together with NSF's priority areas, constitute the agency's PART programs. The investment categories are: Individuals; Institutions; Collaborations; Fundamental Science and Engineering; Centers; Capability Enhancement; Large Facilities; Infrastructure and Instrumentation; Polar Tools, Facilities, and Logistics; and Federally Funded Research and Development Centers. NSF provided support across the full range of science and engineering disciplines.

In FY 2006, four key multidisciplinary priority areas were funded: Biocomplexity in the Environment, Nanoscale Science and Engineering, Mathematical Sciences, and Human and Social Dynamics. Major investments were also made in Cyberinfrastructure and in the Networking and Information Technology R&D Program. NSF also supported education activities for students and teachers from pre-K through the post-doctoral level. Among major research facility and equipment projects supported were the Atacama Large Millimeter Array, which when completed will be the world's most sensitive, highest resolution, millimeter-wavelength telescope; EarthScope, a distributed geophysical instrument array that will enhance our understanding of the structure and dynamics of the North America continent; and the IceCube Neutrino Detector Observatory in Antarctica.

At the time of this report, NSF had not yet received its FY 2007 appropriations. However, our priorities for the coming year are clear. NSF looks toward contributing a major role in the Administration's American Competitiveness Initiative, which outlines a 10-year doubling of investments in NSF and other agencies that are principal supporters of the physical sciences and engineering. NSF's task in this ambitious undertaking is to kindle the leadership and excellence in fundamental research and education that keeps America at the leading edge of science, engineering and technology. NSF will focus on supporting frontier research, broadening participation in the science and engineering enterprise, providing world-class facilities and infrastructure, and bolstering NSF's K-12 education portfolio. NSF will also provide support in fundamental research for activities coordinated by the National Science and Technology Council (NSTC): the National Nanotechnology Initiative; the Climate Change Science Program; Networking and Information Technology R&D; and basic research related to homeland security.

[16] NSF's original appropriations were reduced by a government-wide one percent rescission, an across-the-board reduction required in Section 3801.(a) of H.R. 2863 and a 0.28 percent rescission, required in Section 638(a) of the Conference Report H.R. 109-272.

[17] See page I-19 for a discussion of NSF's fourth strategic goal of *Organizational Excellence*, which focuses on the agency's administrative and management activities.

Improper Payments Information Act of 2002: Status

The Improper Payments Information Act (IPIA) of 2002 and the recently issued OMB Circular A-123 Appendix C guidance 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.

NSF's FY 2004 initial response to the IPIA requirements focused on awards already identified as high-risk through our pre-existing Award Monitoring and Business Assistance Program. In FY 2005, we revamped our Improper Payments Plan and implemented a process to ensure improper payments testing for NSF's IPIA program portfolio. NSF contracted with McBride, Lock, and Associates, Certified Public Accountants, to conduct a statistical review of grant payment data related to two targeted appropriations (NSF's OMB-identified IPIA program) that represented more than 80 percent of NSF total funding. The baseline results and the very low improper payment rates reported in our FY 2004 and FY 2005 Performance and Accountability Report indicate a low risk program that is well below the IPIA $10 million and 2.5 percent total outlays thresholds.

Therefore, in accordance with OMB Memorandum 06-23, Circular A-123 Appendix C, Section K issued on August 10, 2006, NSF applied and received relief from the annual IPIA reporting requirement for this year. NSF will remain vigilant in our monitoring and continue efforts towards improving the payment process. In fact, NSF intends to continue other grant expenditure sampling for improper payment in support of the NSF grant monitoring program to ensure that it remains low risk.

Financial System Strategy

The goal of NSF's financial management team has always been to provide the highest quality of business services to our customers, stakeholders, and staff through effective funds control, prompt and streamlined award processes, and reliable and timely financial data to support sound management decisions. NSF's Financial Accounting System (FAS) enables us to achieve these goals. FAS is an online, real-time system that provides the full spectrum of financial transaction functionality required by a grants-making agency. The system allows NSF to consistently meet financial reporting deadlines, helps ensure FFMIA and OMB A-127 compliance, and provides accurate, on-demand financial information to NSF staff.

FAS is extensively integrated with all of NSF's core business systems, including the Proposal and Reviewer System (PARS), the Awards System, Guest (panelists) Travel and Reimbursement System, and the FastLane System that supports grants management. FAS supports both the grant and core financial processes. It is used to monitor, control, and ensure the management and financial accountability of over 20,000 active awards with nearly 2,000 external grantee institutions. FAS distributes funds electronically to grantees in a seamless and highly controlled environment. Grantees can check available funds in real time on a daily basis. The extensive reporting capabilities built into the software include on-line lookups to verify funds, track commitments and obligations, and the ability to generate daily, weekly, monthly, and quarterly reports that provide up-to-date financial information about NSF operations for program and grantee decision support. All FAS-generated reports are posted electronically and are available to staff via Report.web which is a web-based application that streamlines information distribution. Information from FAS is captured and used in our Enterprise Information System reporting. FAS is custom software that was developed and is maintained by NSF to support our extensive grantmaking enterprise.

NSF's ability to meet interface and integration requirements of any government-wide initiative (e.g. e-Travel and e-Learning), to adopt new legislative, regulatory, and policy requirements as they are promulgated, and to implement required technical upgrades is resource dependent. Consistent with NSF's eGovernment Implementation Plan, FAS will remain in a steady-state phase in the FY 2005-FY 2010

timeframe. NSF will be approaching its future financial system requirements as an integral part of its grant process. The agency will conduct an integrated review of the Grants Management Line of Business (GMLoB) and the Financial Management Line of Business (FMLoB) solution in 2007. If the GMLoB/FMLoB Shared Service Provider (SSP) option is determined to be infeasible, NSF will analyze the FMLoB SSP option in 2008. NSF may conduct a Business Case Feasibility Study for the FMLoB solution in 2009. This plan allows NSF to take advantage of the results/findings of the GMLoB process in becoming a SSP to more fully define our financial requirements. NSF anticipates that if a conversion to a new financial management system is necessary, it will substantially impact NSF grantees beginning in 2010.

Key Financial Metrics

The information in this section presents selected key financial measures of NSF core business of awarding grants and our progress in associated electronic processes. NSF has an established record of success in leveraging automation to increase efficiency and productivity. Since the inception of the Department of Treasury's Financial Management Service Scorecard in FY 2004, NSF has consistently received the highest "Green" ratings for accuracy and timeliness of our financial reporting in the quarterly ratings (Figure 14).

Figure 14.

U.S. Department of Treasury Financial Management Scorecard

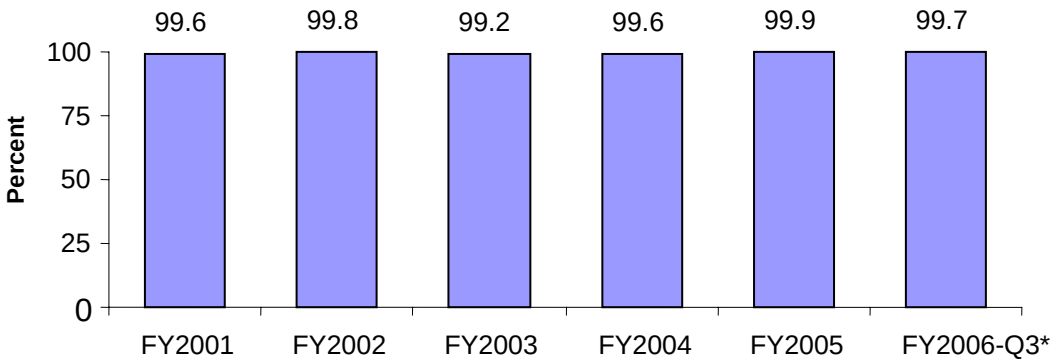
Category	Standard	Results (as of 6/30/06)**
Accuracy of Reporting*	*Green*: If differences outstanding for less than 3 months. *Yellow:* If differences are older than 3 months but less than 6 months. *Red:* If differences are older than 6 months.	●
Timeliness of Reporting*	*Green*: If original and supplemental reporting completed by the third workday. *Yellow:* If original submitted by the 3rd workday and supplemental report submitted on the 4th workday. *Red:* If original submitted after the 3rd workday and/or supplemental submitted after the 4th workday.	●
Checks issued Comparison Reporting	*Green*: If differences outstanding for less than 3 months. *Yellow:* If differences are older than 3 months but less than 6 months. *Red:* If differences are older than 6 months. *N/A:* If agency does not have disbursing authority.	N/A

* FMS 224, SF1218/1221 and FMS 1219/1220.

** Most current data available.

Figure 15.

Percent of Federal Cash Transaction Reports Received

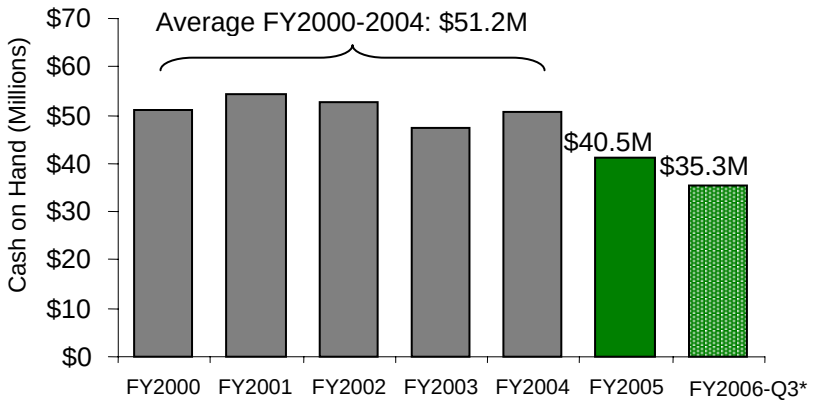


Note: Grantees are required to report the status of funds received from NSF on a quarterly basis through the submission of a Federal Cash Transaction Report (FCTR). The reports are prepared and submitted by the grantee electronically to NSF through the FastLane FCTR Function.
* Most current data available.

Figure 15 focuses on the SF 272 Federal Cash Transaction Report (FCTR) process, a key part of NSF's core grant business. It shows the FCTR collection rate over the past five years including the continued increase of on-time submissions. In FY 1998, NSF developed FastLane, a secure, web-based application that enables grantees to electronically transmit FCTR reports. NSF routinely collects over 99.9 percent of all required FCTRs - a collection rate that significantly exceeds that of other federal agencies.

Figure 16.

Quarterly Average Cash on Hand



*Most current data available.

Figure 16 shows the results of NSF's increased emphasis on enhanced FCTR monitoring activities implemented in January 2005. Unexpended federal cash held by grantees has dropped by an average of

approximately $10 million per quarter due to NSF monitoring activities, indicating improved cash management on the part of the NSF grantees.

Figure 17.

CFO COUNCIL METRIC TRACKING SYSTEM
FINANCIAL MANAGEMENT INDICATORS

Indicator	Definition	Standard	Data through 6/30/06
1. Fund Balance with Treasury (Net)	Identifies the difference between the fund balance reported in Treasury reports and the agency fund balance with Treasury recorded in its general ledger on a net basis.	*Green:* fully successful <= 2% *Yellow:* minimally successful > 2% - <= 10% *Red:* unsuccessful > 10%	GREEN 0.0%
2. Amount in Suspense (Absolute) Greater than 60 Days Old	The timeliness of clearing and reconciling suspense accounts. This metric is reported quarterly.	*Green:* fully successful <= 10% *Yellow:* minimally successful > 10% - <= 20% *Red:* unsuccessful > 20%	GREEN 0.0%
3. Delinquent Accounts Receivable from Public Over 180 days	The success in reducing or eliminating delinquent accounts receivable from the public. This metric is reported quarterly.	*Green:* fully successful <= 10% *Yellow:* minimally successful > 10% - <= 20% *Red:* unsuccessful > 20%	RED 37.9%
4. Electronic Payments	The number of electronic payments measures the extent to which vendors are paid electronically.	*Green:* fully successful >= 96% *Yellow:* minimally successful >= 90% - < 96% *Red:* unsuccessful > < 90%	GREEN 99.2%
5a. Percent Non-Credit Card Invoices Paid on Time	How many non credit card invoices are paid on time in accordance with the Prompt Payment Act (PPA).	*Green:* fully successful >= 98% *Yellow:* minimally successful >= 97% - < 98% *Red:* unsuccessful < 97%	GREEN 99.6%
5b. Interest Penalties Paid	The amount of interest penalties paid on late invoices relative to total dollars paid in accordance with the PPA.	*Green:* fully successful <= 0.02% *Yellow:* minimally successful > 0.02% - <= 0.(*Red:* unsuccessful > 0.03%	GREEN 0.0018%
6a. Travel Card Delinquency Rates Individually Billed Account (IBA)	The percent of travel card balances outstanding over 61 days for Individually Billed Accounts (IBA).	*Green:* fully successful <= 2% *Yellow:* minimally successful > 2% - <= 4% *Red:* unsuccessful > 4%	GREEN 0.8%
6b. Travel Card Delinquency Rates Centrally Billed Account (CBA)	The percent of travel card balances outstanding over 61 days for Centrally Billed Accounts (CBA).	*Green:* fully successful = 0% *Yellow:* minimally successful > 0% - <= 1.5% *Red:* unsuccessful > 1.5%	GREEN 0.0%
6c. Purchase Card Delinquency Rates	The percent of purchase card balances outstanding over 61 days.	*Green:* fully successful = 0% *Yellow:* minimally successful > 0% - <= 1.5% *Red:* unsuccessful > 1.5%	GREEN 0.0%

Figure 17 provides the CFO Metrics Tracking System (MTS) Scorecard for June 2006, the most recent data available. The MTS, sponsored by the CFO Council Committee on Performance Measurement, provides monthly details on core financial metrics across government. NSF received its first "Red" for Indicator 3, "Delinquent Accounts Receivable from Public over 180 Days," for the June reporting month. This indicator is based on the ratio of public receivables greater than 180 days to total receivables. This

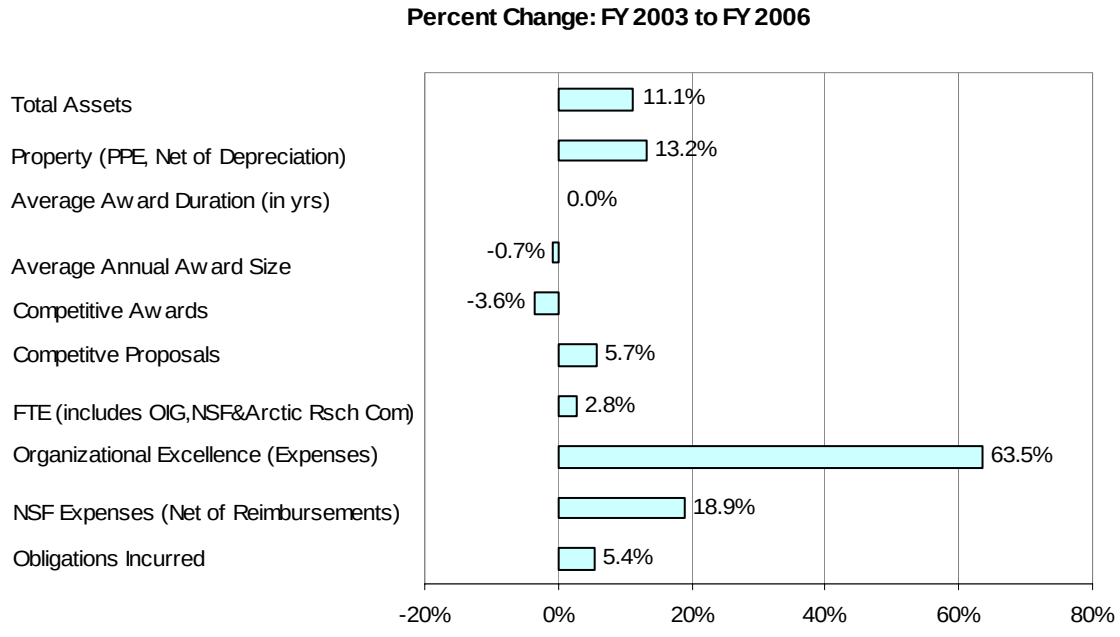
score was caused by a single delinquent debt out of the pool of NSF outstanding public receivables. NSF's receivables are generally one of the lowest total public receivables of all government agencies. This single delinquent debt has caused the MTS score for NSF to experience an anomaly from the normal scoring it receives. In fact, since MTS was launched in January 2005, NSF has had the most consistently high scores of any government agency. MTS scorecards and information are available at www.fido.gov/mts/cfo/public/200606/.

Figure 18.
Recent Trends

The following table summarizes several of NSF's key workload and financial indicators. Obligations are a direct result of each year's appropriation while expenses reflect multiple years of prior obligations. Of real significance is the increase since FY 2003 for Organizational Excellence. This increase reflects the higher onboard FTE as well as other investments designed to address the sustained high level of competitive proposals received and their increasing complexity.

(Dollars in Millions)

	FY 2003	FY 2004	FY 2005	FY 2006	%Change FY 03-06
Obligations Incurred	$5,578.64	$5,870.72	$5,653.90	$5,878.01	5.4%
NSF Expenses (Net of Reimbursements)	$4,707.77	$5,100.14	$5,408.17	$5,595.76	18.9%
Organizational Excellence (Expenses)	$196.36	$268.30	$292.43	$321.09	63.5%
FTE (includes OIG)	1,242	1,274	1,279	1,277	2.8%
Competitive Proposals	40,075	43,851	41,760	42,377	5.7%
Competitive Awards	10,844	10,380	9,794	10,450	-3.6%
Average Annual Award Size	$135,609	$139,637	$143,669	$134,595	-0.7%
Average Award Duration (in yrs)	2.9	2.9	2.9	2.9	0.0%
Property (PP&E, Net of Depreciation)	$230.78	$240.44	$257.56	$261.35	13.2%
Total Assets	$7,424.92	$7,929.03	$8,075.06	$8,247.61	11.1%



Future Business Trends and Events

NSF looks toward meeting all the opportunities and challenges that are presented in the federal environment. The future will require a continued focus on management excellence through increased attention to specific financial operations and strategic issues. For example, the PMA and other new administrative policy initiatives mandate that NSF, like other agencies, demonstrate consistent progress in improving financial management practices as well as adapt to changing management and policy initiatives. We are also committed to leveraging technology and human capital resources to provide an optimum environment for creative intelligence to be utilized to improve operations and services to stakeholders. In addition, we proactively address management challenges identified through internal review and oversight. In the following section, we describe some of the areas we will be focusing on in both the immediate future and the long term.

OMB Circular A-123: NSF underwent its first full implementation under the revised OMB Circular A-123, *Management's Responsibility for Internal Control in FY 2006*. We experienced a steep learning curve in implementing the OMB guidance this year but the agency has emerged with a greater depth and breadth of understanding of the importance of good internal controls at both the entity-wide level and at the financial reporting level. NSF realizes that the process of institutionalizing the OMB A-123 guidance involves detailed planning and execution in the review, documentation, and testing of the business process controls. NSF recognizes that complete institutionalization of the OMB A-123 process does not depend solely on the annual internal control review and test results but also on achieving an overall level of confidence and experience over time. Therefore, in FY 2006, NSF opted for a limited scope on the testing of internal controls over financial reporting for fiscal years 2006, 2007 and 2008. This will allow the agency time to build a level of confidence into the review process.

E-Travel: NSF is the lead agency in implementing EDS's FedTraveler, one of three government-wide approved e-Travel Presidential initiative systems. NSF is paving the way for other agencies to follow and has had to implement and improve a system in parallel. In FY 2006, NSF staff made significant efforts to overcome the obstacles and challenges of a system that was essentially not ready for the e-Travel initiative. As a result, the FedTraveler system has been substantially improved; however, it was not fully implemented due to some remaining system deficiencies and integration issues. NSF is currently addressing these issues aggressively with EDS and GSA as part of a corrective action plan. The FedTraveler system was selected to provide our travelers with an integrated web-based travel system; NSF is confident that with continued diligence and oversight, we will have an optimal and responsive E-Travel system that will meet the needs of this agency.

Federal Financial Report (FFR): As part of its implementation initiatives for the Federal Financial Assistance Management Improvement Act of 1999 (P.L. 106–107), OMB is consolidating and replacing existing grant recipient financial reporting forms with a single Federal Financial Report (FFR). The FFR will provide grantees with a financial reporting process that will be common to all federal agencies while simplifying reporting requirements, procedures and associated business processes. The FFR will utilize a standardized pool of data elements as defined by the Grants Policy Committee of the Federal Chief Financial Officers Council. NSF is developing a FFR for implementation as part of its FastLane Financial Functions. NSF's FFR will assist OMB in advancing Federal Grants Streamlining initiatives, reinforce NSF leadership within the federal grants management arena, and maintain the customized integration of business processes and systems inherent in NSF's end-to-end systems. NSF's FFR will replace the Federal Cash Transaction Report (FCTR) currently being used by all NSF grant recipients, beginning in July 2007.

Financial Service Offerings of the NSF GMLoB: NSF has built a highly integrated financial and grants management process that has the flexibility to provide services to other agencies. As such, NSF is becoming a shared service provider within the Grants Management Line of Business (GMLoB) in a fee-for-service environment to other federal research agencies. Potential financial service offerings include grant payments, grantee financial reporting, and centralized grant accounting. These offerings will complement and extend the shared services to be offered for pre and post award grant management services. NSF financial services have the technical capability and management acumen, combined with proven business processes, which will provide a benefit to the federal research community.

Government-wide Accounting Standardization: There are several government-wide accounting (GWA) initiatives in the federal government, e.g., the GWA Modernization Project and the "Tie-point" Project that will help move the federal government towards government-wide accounting standardization. The goals of these initiatives are to provide reliable, timely and useful information, and to promote a better understanding of the federal accounting and reporting process across the federal government. The Department of the Treasury, in its effort to improve the integrity and consistency of government-wide financial data, is leading the "Tie-point" project through the use of U.S. Standard General Ledger "tie-points". These tie-points will help NSF to further improve our own tie-points that we are using in our current reconciliation process prior to OMB and Treasury reporting. NSF is currently participating and assisting in the project with Treasury and other agencies.

NSF is also involved in a government-wide accounting standardization effort that is spearheaded by the Financial Systems Integration Office under the Financial Lines of Business (FMLoB). The goal of this project is to develop a common government accounting code (CGAC) structure. It includes establishing an applicable set of definitions that all new agency financial management systems must adhere to. Since NSF is moving forward as a Shared Service Provider under the Grants Management Lines of Business (GMLoB), we are studying the feasibility of integrating both GMLoB and FMLoB, and working cooperatively with these two lines of business to develop the touch points. Developments in the CGAC and touch points projects will have an impact on the approach that NSF will take in the future.