National Science Foundation

FY 2001 ACCOUNTABILITY REPORT

February 27, 2002

"Science and engineering are at the heart of the 21st century. New knowledge is a powerful driver of economic prosperity and a force for human progress. That makes new knowledge the most sought after prize in the world."

Rita R. Colwell
Director
National Science Foundation

A MESSAGE FROM THE DIRECTOR

I am pleased to present the National Science Foundation's *FY 2001 Accountability Report*. I am delighted that this year we have been singled out by the Director of the Office of Management and Budget as "a true center of excellence…for reaching for real results and measuring and attaining those results…. " It is a challenge to sustain that praise, one we take seriously and proudly. This report describes our core business priorities and accomplishments of the past year based on data that are complete and reliable. Because we are also committed to the highest standards of management integrity, we will continue to improve our data collection efforts and management processes.

Every year, for more than half a century, the Foundation's far-sighted investments continue to enrich Americans' health, security, environment, economy and general quality of life. And every year, the Foundation's optimal use of limited public funds relies on two conditions: ensuring that NSF's investments are aimed – and continuously re-aimed – at the frontiers of understanding; and certifying that they go to competitive, merit-reviewed, and time-limited awards with clear criteria for success. When these two conditions are met, our nation gets the most intellectual and economic leverage from its investments in research and education.

In the aftermath of the terrorist attacks on September 11, the stakes for our investments could not be higher. The future of America – indeed the future of the world – is more dependent upon advances in science and technology than ever before. An inspired scientific community is focused on ensuring not just our security, but our very quality of life. We well remember that our national security includes the condition of our spirit as much as the size of our arsenal, and we are heartened by the echo of President Franklin D. Roosevelt's words in his secret letter to Robert Oppenheimer in 1943: "Whatever the enemy may be planning, American science will be equal to the challenge."

We have always reached our distant horizons, and set out for new ones in our restless quest for knowledge. The Foundation's investments are essential to our national strategy for attaining our overarching national goals. It is impossible to predict which areas of science and engineering will yield groundbreaking discoveries, what those discoveries will be, or how they will impact other disciplines, and, eventually, our daily lives.

Who can be sure what will be needed to maintain our national security and our strong economy, and to clean up the environment, and develop a healthier and better-educated citizenry? What the National Science Foundation can ensure is that the United States remains at the forefront of scientific capability by sustaining our investments in basic research and education thereby enhancing our ability to shape a more prosperous and secure future for ourselves, our children, and future generations.

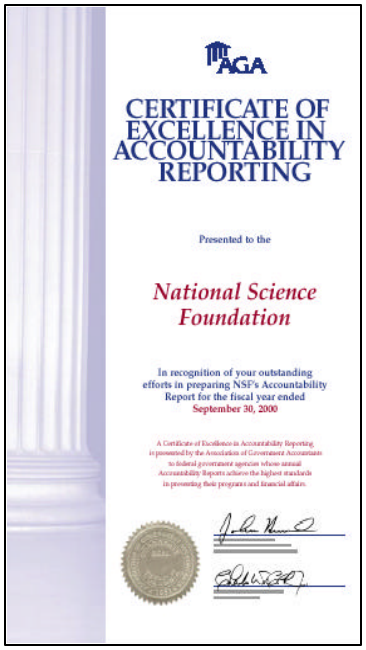
Rita R. Colwell

February 27, 2002

A MESSAGE FROM THE CFO

Thank you for your interest in our *FY 2001 Accountability Report*. I am pleased to report that FY 2001 was a very successful year for the Foundation's business operations. During the year, NSF:

- Received an unqualified opinion on its financial condition, providing a solid foundation for a discussion of agency performance and strategic investments in people, ideas, and tools;
- Was the only federal agency to receive a "green light" on OMB's Management Scorecard -- for outstanding financial management;
- Implemented a new finance and payroll system into NSF's enterprise architecture successfully and seamlessly;
- Became only the second agency to be awarded the Association of Government Accountants' Certificate of Excellence in Accountability Reporting for two consecutive years.



NSF continues to be an efficient operation. A small, dedicated staff of about 1,200—with an operating budget that is only 4.5 percent of the agency's total budget—manages a nearly $5 billion operation. Technology fuels these efficiencies, and NSF has long been recognized as the leader in the federal use of information technology. In the past year alone, NSF electronically processed nearly 14,000 grantee payments (91 percent); received 32,000 proposals (99 percent) electronically; and accepted nearly 20,000 electronic signatures on incoming proposals.

In November 2001, the Director of OMB publicly commended NSF for both excellence in financial management and efficient operations. Clearly, the Foundation's leadership in advancing the frontiers of science and engineering is fueled by a commitment to leading edge excellence in administration and management processes. Looking ahead, while NSF's strategy is on target and implementation improves daily, NSF intends to continue to raise the bar for more effective and efficient management operations.

In the coming year, our focus will be on the government-wide initiatives outlined in the President's Management Agenda, including human capital, competitive sourcing, and electronic government. We will also be addressing issues identified during our annual financial statement audit such as improved cost accounting and grantee oversight, as well as the agency's management challenges.

For five decades NSF grants have led to historical breakthroughs. In 2002, NSF intends to continue to invest in innovations to our management operations to ensure that the agency is prepared for a new era of progress.

Thomas N. Cooley
Chief Financial Officer

February 27, 2002

The NSF Statutory Mission

To promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense.

The NSF Vision

Enabling the Nation's future through discovery, learning and innovation.

Realizing the promise of the 21st century depends in large measure on today's investments in science, engineering and mathematics research and education. NSF investment – in people, in their ideas, and in the tools they use – will catalyze the strong progress in science and engineering needed to secure the Nation's future.

National Science Foundation

FY 2001 ACCOUNTABILITY REPORT

www.nsf.gov/bfa

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I. MANAGEMENT'S DISCUSSION AND ANALYSIS

A. AGENCY PROFILE

The National Science Foundation (NSF), as steward of America's science and engineering enterprise, is charged with supporting and strengthening all research disciplines and providing leadership across the broad and expanding frontiers of scientific and engineering knowledge. NSF's authorizing legislation–the National Science Foundation Act of 1950–directs the Foundation to initiate and support basic scientific research and research fundamental to the engineering process; programs to strengthen scientific and engineering research potential; education programs at all levels of science and engineering; and the establishment of an information base for science and engineering appropriate for development of national and international policy. Over time, other responsibilities that have been added include fostering and supporting the development and use of computers and other scientific methods and technologies; providing Antarctic research, facilities and logistic support; and addressing issues of equal opportunity in science and engineering.

Despite its relatively small size NSF has an extraordinary impact on America's scientific and engineering knowledge and capacity. Although NSF represents only 4 percent of the total federal budget for research and development, it accounts for one-fifth of all federal support for basic research and 40 percent of non-life science basic research at academic institutions. In several fields NSF is the lead federal source; e.g., in the social sciences NSF provides nearly one-half of federal funding for basic research and in mathematics and computer sciences, 75 percent.

The NSF Vision: Enabling the Nation's future through discovery, learning and innovation

During NSF's five decades of leadership, path-breaking advances in science and engineering knowledge have reshaped society and enabled the U.S. to become the most productive nation in the world. The returns on investment in science and engineering have been enormous. For example, economists have attributed the sustained economic prosperity and productivity growth of the nineties largely to technological innovation, and in particular to the spread of information technology. In turn, accelerated productivity has elevated the standard of living for America and western society to a quality of life beyond anything imagined just 50 years ago.

The NSF Strategic Plan notes that "realizing the promise of the 21st century will depend in large measure on today's investments in science, engineering and mathematics research and education." No other time in history has this been more apparent. The events of September 11 clearly brought to the forefront that we are living in a society defined by and dependent on science and technology. The most prominent concerns that arose immediately in the aftermath of the September 11 events–airline security, bio-terrorism, failure of communication links, poisoned food and drinking water, assessment of damaged infrastructure–all depend on scientific and technical knowledge. There has been no other time in the postwar period when NSF's investments to catalyze progress in science and engineering have been more critical to securing the Nation's future.

What NSF Does and How We Do It

To achieve its mission to promote the progress of science, NSF invests in three strategic areas: People, Ideas, and Tools.

- People: Facilitating the creation of a diverse, internationally competitive and globally engaged workforce of scientists, engineers and well-prepared citizens is NSF's first priority. In order to achieve this goal, NSF supports improvement efforts in formal and informal science, mathematics, engineering and technology education at all levels–preK-12, undergraduate, graduate, professional development and public science literacy projects that engage people of all ages in life-long learning. NSF is also committed to enhancing diversity in the science and engineering workforce. The Foundation believes that enhancing the participation of individuals who are members of

underrepresented groups in the science and engineering workforce will not only further scientific progress by promoting diversity of intellectual thought but also meet the need for a technically trained workforce. Across its science, mathematics, engineering, technology research and education programs, NSF provides support for almost 200,000 people, including students, teachers, researchers, post-doctorates and trainees.

Number of People Involved in NSF Activities in FY 2001

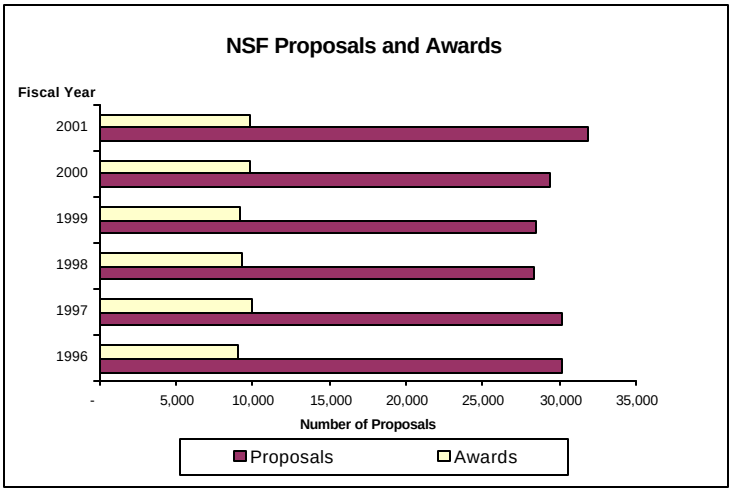
Senior Researchers	27,601
Other Professionals	9,904
Postdoctoral Associates	5,608
Graduate/Undergraduate Students	56,505
K-12 Students	11,335
K-12 Teachers	83,401
Total *	194,354

* Does not include individuals to be funded through H-1B Nonimmigrant Petitioner Receipts.

- Ideas: Investments in "Ideas" support cutting edge research and education that yield new and important discoveries and promotes the development of new knowledge and techniques within and across traditional boundaries. These investments help maintain the Nation's academic institutions at the forefront in science and engineering. The results of NSF-funded projects provide a rich foundation for broad and useful applications of knowledge and the development of new technologies. Support for Ideas also promotes the education and training of the next generation of scientists and engineers by providing them with an opportunity to participate in discovery oriented projects.

- Tools: NSF investments provide state-of-the-art tools for research and education, such as instrumentation and equipment, multi-user facilities, digital libraries, research resources, accelerators, telescopes, research vessels and aircraft, and earthquake simulators. In addition, resources support large surveys and databases as well as computation and computing infrastructures for all fields of science, engineering and education. Support for these unique national facilities is essential to advancing U.S. research and education, with the need driven predominately by research opportunities and priorities. NSF-supported facilities also stimulate technological breakthroughs in instrumentation, and are the site of research and mentoring for many science and engineering students.

NSF itself does not conduct research or operate laboratories. Instead, NSF's role is that of a catalyst–seeking out and funding the best ideas and most capable people, making it possible for these researchers to pursue new knowledge, discoveries and innovation. Each year NSF receives approximately 30,000 proposals, of which about one in three are funded. In FY 2001, of the 31,902 proposals submitted 9,882 awards were made to nearly 2,000 colleges, universities, and other institutions–public, private, state, local and federal–throughout the U.S.



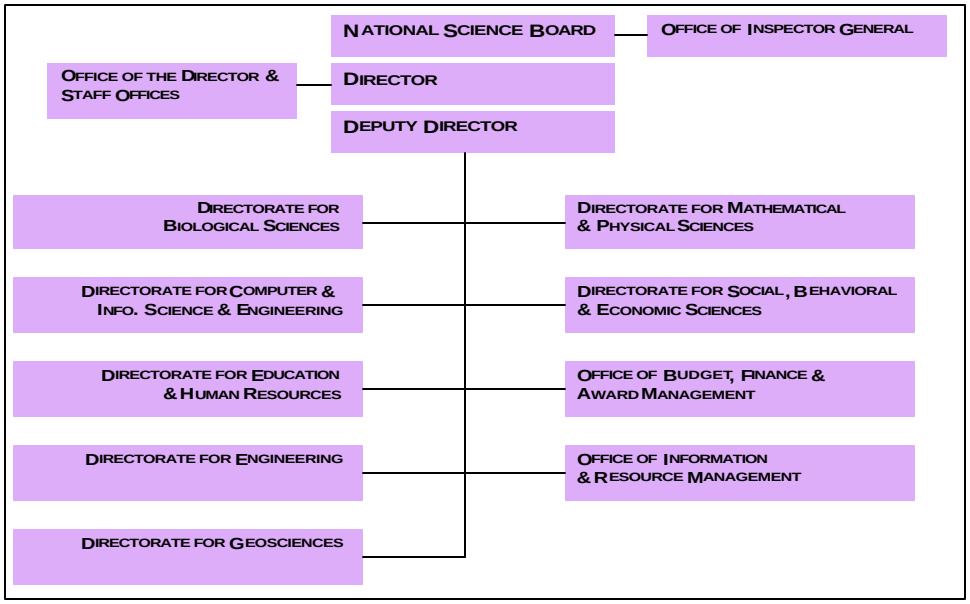
Nearly 90 percent of NSF funding is allocated through a merit-based competitive process that is critical to fostering the highest standards of excellence and accountability–standards for which NSF is known the world over. Each year more than 200,000 merit reviews involving nearly 40,000 external reviewers from all segments of the science, engineering, mathematics and education communities help NSF program officers evaluate the proposals submitted. Reviewers focus on two primary criteria–what is the intellectual merit of the proposed activity and what are its broader impacts, e.g., how well does the activity promote teaching, training, and learning. Reviewers also consider how well the proposed activity fosters the integration of research and education and broadens opportunities to include a diversity of participants, particularly underrepresented groups.

Organization Structure

NSF is headed by a director appointed by the President and confirmed by the U.S. Senate. NSF's current director, distinguished biologist Dr. Rita R. Colwell, became NSF's eleventh director in 1998. Dr. Colwell holds the distinction of being the first woman to head the Foundation. A 24-member National Science Board (NSB) oversees the policies and programs of the Foundation. NSB members, prominent contributors to the science, mathematics, engineering and education communities, are also appointed by the President with the consent of the Senate. The NSF director is a member *ex officio* of the Board. Both the director and NSB members serve six-year terms. The Board also serves the President and the Congress as an independent advisory body on policies related to the U.S. science and engineering enterprise.

NSF is structured much like an academic institution, with divisions organized by disciplines and fields of science and engineering, and for science, math, engineering and technology education. There are seven operating directorates, an Office of Polar Programs and two business offices. See Appendix 1 for a more detailed description of each directorate and business office.

NSF is funded primarily by Congressional appropriations and maintains a staff of about 1,200. To ensure that science and engineering funded by the Foundation remains at the frontier of the research enterprise, NSF utilizes the Intergovernmental Personnel Act (IPA) and Visiting Scientists, Engineers and Educators (VSEE) programs to regularly recruit outstanding scientists, engineers and mathematicians to serve short-term appointments, who bring with them new and innovative ideas.



Management Operations: A Center of Excellence and a "Green Light" for Financial Management

In a speech last fall at the National Press Club, White House Office of Management and Budget (OMB) Director Mitch Daniels lauded NSF as a model of administrative efficiency. He called the Foundation, "a true center of excellence" for its low overhead costs–5 percent of its total budget–and proposal review process that disseminates tax dollars through a merit-based competitive process to researchers pursuing the frontiers of science. As an example of performance results, Daniels noted that eight of the twelve most recent Nobel Laureates were supported by NSF.

As part of the Administration's agenda to improve management in the federal government, OMB developed a scorecard to rate agencies in five areas. OMB noted that the Foundation received a better baseline evaluation than most other agencies, and in fact, NSF was the only agency to receive a "green light"—for meeting the OMB-defined core criteria in financial management. NSF was also cited as a federal government leader for E-Government and information technology. NSF's management scorecard can be found in Appendix 2.

The growing demands on NSF, however, will require the Foundation to further improve its management operations. Over the past decade, as the agency's budget has increased over 80 percent and workload and program responsibilities have increased both in terms of volume and complexity, onboard staff has remained essentially flat. In order to accommodate the increased workload as well as better serve our diverse and growing customer base, NSF has been engaged in an ongoing effort to streamline its work processes, invest in systems and infrastructure improvements, and better deployment of human and capital resources.

NSF's pursuit of advanced information technologies to facilitate business transactions with the academic research community has produced impressive results. In FY 2001, virtually all grant proposals were submitted electronically; NSF is currently the only federal research agency receiving proposals electronically on a production basis. Along similar lines, 99 percent or $3.2 billion of NSF's financial payments to grantees were transacted electronically.

In FY 2001, NSF also made significant strides in enhancing program, accounting and financial business delivery systems. Implementation of the Program Announcement Template (PATS) has streamlined the way program announcements and solicitations are developed; a user can "walk through" preparation of a program announcement on a Web-based system. A new client/server platform system integrates the personnel system ("IPERS"), the payroll system ("IPAY") and the time and attendance system ("ITAS") and interfaces with NSF's Financial Accounting System. The new IPAY system allows for electronic transfers of payroll and financial information to other government agencies and commercial financial institutions as well as incorporates employee electronic self-service capabilities. By reducing data entry requirements, eliminating manual reconciliations and making data available to employees online via their personal computer, IPAY enhances the entire payroll process.

Finally, in FY 2001, the agency's CFO and CIO collaborated to establish a new Business and Operations Advisory Committee to provide external input to NSF's business and management operations practices. The broad range of expertise offered by members of the Advisory Committee will aid NSF to poise itself to meet the administrative and management challenges of the 21st century.

The Foundation is committed to making and implementing effective management, stewardship and policy and program decisions. NSF adheres to the highest standards of management efficiency and integrity and in its pursuit of excellence and efficiency, assumes a pro-active role in meeting its management challenges. Looking ahead, in the immediate future, significant challenges to be addressed include accommodating new functions, processes and increased workload; better human capital management to sustain a high-performing workforce; increased emphasis on leadership and succession planning; and better oversight, management and accountability of larger, more complex interdisciplinary program activities and large infrastructure projects. The *President's Management Agenda* initiatives dealing with Human Capital, Competitive Sourcing, Improved Financial Management, E-Government, and Budget/Performance Integration are high priorities for the Foundation.

B. FY 2001 PERFORMANCE RESULTS [1]

This is the third year NSF is reporting GPRA (Government Performance and Results Act of 1993) performance results. NSF began implementing GPRA in 1997, by developing an agency GPRA Strategic Plan. In September 2000, NSF updated the Strategic Plan to cover the period FY 2001-2006, and established three new strategic areas of focus, which directly translate into three strategic outcome goals–People, Ideas and Tools (PIT). The new PIT strategic areas of focus provide the guiding framework for NSF's FY 2001 Annual Performance Plan as well as NSF's FY 2001 Budget, which were developed concurrently to ensure a direct link between programmatic activities and the achievement of NSF's strategic outcome goals.

GPRA implementation has been a particular challenge for agencies like NSF whose mission involves research activities. This is primarily due to: (1) the difficulty of linking research outcomes to annual investments and the agency's annual budget; it is not unusual for research outcomes to appear years or decades after the initial investment, and (2) the fact that assessing the results of research is inherently retrospective and requires qualitative judgment of experts. NSF has developed an alternative format that has been approved by OMB, using external expert review panels to assess research results and reporting research outcome goals utilizing a qualitative scale. The use of external expert panels to review research results and outcomes is a common, long-standing practice used by the academic research community.

NSF's Performance Goals

NSF has three mutually supportive sets of performance goals and measures–for Strategic Outcomes, for Management and for Investment Process.

- Strategic Outcome Goals: To accomplish the NSF mission to promote the progress of science, NSF invests in the best People, with the best Ideas and provides them with the Tools they need. NSF's outcomes from its grants and cooperative agreements provide evidence of the success of NSF's investments in People, Ideas and Tools.[2, 3]

- Management Goals: For FY 2001, NSF's management goals focus on some of the critical factors in the Foundation's managing for excellence including exemplary use of, and broad access to, new and emerging technologies for business application; a diverse, capable, motivated staff that operates with efficiency and integrity; and a quality work life and work environment for its employees.

- Investment Process Goals: The Investment Process Goals focus on the means and strategies NSF uses to achieve its Outcome Goals and set performance targets for the investment processes by which NSF shapes its portfolio of awards. NSF's Investment Process Goals focus on the proposal and award process; broadening participation; and facilities oversight.

The longer term desired results of NSF awards are reflected in the Outcome Goals. Achieving the desired Outcome Goals depends in part on the quality of the investment process, which is related to the efficiency and effectiveness of the agency's administration and management. The Investment Process Goals and Management Goals are necessary to ensure that the longer term Outcome Goals will be achieved. NSF's Strategic Plan emphasizes three core strategies that are critical to achieving the strategic outcomes–

[1] For a comprehensive discussion of NSF's performance goals, final results and related issues, see *NSF's FY 2001 GPRA Performance Report* (www.nsf.gov/od/gpra/).

[2] See Appendix 3 for a discussion of how NSF research results are assessed.

[3] Pages 15-22 provide examples of outcomes and results that emerged in FY 2001 from NSF investments in research and education activities made in prior years.

developing intellectual capital, integrating research and education, and promoting partnerships. They guide the agency in establishing priorities, identifying opportunities and designing new programs and activities. NSF's primary means for success is through use of a rigorous merit review process in making awards for activities that will influence research and education in math, science and engineering, both directly and indirectly.

How Performance Goals are Linked to the Budget Structure

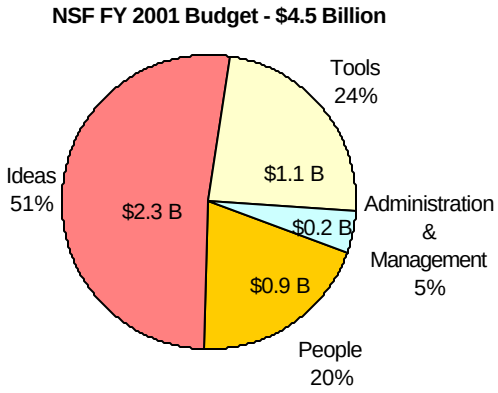
NSF receives five Congressional appropriations: Research and Related Activities (R&RA); Major Research Equipment (MRE); Education and Human Resources (EHR); and Salaries and Expenses (S&E). The fifth appropriation funds the Office of Inspector General. The following chart shows the appropriations that provide support for each of the Strategic Outcome Goals of People, Ideas and Tools. About 95 percent of NSF's budget goes directly to investments that support the Strategic Outcome Goals.

It is notable, however, that NSF's investments in support of its strategic outcomes of People, Ideas and Tools sometimes serve multiple purposes. For example, the involvement of graduate students in research projects not only generates new ideas and prepares them for entry into the workforce, but it often involves them in the development of new tools.

How NSF's FY 2001 Appropriations Are Linked to NSF's Strategic Outcome Goals

Appropriation	***Strategic Outcome Goal***
Education and Human Resources ($612M) *Research and Related Activities ($283M)*	People*: Develop a diverse, internationally competitive and globally engaged workforce of scientists, engineers and well-prepared citizens.*
Research and Related Activities ($2.2B) *Education and Human Resources ($144M)*	Ideas*: Enable discovery across the frontier of science and engineering, connected to learning, innovation and service to society.*
Research and Related Activities ($911M) *Major Research Equipment ($119M)* *Education and Human Resources ($25M)*	Tools*: Provide broadly accessible, state-of-the-art and shared research and education tools.*
Salaries and Expenses ($166M) *Office of Inspection General ($7M)* *[In the Statement of Net Cost, the indirect support activities funded by the Salaries and Expenses and Inspector General appropriations are prorated among People, Ideas and Tools based on each program's direct cost.]*	People, Ideas, Tools [See below; the S&E Appropriation supports NSF's Management and Investment Process Goals, which support the achievement of the Strategic Outcome Goals.]

In FY 2001, support for the three Strategic Outcome Goals of People, Ideas and Tools totaled $894 million, $2.3 billion, and $1.1 billion, respectively.



NSF's Management and Investment Process Goals focus on the internal operations and activities of the agency–e.g., processing proposals and merit review–which enable the achievement our mission. The Management and Investment Process Goals are primarily supported by the S&E appropriation. There is also R&RA and EHR funding that directly support limited program support activities. To capture the administration and management activities that support achievement of the Strategic Outcome Goals, in the Statement of Net Cost, S&E is prorated among People, Ideas and Tools based on each program's direct cost. The OIG appropriation is treated similarly.

How NSF's FY 2001 Appropriations Are Linked to NSF's Management and Investment Process Goals	
Appropriation	***Performance Goal***
Salaries and Expenses ($161M) *[In the Statement of Net Cost, S&E is prorated among People, Ideas and Tools to account for its contribution to the achievement of the outcome goals*.] *R&RA ($26M)* *EHR ($15M)*	Management Goals Investment Process Goals

Data Verification and Validation

For the second consecutive year, NSF engaged an independent, external consulting firm–PricewaterhouseCoopers LLP (PwC)–to conduct verification and validation review of selected performance measures. PwC's assessment was based on criteria established by the General Accounting Office's *Guide to Assessing Agency Annual Performance Plans (GAO/GCD-10.1.20).* PwC assessed the accuracy of

NSF's performance measures, described the reliability of the processes NSF uses to collect, process, maintain and report data; reviewed system controls to confirm that quality input results in quality output; and identified changes to processes and data for those goals undergoing review for the second time. For the goals undergoing review for the first time, PwC documented the processes NSF follows to collect, process, maintain and report performance data. PwC also identified relevant controls and commented on their effectiveness.

In their report, PwC asserts the following: "We commend NSF for undertaking this second year effort to confirm the reliability of its data and the processes to collect, process, maintain and report this data. From our FY 2001 review, we conclude that NSF has made a concerted effort to ensure that it reports accurately to the federal government and has effective systems, policies, and procedures to ensure data quality. We have noted some areas for improvement, particularly in the area of data collection for the goals related to facilities management. However, overall NSF relies on sound business practices, system and application controls, and manual checks of system queries to report performance. Further, our efforts to re-calculate the Foundation's results based on these systems, processes and data were successful."

The PwC study concluded that NSF reported on ten of the quantitative goals and all five qualitative goals "in a manner such that any errors, should they exist, would not be significant enough to change the reader's interpretation of the Foundation's success in meeting the supporting performance goal. For these goals, NSF relies on sound business processes, system and application controls, and manual checks of system queries to report performance. We believe that these processes are valid and verifiable." For the four goals related to facilities management, PwC identified data limitations that did not allow verification of the processes, however, PwC was able to validate that NSF's outcomes were consistent with the data that was collected. NSF will consider the recommendations made by PwC in its continuing efforts to improve data collection and reporting processes.[4]

Summary of FY 2001 Performance Results

Performance Goal	***Number of Goals Achieved in 2001***	***Number of Goals Achieved in 2000***
Strategic Outcome Goals	4 out of 5 (80%)	6 out of 8 (75%)
Management Goals	4 out of 5 (80%)	5 out of 6 (83%)
Investment Process Goals	7 out of 13 (54%)	7 out of 14 (50%); one goal was not applicable
Total	15 out of 23 (65%)	18 out of 28 (64%)

In FY 2001, NSF achieved 15 of 23 performance goals, or 65 percent. Overall, these results are similar to the prior year results, when NSF achieved 64 percent of its performance goals. The following is a discussion of selected key FY 2001 performance goals and results; see Appendix 4 for a performance chart that includes all of NSF's FY 2001 GPRA performance goals and results. For a comprehensive discussion

[4] For a more detailed discussion of verification and validation of NSF's GPRA results, see *NSF's FY 2001 GPRA Performance Report.*

of NSF's GPRA performance goals, results and related issues, see NSF's *FY 2001 GPRA Performance Report.*

1. Strategic Outcome Goal – Ideas: Enabling discovery across the frontier of science and engineering, connected to learning, innovation, and service to society.

Investments in ideas support cutting edge research that yields new and important discoveries and promotes the development of new knowledge and techniques within and across traditional boundaries. These investments enable NSF to meet its mission of promoting the progress of science while at the same time helping to maintain the Nation's capacity to excel in science and engineering, particularly in academic institutions. The results of NSF-funded research projects provide a rich foundation for broad and useful applications of knowledge and the development of new technologies. Support in this area also promotes the education and training of the next generation of scientists and engineers by providing them with an opportunity to participate in discovery-oriented projects. NSF-funded centers provide an enhanced environment for broad interdisciplinary education at all levels. On pages 15-22 are examples of results and outcomes that emerged in FY 2001 from NSF investments in research and education activities made in prior years.

Performance Goal for "Ideas" outcome: NSF's performance is successful when, in the aggregate, results reported in the period demonstrate significant achievement for one or more of the following indicators: (1) a robust and growing fundamental knowledge base that enhances progress in all science and engineering areas including the science of learning; (2) discoveries that advance the frontiers of science, engineering and technology; (3) partnerships connecting discovery to innovation, learning and societal advancement; and (4) research and education processes that are synergistic.

Baseline: This is a new goal.

Results: This goal was achieved. Reports prepared by external experts during FY 2001 GPRA reporting provide assessments and retrospective examples of NSF-supported projects that document significant achievement. [5] NSF's key strategy for success is to support the most promising ideas in research and education, as identified through merit review of competitive proposals. Innovation and creativity, cooperative research through partnerships, and education and training are emphasized and encouraged.

[5] For a more detailed explanation of how research results are assessed, see Appendix 3.

2. Management Goal – Electronic Proposal Submission: In FY 2001, 95 percent of full proposals will be received electronically through FastLane.

FastLane is a collection of modules that streamlines and re-engineers the Foundation's interactions with the research community by allowing transactions and communications between NSF and its grantees to be facilitated via the Internet. Under development as a research project since 1994, the goal was to provide a paperless environment by the end of FY 2001. To achieve this, the annual GPRA goal has been progressively more stringent, and through a combination of educational initiatives and technical assistance we have successfully reached our goal each year. For FY 2001, the goal was exceeded.

Performance Indicator: Percent of full proposals received electronically through FastLane. FY 1998 Baseline: 17% FY 1999 Result: 44% FY 2000 Goal: 60% FY 2000 Result: 81% **FY 2001 Goal: 95%** **FY 2001 Result: 99%**	**RESULTS: This goal was achieved.** FastLane has been universally accepted by NSF's external customers for proposal submission. NSF's outreach program continues to educate and inform external customers as well as provide assistance for those customer groups who might have difficulty or limited technical access for electronic submission. The electronic signature capability has enabled virtually 100% complete electronic submissions. As a result, we have achieved this goal and will no longer monitor it in future GPRA Plans. NSF is the only federal research agency currently receiving proposals electronically on a production basis.

3. Investment Process Goal – Use of Merit Review: At least 85 percent of basic and applied research funds will be allocated to projects that undergo merit review.

Performance Indicator: Percent of project funding that has undergone merit review. FY 2000 Goal: 80% FY 2000 Result: 87% **FY 2001 Goal: 85%** **FY 2001 Result: 88%** [During FY 2000, OMB redefined what constitutes a merit-reviewed project and established a new target level of 70-90 percent.]	**RESULTS: This goal was achieved.** NSF's merit review process is the keystone for award selection. NSF evaluates proposals for research and education projects using two criteria – the intellectual merit of the proposed activity and the broader impacts of the proposed activity on society. The criteria now in place, established by the National Science Board, were revised in 1998 to simplify and harmonize them with the Strategic plan. Both support NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense."

4. Investment Process Goal–Time to Decision: For 70 percent of proposals, be able to tell applicants whether their proposals have been declined or recommended for funding within six months of receipt.

Customer Service Standard: This customer service standard was established in response to a survey of NSF applicants who indicated that processing proposals within six months of receipt was valued highly. Processing proposals within six months of receipt remains a challenging goal for NSF.

Performance Indicator: Percent of proposals processed within six months: FY 1998 Baseline: 59% FY 1999 Goal: 70% FY 1999 Result: 58% FY 2000 Goal: 70% FY 2000 Result: 54% **FY 2001 Goal: 70%** **FY 2001 Result: 62%**	**RESULTS: This goal was not achieved.** In FY 2001, NSF processed 62% of all proposals within six months. This performance improves upon the FY 1998 baseline of 59% but is still short of the 70% goal. Data shows that about 77% of proposals were processed in less than seven months and over 90% were processed in less than nine months. During FY 2001, NSF took a number of important steps to reduce processing time. A series of new electronic processes designed to improve the efficiency and effectiveness of the proposal review process was implemented. New FastLane modules such as the Interactive Panel System and Electronic Declination, as well as the pilot project to provide proposals to reviewers electronically with print-on-demand available, are reducing processing time and helping NSF staff cope with increasing workload. In addition, NSF sponsored a series of brainstorming sessions for staff at all levels to discuss issues and effective practices related to proposal processing time. The results of these sessions, including effective practices employed by organizations with excellent processing times, were widely disseminated throughout NSF. These sessions also identified a number of key management issues related to processing time such as the need for timely processing of declinations and better tracking information on proposals in process. A report was developed that tracks proposals through major processing stages and identifies those that are close to exceeding recommended time frames for each stage. This report is produced centrally and periodically distributed to division directors throughout NSF. In FY 2002, NSF will continue to focus on improving the efficiency of proposal processing, including the dissemination of best practices to program staff.

5. Investment Process Goal–Award Size: NSF will increase the average annualized award size for research projects to a level of $110,000. (Note this target is only applicable to competitive research grants, a subset of awards that focuses on awards to individual investigators and small groups.)

Performance Indicator: Annualized award size of research projects. FY 1998: $90,000 FY 1999: $94,000 FY 2000: $105,800 **FY 2001 Goal: $110,000** **FY 2001 Result: $113,601**	**RESULTS: This goal was achieved.** This was a new goal for FY 2001. The issue of award size continues to be a concern for NSF. With larger award size, researchers are able to devote a greater portion of their time to productive research. Adequate award size is important both to getting high quality proposals and to ensuring that proposed work can be accomplished as planned. In FY 2002, increasing award size remains a priority; a higher target will be set.

6. Investment Process Goal – Award Duration: NSF will increase the average duration of awards for research projects to at least three years.

Performance Indicator: Average duration of research projects. FY 1998 Baseline: 2.7 years FY 1999 Goal: 2.8 years FY 1999 Result: 2.8 years FY 2000 Goal: n/a FY 2000 Result: 2.8 years FY 2001 Goal: 3.0 years FY 2001 Result: 2.9 years (This goal was dropped in FY 2000 but reinstated for FY 2001.)	**RESULTS: This goal was not achieved.** The issue of award duration continues to be an ongoing concern for NSF. With longer duration, researchers are able to devote a greater portion of their time to productive research. Adequate award duration is important both to obtaining high quality proposals and to ensuring that proposed work can be accomplished as planned. In FY 2002, this goal remains a priority.

7. Investment Process Goal – Operations and Management of Facilities: For 90 percent of facilities, keep operating time lost due to unscheduled downtime to less than 10 percent of the total scheduled operating time.

Performance Indicator: Comparison to scheduled operating time. FY 1999 Result: Inconclusive. FY 2000 Result: Goal not achieved. Of the 26 facilities, most met the goal of keeping unscheduled downtime to below 10% of the total scheduled operating time. **FY 2001 Result:** Of the 29 facilities, 25 (86%) met the goal of keeping unscheduled down time to below 10% of the total scheduled operating time. Four reported unscheduled downtime greater than 10%. Of those four, two facilities reported unscheduled downtime within 14% of the total scheduled operating time.	**RESULTS: Goal was not achieved.** Some causes for failure to achieve this goal were outside the control of the facility, such as electric power supply interruption and equipment failure. Other causes ranged from sub-par performance of new instruments early in their commissioning to unanticipated equipment failure and downtime for repairs. In FY 2002, NSF will continue to work with awardees to identify obstacles to successful performance and develop plans to avoid or mitigate their consequences in the future.

An Impressive Return on Investments

The following examples illustrate the impact and success of NSF's investments in People, Ideas and Tools. NSF supports cutting edge research that yields new discoveries over time. These discoveries are essential for maintaining the Nation's capacity to excel in science and engineering and lead to new and innovative technologies that benefit society. Because many research results appear long after the period when the investment is made, these are outcomes and results of NSF support of research and education projects made in prior years but which emerged in FY 2001.[6]

Scientists Find Unexpected Life Forms, Structures in Oceans Around the Globe: Scientists exploring a remote area of the central Indian Ocean seafloor 2½ miles deep have found animals that look like fuzzy snowballs and chimney-like structures two stories tall spewing super-heated water full of toxic metals. Another team in the northern Pacific has found astounding numbers of *archaea*, a microscopic life form distinct from plants and animals once thought to exist only in extremely hot or acidic environments. Yet another team in the Atlantic has found hydrothermal vents towering 180 feet above the ocean floor.

An NSF-supported team of 34 scientists and engineers from a dozen institutions explored the Indian Ocean aboard the Woods Hole Oceanographic Institution's 279-foot research vessel *Knorr*. They deployed instruments like the remotely operated vehicle, *Jason*, to explore temperature variations, which led them to the discovery of the hydrothermal vents resembling smokestacks and sea anemones resembling snowballs. David Karl, Markus Karner, and Edward DeLong of the NSF-sponsored Hawaii Ocean Time-series project sampled the northern Pacific Ocean from the surface to 4,750 meters deep and found that *archaea* may make up to 50 percent of the biomass in the open sea.

Another expedition of scientists from the Scripps Institution of Oceanography, Duke University, the University of Washington, and other institutions explored a mid-Atlantic mountain ridge. The towering hydrothermal vents they discovered are the largest ever observed. They are also unique in their composition of carbonate material and silica and the fact that dense macrofaunal communities such as clams, shrimps, mussels, and tube worms, which typify most other mid-ocean ridge hydrothermal environments, are absent in this field.

The findings may provide critical answers to long-standing questions about the diversity of life in the deep sea, how the oceans function ecologically, how animals move from place to place, and how the ocean crust is changing.

"Silent" DNA Speaks up for the First Time: By moderately raising the temperature of cells, biologists have broken through what was considered an impermeable barrier that kept half the genes in some cells "silent." The surprising results, in which these heated genes reached 500 times their normal rate of expression, could lead to better understanding of cellular processes involved in aging, fever, and toxicity.

Biochemistry and molecular biology professor David Gross and graduate student Edward Sekinger conducted the research at Louisiana State University Health Science Center (LSUHSC) with NSF support. Their findings appeared in the May 2001 issue of the journal *Cell*.

The process that makes some genes silent could itself help scientists understand aging. These findings could turn the gene-expression field upside down. Apart from the possible implications for aging, the research could eventually help explain why certain cells are more vulnerable to fever and toxic chemicals, and how to control their negative effects.

Big City Students Make Gains in Math and Science: In 1993, NSF undertook a bold initiative to encourage and invest in system-wide reform of K-12 mathematics and science education in some of the most

[6] For additional examples of results and outcomes of NSF's investments, see the NSF's Office of Legislative and Public Affairs Website at www.nsf.gov/od/lpa/ .

disadvantaged urban school systems. Students in these systems were performing poorly in mathematics and science, with wide gaps evident between minority and majority students. NSF introduced Urban Systemic Initiatives (USI) to enable cities to implement wide-ranging reforms through standards-based curricula, professional development for teachers, and accountability for achievement through data collection and assessment. Now, an external evaluation team reports some dramatic payoffs to these investments.

Academic Excellence for All Urban Students, a summary report on urban programs making up NSF's USI, shows that students in most of the 22 cities where school systems undertook reform efforts are making progress in several areas. The report is part of a larger, ongoing NSF-funded evaluative study. The study has found that in most of the USI cities, students are taking more math and science courses and increasing achievement levels, demonstrated through various assessment tools. Minority students, meanwhile, are making even greater gains in enrollments and performance, reducing the "achievement gap" between themselves and majority students.

These preliminary indicators give insights into what can happen when school systems use investments wisely to support system-wide policies for learning, to develop capabilities of teachers, and to connect with the community through partnerships. Great returns on those investments are possible when all of the pieces fit together.

Synthetic Clay Could Assist Radioactive Waste Cleanup: Researchers at Pennsylvania State University completed an important step in the drive to remove harmful materials from waste streams and drinking water. A team led by Sridhar Komarneni, professor of clay mineralogy, demonstrated that a synthetic clay known as swelling mica has the ability to separate ions of radium, a radioactive metal, from water. The finding could have implications for radioactive and hazardous waste disposal, particularly in the cleanup of mill tailings left over from the processing of uranium for the Nation's nuclear industry. The tailings contain radium and heavy metals that can leach into groundwater and contaminate drinking water supplies.

The swelling mica, known as Na-4, is one of a group of clays not found in the natural environment. Created specifically for water treatment purposes, swelling micas expand as they absorb metal ions and then, reaching their capacity, collapse and seal the contaminants inside. The swelling micas are being explored for potential use in separating ions of heavy metals such as lead, zinc, and copper as well as other radioactive materials, including strontium, from waste streams. Because they trap the ions, the micas can permanently immobilize the pollutants. They could prove useful for the recovery and recycling of valuable metals as well.

Full of Holes: Scientists developing photonic devices for optical and electronic applications may get a boost from a new process for "cutting" 3-D arrays of holes in a polymer material. Researchers found a way to create an orderly pattern of air bubbles throughout a polymer film using a simple solvent. By controlling the polymer, solvent, humidity, and flow of air across the polymer, scientists can trigger a condensation of tiny uniform water droplets. The droplets sink into the polymer film. The process repeats itself on its own until the film is filled with a three dimensional array of water bubbles. When the solvent and water evaporate, they leave behind a polymer scaffold with a lattice of equal-sized air bubbles.

The process could contribute to the development of optical switches and the ability to direct or "steer" light beams, just as electrical switches and conducting materials control and direct electrical current. Potential applications include lasers, antennas, millimeter wave devices, and solar cells. This discovery represents an easy way of making materials with the regular structure needed for optical and photonic applications in a completely self-assembled process.

Researcher Mohan Srinivasarao, a physical polymer chemist in the Georgia Institute of Technology's textiles and fiber engineering department, is an NSF CAREER awardee. The Foundation-wide CAREER program recognizes and supports the early career-development activities of those teacher-scholars who are most likely to become the academic leaders of the 21st century. CAREER awardees are selected on the

basis of creative, career-development plans that effectively integrate research and education within the context of the mission of their institution.

Superconductivity: Making it Work in the Real World: A new high-temperature superconductor found in January 2001 by a Japanese team in a simple, commonly available compound has profound potential for future uses. U.S. scientists at an NSF materials research center at the University of Wisconsin, in collaboration with an NSF-funded solid-state chemistry group at Princeton University, have shown that the compound, magnesium diboride or MgB_2, will be useful for real-world applications such as electronics, communications, and industrial tasks that would benefit from the passage of large amounts of current with no resistance.

Superconductors are materials that lose all their resistance to electrical current flow below a certain critical temperature. The higher the critical temperature, the more useful the material for practical applications. MgB_2's critical temperature at 39 Kelvin is lower than other candidate materials–generally copper oxides–but has other properties that this team says make it a "go."

In the copper oxide superconductors discovered so far, the interfaces between the crystals of the material–the so-called "grain boundaries"–interfere with the efficient flow of current, severely limiting their usefulness. In the case in MgB_2, this research team has shown the current passes smoothly between the crystal grains. One of the unfulfilled promises of previously known copper-oxide superconductors is the commercial production of wires carrying large amounts of current for everyday applications. Potential applications include magnetic resonance imaging (MRI) devices, more efficient power transmission lines, and a variety of electronic devices.

The Birth of the Universe: Two teams of cosmologists released new findings about the nature of the universe in its infancy. Their spectacular images of the cosmic microwave background (CMB), taken with instruments operating from Antarctica, reveal the strongest evidence to date for the theory of inflation, the leading model for the formation of the universe. The announcement represents the first release of data from the Degree Angular Scale Interferometer, a 13-element ground-based instrument operating since last year at the NSF Amundsen Scott South Pole Station. Scientists also released similar results from further analysis of data from the Balloon Observations of Millimetric Extragalactic Radiation and Geophysics project, obtained in 1998 and first reported in 2000.

These spectacular results represent a payback from the significant national investment in research in the polar regions. The Antarctic environment provides exceptional clarity for astrophysical observations, and the U.S. Antarctic Program provides unmatched support for world-class research. Both analyses, unveiled at the American Physical Society meetings, support the model that the universe experienced a tremendous spurt of growth shortly after the Big Bang. Cosmologists believe the structures that formed in the very first moments of the cosmos left their imprint as a very faint pattern of variations in the temperature of the CMB, the radiation left over from the intense heat that filled the embryonic universe during the initial growth spurt. Some 12–15 billion years later, these temperatures have become detectable from Earth with highly sensitive instruments. Multiple teams supported by NSF have probed the CMB for these minute temperature variations, including the two teams operating from the polar region. Two other teams using instruments in the continental United States also released data.

This is an outstanding example of how NSF supports multiple scientific projects, leading to rapid, new results. It took more than a decade to get the initial observations of the cosmic microwave background with the COBE satellite, and in only a few short years, the progress in sharpening those observations has been truly astounding.

The teams used independent methods and two different technologies to obtain detailed observations of the CMB. The observations have provided so much data that new methods had to be invented to analyze them. As the data analyses continue, they are providing precise measurements of parameters that cosmologists

have long used to describe the early evolution of the universe, but in the past could only illustrate with models.

Genome Sequencing Yields Many Insights: Genetics reached a major milestone in December 2000 as an international research team announced it had completed the first plant genome sequence. The species *Arabidopsis thaliana* has emerged as the plant counterpart of the laboratory mouse, offering clues to how all sorts of living organisms behave genetically, with potentially widespread applications for agriculture, medicine, and energy.

The *Arabidopsis* Genome Initiative (AGI) is a collaboration of research groups in the U.S., Europe, and Japan funded by government agencies, including NSF. Because it is a model for over 250,000 other plant species, *Arabidopsis* is yielding insights that scientists are already applying to make other plants easier to grow under adverse conditions and healthier to eat.

The complete sequence of *Arabidopsis* is directly relevant to human biological functions because many fundamental life processes at the molecular and cellular levels are common to all higher organisms. *Arabidopsis* contains numerous genes equivalent to those that prompt disease in humans—ranging from cancer to premature aging. To help researchers capitalize on the genome sequence, NSF has begun a "2010 Project" to determine the function of 25,000 *Arabidopsis* genes.

The applications of this project are not confined to biology and medicine. Plants hold great potential as sources of renewable energy, although they currently represent just 3 percent of U.S. energy resources. Studying the *Arabidopsis* genome sequence is revealing how photosynthesis converts solar energy and carbon dioxide into biomass, helping scientists develop better plants for fuel and chemical uses.

Another NSF-funded team of scientists has completed the genome sequence of *Halobacterium* species NRC-1, a microorganism that is among the most ancient forms of life. The achievement is especially significant due to this bacterium's widespread use as a model for genetic manipulation.

The research was led by microbial geneticist Shiladitya DasSarma at the University of Massachusetts at Amherst in collaboration with molecular biotechnologist Leroy Hood at the Institute of Systems Biology in Seattle. DasSarma and Hood led a consortium of researchers from 12 universities and research centers in the U.S., Canada and the U.K. on the 3-year project. *Halobacteria* convert sunlight to energy, giving off a red byproduct whose light sensitivity makes it commercially useful in possible applications such as information storage for computers.

These tiny creatures will provide many insights into how more complex creatures manage life functions, including cell division, and the way cells transport proteins across biological membranes. Several biomedical applications using *Halobacterium* are now being investigated, including the development of orally administered vaccines and the design of new antibiotics.

World Trade Center Response: Following the September 11 terrorist attacks, NSF responded in record time to fund several studies on the engineering, communications, and psychological implications of those events. In December 2001, a team of scientists from Renssalaer Polytechnic Institute headed to the site of the WTC attacks to study how New York's utility companies worked together to quickly restore water, power, transit and phone services. A team from Northern Arizona University is studying how individuals respond to collective loss. Results from the study may aid intervention efforts directed at coping with catastrophic events. The knowledge obtained from Ground Zero can help prevent future tragedies by enabling construction of buildings more resistant to earthquakes, bombs, and other catastrophic forces.

Small Streams Contribute Far More Than Previously Thought to Cleaning Waterways: Small streams remove more nutrients such as nitrogen from water than do their larger counterparts, according to researchers who have applied sampling methods developed in a NSF Arctic area ecological study. The finding could have important implications for land-use policies in U.S. watersheds from the Chesapeake Bay on the East Coast to Puget Sound in the West. The findings are based on data collected from streams in NSF's Arctic Tundra Long-Term Ecological Research (LTER) site in Alaska. Excess nitrogen can cause

ecologically damaging effects in large waterways, including algae blooms, because the nutrients are transported downstream and collect there. According to the research, the smaller the stream, the more quickly nitrogen can be removed and the less distance it will be transported down the stream. "There's a very strong relationship between the size of a stream and how rapidly that stream removes nutrients," said Bruce Peterson of the Ecosystems Center at the Marine Biological Laboratory in Woods Hole, MA. Peterson notes that, collectively, the new studies provide a radically different picture of the role of small streams in contributing to existing nutrient loading. By placing tracers in smaller streams, the researchers discovered how quickly nutrients were assimilated and processed by organisms that live on the streambeds. Peterson argues that the finding could have important implications for land use policies. In many agricultural areas, for example, small streams are often covered to allow ease of access for tilling and working fields. The covering, in effect, creates a dark pipe that inhibits the stream's ability to scrub excess nutrients. Taking greater care to insure that small streams can work effectively to clean the water will reduce the overall nitrogen load that makes its way into larger bodies of water.

Earliest Human Ancestors Discovered in Ethiopia: Anthropologists have discovered the remains of the earliest known human ancestor in Ethiopia, dating to between 5.2 and 5.8 million years ago and which predate the previously oldest-known fossils by almost a million years. The previous discovery of the 4.4-million-year-old *Ardipithecus ramidus* was up to this point the oldest known hominid, the primate zoological family that includes all species on the human side of the evolutionary split with chimpanzees. The fossil finds were made by NSF-funded scientists over a four-year period in Ethiopia's Middle Awash study area, about 140 miles northeast of the capital, Addis Ababa. To the team of scientists, the discovery represents more evidence to confirm Darwin's conclusion that the earliest humans, or hominids, arose in Africa. The area where this hominid discovery took place has been the focus of much recent attention. Eleven hominid specimens have been recovered from five late Miocene localities within the Middle Awash region. The researchers explain that about six million years ago, the Middle Awash region was already a well-defined rift valley characterized by intense earth movements, with active volcanoes nearby. The researchers estimate the size of the skeletal bones and the lower jaw is roughly the same size as a modern chimpanzee.

New Grid Portal to Improve U.S. Researchers' Access to Advanced Computing Resources: Computational scientists will soon have a powerful new tool for using resources on the national "grid" of high-performance research networks. The Web-based grid portal will help computer scientists, scientists and engineers by simplifying and consolidating access to advanced computing systems supported by NSF and its Partnerships for Advanced Computational Infrastructure (PACI). "The collaboration efforts mean that computational scientists will have access to machines supported by the National Partnership for Advanced Computational Infrastructure (NPACI), the National Computational Science Alliance (NCSA), Pittsburgh Supercomputing Center, and NASA, provided that they have accounts," said Richard Hilderbrandt, NSF program director for the PACI program. "The complementary efforts of the PACI partnerships have made the PACI grid portal a reality." Representatives from NPACI, the Alliance, and NASA IPG have conducted a series of workshops targeting specific technologies and resources to include in the effort to demonstrate computational science portals using the high-end systems made available by each organization.

The portal integrates many leading-edge grid technologies being developed by the PACI program, and through continued collaboration, future releases of the portal will integrate additional PACI technologies, such as the Network Weather Service and the SDSC Storage Resource Broker. NPACI unites 46 universities and research institutions to build the computational environment for tomorrow's scientific discovery. PACI also provides operational support to the National Computational Science Alliance (NCSA), which is a partnership to prototype, an advanced computational infrastructure for the 21st century and includes more than 50 academic, government and industry research partners from across the United States.

Research Network Brings Wireless Internet to Native American Reservations: Researchers at the University of California, San Diego (UCSD) are using the latest solar-powered wireless technology to help a pair of Native American tribes bridge the digital divide. The High Performance Research and Education Network (HPWREN) is overcoming geographical, social and technical barriers to bring high-speed Internet access to the La Jolla and Pala tribes.

In remote San Diego County, HPWREN's 45Mbps (million bits per second) wireless backbone connects the low-lying San Diego coastline with the county's mountainous eastern region, home of the La Jolla and Pala Native American reservations. This outreach is funded by NSF as part of an experimental wireless network. UCSD received a $2.3 million NSF award in August 2000 to create, demonstrate and evaluate a prototype wide-area network for research and education. Connecting the Native American communities posed special challenges for the team lead by computer scientist Hans-Werner Braun and geophysicist Frank Vernon of UCSD. Foremost among these is the rugged terrain where the reservations are located–ranging from valleys with elevation of 2,000 feet above sea level to mountain peaks at 5,000 feet. "There are no line-of-sight views of existing microwave towers from the sites," Braun said. "And in the case of La Jolla, we didn't even have access to electric grid power on the mountain ridge edge of the reservation." The project is an interdisciplinary effort to design a network that–though experimental–is robust enough to be relied upon by researchers under even very adverse conditions, including catastrophic earthquakes. HPWREN is developing such a system for geophysicists, astronomers and ecologists, while demonstrating that the same tools can connect under-served educational users at remote locations like the Pala and La Jolla reservations."

Molecular Rulers Make Nano-Scale Gaps: Scientists at Pennsylvania State University have developed a precise method for making nano-sized metal wires spaced very close to each other. The process could speed the miniaturization of electronic devices used for circuits, high-density data storage and sensors. Anat Hatzor and Paul Weiss fabricated wires that range from 15 to 70 nanometers wide and a few micrometers long and are spaced 10 to 40 nanometers apart. Previously, nano-scale construction methods had been limited to structures with larger, less controlled spacings. The scientists used organic molecules as "molecular rulers," expanding the molecules into nano-scale structures with precise amounts of spacing between them, then using those spaces as miniature molds for gold wires. The ability to create precisely sized, parallel nano-wires simultaneously is expected to be useful in the development of molecular electronics, in which molecules connected by such wires will serve as transistors, switches and other electronic devices. The research was funded by NSF, the Army Research Office, the Defense Advanced Research Projects Agency and the Office of Naval Research. It was conducted at one of NSF's National Nanofabrication Users Network facilities that provides the research and industrial communities with infrastructure and equipment to make nano-scale devices in small quantities.

Team Finds Ancient X-Rays from the Farthest Quasar: A team of U.S. and European astronomers has detected x-rays from the most distant quasar on record. The x-rays, detected with the XMM-Newton satellite, came from a quasar with a redshift of 5.8–which means the x-rays were emitted when the universe was less than one billion years old. The NSF-supported team, led by Niel Brandt of Pennsylvania State University, is using x-ray observations to study some of the oldest and hottest objects in the universe to learn more about how the first quasars and galaxies were formed. The ancient radiation provides a glimpse of the universe shortly after the dawn of the modern universe. Quasars can emit 1,000 times the energy of our entire galaxy and are believed to be fueled by supermassive black holes that in turn are powered by material from their host galaxies.

How Cold is Cold? Scientists Now Know For Sure: Thirty-five years ago, a University of Florida physics professor suggested a new way to measure very low temperatures–that is, temperatures so cold they were off the official scale, which at that time stopped at 0.65 Kelvin. E. Dwight Adams and graduate student Richard Scribner, with support from NSF, created a new type of thermometry by determining the pressure and temperature needed to freeze helium-3. As more and more research was performed in extreme cold,

scientists used this method to gauge temperatures that sometimes approached 0 degree, the theoretical absolute zero.

Now, the International Commission on Weights and Measures has officially adopted the Adams' "melting pressure thermometry" gauge as the worldwide standard for measuring the ultra-cold. Adams' research in magnetism and ultra-low temperatures spans more than three decades, dating to his invention, with graduate student Gerald Straty, of the pressure gauge that allowed the measurements to be made. He now serves as director of a user facility at the NSF National High Magnetic Field Laboratory at the University of Florida, the Nation's premier facility for research into magnetism.

On First Science Cruise Icebreaker Healy Steams to Arctic to Study Crust Formation: Researchers funded by the National Science Foundation (NSF) sailed on the maiden scientific voyage of the U.S. Coast Guard's newest icebreaker to study one of the world's slowest growing oceanic ridges, with an eye to understanding how the Earth's crust forms. The USCGC *Healy*, which is outfitted as a scientific research vessel, carried out the Arctic Mid-Ocean Ridge Expedition (AMORE) from late June until early October 2001. The *Healy* later sailed with the German research vessel Polarstearn, to sample and study the Gakkel Ridge, a little known geological feature in the Atlantic Ocean. Among the important milestones from the cruise, scientists discovered an as yet unexplained "discontinuity" of volcanic activity along the Gakkel Ridge. Most surprisingly, a dredge team recovered fresh sulfides that apparently are part of "black smoker" chimneys, the most striking manifestation of hydrothermal activity. While the heated water from the hydrothermal vents does not significantly affect ocean temperatures, the vents have attracted the attention of both biologists and geologists. Hydrothermal vents on mid-ocean ridges in the world's oceans provide chemical energy that supports exotic life forms and large ecosystems far removed from the Earth's sunlit surface, where photosynthesis forms the base of the food chain. The discovery of these signs of hydrothermal vents indicates that they may be present in abundance in the Arctic Ocean.

Animated 3-D Boosts Deaf Education: A pool of Internet-enabled virtual people, animated in 3-D, translates English into sign language. Through SigningAvatar™ software, developed with assistance from the NSF's Small Business Innovation Research (SBIR) program, each "person" displays a distinct personality and natural facial expressions that help interpret words and phrases for hearing-disabled viewers on their computer screens. The software represents a step forward in providing universal access to technology and in helping deaf and hard-of-hearing children to develop language and reading skills. "Deaf children face considerably more difficulty than hearing children learning to read," said Edward Sims, chief technology officer of VCom3D of Orlando, Fla., which is marketing the assistive technology. "Our virtual signing interpreters help narrow that gap." The software has been praised by teachers of the deaf and experts in computer technology for putting virtual 3D technology, widely used in video games, to use for educational purposes. SigningAvatar™ is used in several Florida school districts and at schools serving deaf students around the country. "Lots of educational software teaches through voice communication," said Sara Nerlove, NSF's program manager. "This is one of the first compelling uses of computer animation technology to benefit an audience with hearing loss."

The characters interpret words, sentences and complicated concepts into sign language, combining signing, gestures and body language to simulate natural communication. The animations are based on in-depth research of how both hearing and deaf persons use the face and body to communicate. The interpreters include digital teenagers with unique personalities, such as red-haired Andy and 13-year-old Tonya, and a cyber-lizard named Pete. Besides translating printed text, they "tell" stories, ask follow-up questions and hold interactive conversations with viewers. Their vocabulary includes more than 3,500 words in English and in "Conceptually Accurate Signed English," which includes elements of American Sign Language.

New Database to Save Endangered Languages: The emergence of English and Spanish as the dominant languages of global commerce is causing many other tongues to fall into disuse. This trend alarms social scientists worldwide because linguistic research not only provides cultural information, but also insight into the diverse capabilities of the human mind. To combat the decrease in the number and diversity of

languages and to capitalize on a growing store of digitized linguistic data, a team of NSF-funded researchers led by Anthony Aristar at Wayne State University is developing an endangered languages database and a central information server that will allow users to access the material remotely by computer. A $2 million NSF grant to Aristar and his colleagues at Eastern Michigan University, the University of Pennsylvania and the University of Arizona will be used to create this public digital archive.

The Electronic Metastructure for Endangered Languages Data (E-MELD) project will collect data on endangered languages and devise a Web-based protocol so that new and existing data will be accessible to researchers and native speakers everywhere. The researchers on the E-MELD project will start with 10 distinct endangered languages to design a system modeled on the Internet, where standard communications protocols allow users to access information housed on a variety of very different operating systems, including UNIX, Windows-NT, and VMS. The first version of E-MELD is expected to appear online this fall.

C. MANAGEMENT INTEGRITY: CONTROLS, COMPLIANCE AND CHALLENGES

The Federal Managers' Financial Integrity Act of 1982 (FMFIA) requires an annual review of the adequacy of NSF program and activity management controls. The NSF Management Controls Committee (MCC), chaired by the Chief Financial Officer, is responsible for the oversight and reporting of the Foundation's management and internal control program to the NSF Director on an annual basis.

The MCC requires that individual offices provide assurance statements each year on the FMFIA reviews within their own organizations on program and activity management controls. Individual assurance statements from each of NSF's Assistant Directors and Staff Office Directors serve as the primary basis for NSF's assurance that management controls are adequate (Section 2 of FMFIA), and that NSF systems are in compliance with all applicable laws and administrative requirements, including OMB circulars A-123 and A-127 and Section 4 of FMFIA. The MCC asserted to the NSF Director that agency management controls and financial management systems taken as whole provide reasonable assurance that the objectives of FMFIA were achieved for FY 2001. It was also determined that agency assets were properly safeguarded.

Consistent with the provisions of the Reports Consolidation Act of 2000, and with the approval of the Office of Management and Budget, the results of NSF's management evaluations required by FMFIA for the period ending September 30, 2001 are included here. During the FY 2001 management evaluation process, the MCC did not identify any material weaknesses as defined by OMB guidance. However, as in prior years, the MCC reported several management challenges identified through the FMFIA assessment process. These management challenges do not impact the internal controls of the Foundation, but warrant attention of senior management in order to maintain the long-term effectiveness of operations at NSF.

They include issues related to human capital; awards monitoring; cost accounting and cost sharing review; system and data management; and security. The MCC will address these issues, most of which require long-term attention.

The independent auditors assert that their finding of information security weaknesses compels a finding of noncompliance with the Federal Financial Management Improvement Act (FFMIA). NSF management does not concur with this assertion for reasons fully discussed in the auditor's report. The Director of NSF has determined that the National Science Foundation is in substantial compliance with FFMIA.

The Director's Statement of Assurance for FY 2001

Based on internal management evaluations and the independent auditor's report, it is my determination, with reasonable assurance, that the National Science Foundation is in compliance with the Federal Managers' Financial Integrity Act. Additionally, I find that the National Science Foundation is in substantial compliance with the Federal Financial Management Improvement Act.

The NSF Management Controls Committee, under the guidance of the agency's Chief Financial Officer, provides senior executive attention to management control issues. Through its representation on the Management Controls Committee, the Office of the Inspector General continues to provide constructive suggestions for improving the agency's management controls and financial management policies and practices.

Rita R. Colwell

IG's Statement of Management and Performance Challenges

As required by the Reports Consolidation Act of 2000, this report includes a statement by the Inspector General (IG) addressing NSF's most serious management and performance challenges; see section on "Other Reporting Requirements." The Director's response follows the IG's statement.

D. DISCUSSION AND ANALYSIS OF THE FINANCIAL STATEMENTS

The National Science Foundation is committed to providing quality financial management to all our stakeholders. We honor that commitment by preparing annual financial statements in conformity with generally accepted accounting principles in the United States and then subjecting the statements to an independent audit to ensure their reliability in assessing the performance of NSF. The results are an opinion on the fair presentation of those financial statements.

FY 2001 Financial Statement Audit

The Chief Financial Officer's Act of 1990 (P.L. 101-576) requires that NSF prepare financial statements to be audited in accordance with Government Auditing Standards. The NSF Inspector General is statutorily responsible for the manner in which the audit of NSF's financial statements is conducted. KPMG LLP, an independent certified public accounting firm, was selected by the NSF Inspector General to perform the audit of NSF's FY 2001 financial statements.

For FY 2001, NSF received an unqualified opinion that the principal financial statements were fairly stated in all material respects. The independent auditors did not report any material weaknesses.

The independent auditors did note two reportable conditions in their report on internal controls related to information security weaknesses and grant monitoring. NSF management does not concur with the assertions made in these findings and provided a response in the audit report. Nonetheless, management has corrected the security weaknesses identified and has identified grant monitoring as a management challenge that merits continued attention and improvement.

The independent auditors' report noted one instance of noncompliance with laws and regulations. Their report found NSF non-compliant with FFMIA based on the information security reportable condition. NSF management does not concur with the non-compliance determination and provided a response in the audit report. The Director of NSF has found the agency to be substantially compliant with FFMIA.

Understanding the Financial Statements

NSF's current year financial statements and notes are presented in a comparative format providing financial information for FY 2000 as well as for FY 2001. Comparative financial statements are required for FY 2001 by OMB 01-09, *Form and Content of Agency Financial Statements*, dated September 25, 2001. NSF elected early implementation of comparative financial statements in FY 2000.

The following provides a brief description of the nature of each required financial statement and its relevance to NSF. Some significant balances or conditions on each statement are noted to help clarify their link to NSF operations.

Balance Sheet: The Balance Sheet presents the combined amounts available for use by NSF (assets) against the amounts owed (liabilities) and amounts that comprise the difference (net position). Three line items represent 99 percent of NSF's current year assets.

Fund Balance With Treasury is funding available through the Department of Treasury accounts from which NSF is authorized to make expenditures and pay liabilities. *Property, Plant and Equipment* comprises capitalized property located at NSF headquarters and NSF-owned property in New Zealand and Antarctica that support the United States Antarctic Program. *Advances* are funds advanced to NSF grantees, contractors and minor amounts to NSF employees.

Accounts Payable and *Advances From Others* represent 96 percent of NSF's current year liabilities. *Accounts Payable* includes liabilities to grantees for their unreimbursed expenses and liabilities to NSF

vendors for unreimbursed goods and services received. *Advances From Others* are amounts advanced to NSF from other federal entities for the administration of grants on their behalf. NSF maintains the expertise and automated systems for the administration of research grants upon which other federal entities rely to assist in the administering of their grants.

Comparative Discussion: Analysis of significant changes from FY 2000 to FY 2001 incorporates an increase in *Fund Balance With Treasury*; *Intragovernmental Accounts Receivable*; *General Property, Plant and Equipment*; *Advances from Others, Other Intragovernmental Liabilities*; and *Lease Liabilities.*

The increase in FY 2001 *Fund Balance with Treasury* was in correlation to the overall increase in budget authority. Our appropriated funds increased by approximately 13 percent. The FY 2001 *Intragovernmental Accounts Receivable* increase stems from military receivables. *General Property, Plant and Equipment* increased in FY 2001 mainly through additions to construction in progress related to polar program operations. These additions will eventually result in increase to our buildings and other structures. The increase in *Advances from Others* is attributable to an increase in reimbursable activity with the Department of Energy and NASA. The decrease in *Intragovernmental Liabilities* was primarily due to the payment at the beginning of FY 2001 of an interagency On-line Payment and Collection (OPAC) liability outstanding at the end of FY 2000. *Lease Liabilities* will see a gradual reduction over the next several years and eventually will be eliminated. As a business practice, NSF has changed its policy to purchase in-house equipment instead of leasing.

Statement of Net Cost: This statement presents the annual cost of operating NSF programs. The gross cost less any offsetting revenue for each NSF program is used to arrive at the net cost of specific program operations. Revenues are recognized from other federal agencies for grant administration work, which is completed during the year.

Almost 96 percent of all current year NSF costs incurred were directly related to the support of NSF People, Ideas and Tools programs. Costs incurred for indirect general operation activities such as salaries, training, activities related to the advancement of NSF information systems technology, and Inspector General activities account for approximately 4 percent of the total current year NSF net cost of operations. NSF's commitment to administrative efficiency is evident in the relatively small portion of its total costs devoted to general operation activities.

Comparative Discussion: Analysis of changes in Net Cost from FY 2000 to FY 2001 shows about a 6 percent increase in Net Cost of Operations. This increase is reflective of the agency's overall increase in Budget Authority.

Statement of Changes in Net Position: This statement presents those accounting items that caused the net position section of the balance sheet to change from the beginning to the end of the reporting period.

Consistently, 99 percent of all financing sources are comprised of appropriated funds from Treasury accounts and donations received from private and foreign government sources used in the furtherance of the mission of the Foundation. The increase in unexpended appropriations is due mainly to an increase in unliquidated obligations from the prior fiscal year. Unliquidated obligations are obligations maintained by NSF for research and education for which expenses have not yet been recognized.
Comparative Discussion: Analysis of changes in Net Position from FY 2000 to FY 2001 indicates a 17 percent increase in ending Net Position. This change is largely due to an increase in unexpended appropriations or the amount of appropriation funding remaining at year-end. This increase is consistent with the overall increase to our Budgetary Authority. Another item of note is *Transfers in*. *Transfers in* for FY 2001 relate to the salvage value of the satellite received from NOAA.

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. The outlays

reported on this statement reflect the actual cash disbursed for the year by Treasury for NSF obligations. Most obligations incurred by NSF are for science and engineering grants. This statement is in accordance with the President's Budget.

Comparative Discussion: Analysis of changes in Budgetary Resources from FY 2000 to FY 2001 shows a 14 percent increase in *Budget Authority* and a 6 percent increase in *Total Outlays*. Both of these increases are consistent with our increase in appropriated funds.

Statement of Financing: This statement provides reconciliation between the resources available to NSF to finance operations and the net cost of operating NSF programs. *Net Cost Capitalized on the Balance Sheet* are additions to capital assets made during the fiscal year. *Costs That Do Not Require Resources* include depreciation and the operating gain or losses recognized upon the disposition of NSF capital assets. *Change in Financing Sources Yet to be Provided* discloses the net change or increase in liabilities that are not covered by current budgetary resources.

Comparative Discussion: Analysis of changes in financing from FY 2000 to FY 2001 revealed an increased in C*hange in Unfilled Customer Orders* that occurred due to a significant effort in FY 2000 to resolve 1999 unfilled customer orders. The FY 2000 change in unfilled customer orders is characteristic of normal activity. An increase in *Net Costs Capitalized on the Balance Sheet* related to major additions to construction in progress, normal equipment purchases and initial capitalization of software in FY 2001; and a gain on *Disposition of Assets* is being shown to reflect disposition at auction for some items retired.

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 shown in this statement as the number of awards made and the number of researchers and students supported in the pursuit of discoveries in science and engineering and in science and math education.

Comparative Discussion: Analysis of changes in stewardship investments from FY 2000 to FY 2001 showed consistent incremental increases in research and human capital activities in support of NSF's overall mission as reported in monetary investments and measured outputs and outcomes.

Budgetary Integrity: NSF Resources and How They Are Used

NSF is funded primarily through five Congressional appropriations that totaled $4.4 billion in FY 2001, a 13.1 percent increase from the prior year. Other FY 2001 revenue resources include $115.6 million in reimbursable authority and appropriation transfers from other federal agencies and $28 million in donations to support NSF activities. Additional resources were also received from the Department of Justice under the American Competitiveness and Workforce Improvement Act, enacted in 1998, which provides for a temporary increase in access to skilled personnel from abroad under the H-1B visa program. In FY 2001, NSF received $78.5 million from H-1B visa fees, to support education activities and scholarships for financially disadvantaged students in computer science, engineering, and mathematics.

NSF's FY 2001 obligations totaled $4.5 billion. As indicated in the Statement of Net Cost, the Foundation made investments in education and fundamental research in support of its three strategic outcome goals of People, Ideas and Tools.[7] Administrative support for the Foundation as a whole is provided by the Salaries and Expenses appropriation. The Office of Inspector General is funded under its own separate appropriation.

For FY 2002, Congress has appropriated $4.8 billion to NSF, an 8.2 percent increase from the prior year. In addition, it is estimated that NSF will receive $90 million from the collection of visa fees under the H1-B program. Key priority areas of focus in FY 2002 include Biocomplexity in the Environment;

[7] See page 8 for a discussion of how NSF's appropriations are linked to NSF's GPRA performance goals.

Information Technology Research; Nanoscale Science and Engineering; and Learning for the 21st Century Workforce. Core research activities being supported include interdisciplinary mathematics research and plant genome research. Ongoing support is also being provided for major research instrumentation and science and technology centers. A new Math and Science Partnership program encourages colleges and universities to develop partnerships with local K-12 school districts, to improve science and math education. The Noyce Scholarship program, designed to encourage undergraduate students in mathematics, sciences and engineering, to pursue teaching careers, offers scholarships to those students in exchange for commitments to teach in elementary or secondary schools. In an effort to attract the most promising students to pursue graduate studies in science and engineering, graduate fellowship stipends are being increased to a level of $21,500. Finally, among the large infrastructure projects being supported in FY 2002 are a terascale computing system, the Atacama Large Millimeter Array radio telescope and the Large Hadron Collider.

Future Business Trends and Events

NSF is continually evolving as we focus on new priorities and challenges. The future will require NSF to focus on demonstrating management excellence through sharpened attention to specific issues. For example, the *President's Management Agenda* mandates that NSF, like other agencies, demonstrate consistent results through proven management practices in Human Capital Management; Achieving eGovernment; Competitive Sourcing; Financial Management; and Integrated Budget and Performance Management. In addition, the agency also pro-actively addresses management challenges identified through internal review and oversight as well as those identified by the agency's Inspector General and the General Accounting Office. Some of the areas NSF will focus on in both the immediate future and long term are:

- Financial Performance. NSF, although receiving high marks from the Office of Management and Budget for our ability to maintain, control and report the financial position of the agency, will need to seek continued improvement as outlined by the President's Management Agenda. NSF, along with other federal agencies, will be pursuing future financial performance issues of accelerated financial statement reporting; risk and cost/benefit assessments of erroneous payments; cost and performance information integration; and financial systems that routinely produce information for operational and investing decisions. NSF also will need to address the audit findings resulting from the year 2001 financial statements through the coming year. NSF is positioned to accept the challenges by increasingly leveraging technology to meet the demands of new or existing legislative requirements. However, NSF projects that in order to meet ever increasing demands in accountability and improved timeliness of financial data, more financial and human capital resources will be required in order to maintain our standards of excellence.

- Human Capital Planning. The nature of science and engineering research and education at an ever-changing frontier demands unique knowledge agility in the NSF workforce. The agency maintains this characteristic by capitalizing upon current staffing flexibilities such as the Intergovernmental Personnel Act to complement its permanent workforce. By so doing, it develops a cohort of visiting scientists and engineers who typically spend one to three years with the agency. These individuals motivate innovation in perspective and stimulate science and engineering investments that may not occur otherwise. Following their NSF assignments, these researchers and educators return to their home organizations with an informed perspective on national science and engineering priorities and federal investments in science and engineering research and education. They also serve as a reserve workforce to call upon in the future as the need arises.

  To sustain its high-performing workforce, NSF is exploring ways to provide a flexible, motivating work environment and to recruit and retain excellent employees. New initiatives include an updated telecommuting program; strategic recruiting techniques that also seek to increase representation of underrepresented groups in the NSF science and engineering workforce that reflects the diversity goal

in the agency's FY 2002 GPRA annual performance plan; a renewed focus on continuous learning; and an increased emphasis on leadership and succession planning.

- Expand an Electronic NSF. NSF is one of the founders and partners of the Federal Commons initiative, a project led by the Department of Health and Human Services/National Institute of Health to develop electronic systems to support grants processes for the science and engineering research and education community. NSF is committed to the new government-wide E-Grants Initiative. While other agencies are planning for electronic grant submissions, in October 2000, NSF started conducting virtually all business interactions and transactions electronically with the grantee community through its "FastLane" grants system.

  The NSF FastLane system exemplifies what can be achieved in eGovernment information system design, development and implementation. In June 2001, NSF implemented electronic signatures for proposals which enabled the complete electronic submission of proposals. So far nearly 20,000 electronic signatures have been collected. Virtually all of NSF's external customers–scientists, engineers, educators, technology experts and academic administrators–use FastLane's Web-based system for a variety of tasks–to submit proposals, to conduct peer-reviews, or to submit awardee progress reports. Universities and other organizations request funding increments and report on billions of dollars in expenditures through this system. In addition, the public can access titles, authors, funding amounts and abstracts of NSF awards.

  NSF has also contributed time and resources to develop a significant part of the Federal Commons, the Government-wide grants portal, and remains active in supporting the eGrants initiative approved by the President's Management Council. For example, NSF created a generic federal grants Web prototype for use by all federal grant-making agencies as part of the Federal Commons. Turned over to the Federal Commons in October 2001, the Web-based grant submission program uses XML to transmit the submitted data to federal agencies and other participants. NSF is a leader of electronic government and will continue to commit its expertise, experience, and technologies to leverage best practices in the future inter-agency eGrants initiatives.

- Competitive Sourcing. For many years NSF has leveraged the potential of competitive sourcing to achieve its mission. While the agency is comparatively small and has a federal workforce of only about 1,200, many times that number are involved each year in realizing the agency's goals.

  NSF has competitively sourced its commercial administrative functions, including its mailroom, copy center, health unit, travel center, and much of its software and systems development. A high level of competitively sourced commercial activities over the years has enabled NSF to focus its small workforce on its core business needs and mission-essential functions. Although NSF's budget has increased by more than 80 percent in the past ten years, the number of NSF employees has remained virtually flat, due in part to the agency's effective use of competitive sourcing. NSF will continue to pursue cost-effective means of competitive sourcing as future trend of maintaining a high operating efficiency.

Limitations of the Financial Statements

Responsibility for the integrity and objectivity of the financial information presented in the financial statements lies with NSF management. The accompanying financial statements are prepared to report the financial position and results of the operations of NSF, pursuant to the requirements of Chapter 31, of the United Sates Code section 3515 (b). While these statements have been prepared from the books and records of NSF in accordance with formats prescribed in Office of Management and Budget guidance on *Form and Content of Agency Financial Statements*, these financial 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 financial statements should be read with the realization that NSF is an agency of the executive branch of

the United States Government, a sovereign entity. Accordingly, unfounded liabilities reported in the statements cannot be liquidated without the enactment of an appropriation, and ongoing operations are subjected to enactment of appropriations.

II. FINANCIAL STATEMENTS

as of and for the years ended
September 30, 2001 and 2000

National Science Foundation
Balance Sheets
As of September 30, 2001 and 2000
(Amounts in Thousands)

	2001	2000
ASSETS		
Intragovernmental		
Fund Balance With Treasury (Note 2)	$ 5,720,311	$ 4,892,765
Accounts Receivable (Note 3)	5,588	3,997
Total Intragovernmental Assets	5,725,899	4,896,762
Cash	5,744	5,835
Accounts Receivable, Net (Note 3)	875	658
Advances (Note 4)	66,138	69,696
General Property, Plant and Equipment, Net (Notes 5 and 13)	203,242	167,362
Total Assets	$ 6,001,898	$ 5,140,313
LIABILITIES		
Intragovernmental Liabilities		
Advances From Others	$ 115,125	$ 96,383
Other Intragovernmental Liabilities (Note 6)	108	1,219
Employee Benefits (Notes 7 and 8)	296	335
Total Intragovernmental Liabilities	115,529	97,937
Accounts Payable	284,386	266,478
Other Liabilities (Note 6)	3,207	3,890
Employee Benefits (Notes 7 and 8)	1,806	1,767
Lease Liabilities (Notes 7 and 9)	451	602
Accrued Annual Leave (Note 7)	9,660	9,295
Total Liabilities	415,039	379,969
NET POSITION		
Unexpended Appropriations (Note 10)	5,343,547	4,541,631
Cumulative Results of Operations (Note 13)	243,312	218,713
Total Net Position	5,586,859	4,760,344
Total Liabilities and Net Position	$ 6,001,898	$ 5,140,313

The accompanying notes are an integral part of these statements.

National Science Foundation
Statement of Net Cost
For the Year Ended September 30, 2001
(Amounts in Thousands)

Program Costs		**2001**
People		
Intragovernmental		
Program Cost	$	1,454
Salary & Expense and Inspector General Cost		493
Total Intragovernmental Cost		1,947
With the Public		
Program Cost		703,495
Salary & Expense and Inspector General Cost		27,808
Total Public Cost		731,303
Total People Program Cost		733,250
Less: Earned Revenues		9,832
Net People Program Cost		723,418
Ideas		
Intragovernmental		
Program Cost		10,419
Salary & Expense and Inspector General Cost		3,528
Total Intragovernmental Cost		13,947
With the Public		
Program Cost		1,964,948
Salary & Expense and Inspector General Cost		77,670
Total Public Cost		2,042,618
Total Ideas Program Cost		2,056,565
Less: Earned Revenues		54,125
Net Ideas Program Cost		2,002,440
Tools		
Intragovernmental		
Program Cost		82,119
Salary & Expense and Inspector General Cost		27,810
Total Intragovernmental Cost		109,929
With the Public		
Program Cost		846,178
Salary & Expense and Inspector General Cost		33,448
Total Public Cost		879,626
Total Tools Program Cost		989,555
Less: Earned Revenues		17,272
Net Tools Program Cost		972,283
Net Cost of Operations (Note 11)	$	3,698,141

The accompanying notes are an integral part of these statements.

National Science Foundation
Statement of Net Cost
For the Year Ended September 30, 2000
(Amounts in Thousands)

Program Costs

		2000
Research Programs:		
Intragovernmental		
Program Cost	$	101,304
Salary & Expense and Inspector General Cost		28,652
Total Intragovernmental Cost		129,956
With the Public		
Program Cost		2,708,885
Salary & Expense and Inspector General Cost		113,426
Total Public Cost		2,822,311
Total Research Program Cost		2,952,267
Less: Earned Revenues		76,372
Net Research Program Cost		2,875,895
Education Programs:		
Intragovernmental		
Program Cost		2,262
Salary & Expense and Inspector General Cost		572
Total Intragovernmental Cost		2,834
With the Public		
Program Cost		594,255
Salary & Expense and Inspector General Cost		19,370
Total Public Cost		613,625
Total Education Program Cost		616,459
Less: Earned Revenues		7,844
Net Education Program Cost		608,615
Net Cost of Operations (Notes 11 and 13)	$	3,484,510

The accompanying notes are an integral part of these statements.

National Science Foundation
Statement of Changes in Net Position
For the Years Ended September 30, 2001 and 2000
(Amounts in Thousands)

	2001	2000
Net Cost of Operations	$ 3,698,141	$ 3,484,510
Financing Sources:		
Appropriations Used	3,688,983	3,461,834
Donations	27,955	39,371
Interest and Penalties	139	298
Imputed Financing	5,663	4,774
Transfers in (Note 12)	-	227
Total Financing Sources	3,722,740	3,506,504
Net Results of Operations	$ 24,599	$ 21,994
Prior Period Adjustment (Note 13)	-	24,557
Net Change in Cumulative Results of Operations	$ 24,599	$ 46,551
Increase in Unexpended Appropriations	801,916	473,233
Change in Net Position	826,515	519,784
Net Position – Beginning of Period	4,760,344	4,240,560
Net Position – End of Period	$ 5,586,859	$ 4,760,344

The accompanying notes are an integral part of these statements.

National Science Foundation
Statements of Budgetary Resources
For the Years Ended September 30, 2001 and 2000
(Amounts in Thousands)

	2001	2000
Budgetary Resources		
Budgetary Authority (Note 14)	$ 4,547,001	$ 4,001,238
Unobligated Balances – Beginning of Period	247,076	187,607
Spending Authority from Offsetting Collections	101,144	85,498
Adjustments:		
Recoveries of Prior Year Obligations	46,954	76,574
Cancelled Authority Returned to Treasury	(28,023)	(26,689)
	18,931	49,885
Total Budgetary Resources	$ 4,914,152	$ 4,324,228
Status of Budgetary Resources:		
Obligations Incurred	$ 4,674,880	$ 4,077,152
Unobligated Balances – End of Period – Available	152,249	144,593
Unobligated Balances – End of Period – Not Available	87,023	102,483
Total Status of Budgetary Resources	$ 4,914,152	$ 4,324,228
Outlays		
Obligations Incurred	$ 4,674,880	$ 4,077,152
Less: Spending Authority from Offsetting Collections and Recoveries of Prior Year Obligations	148,098	162,072
Obligated Balance, Net – Beginning of Period	4,645,202	4,217,513
Less: Obligated Balance, Net – End of Period	5,480,812	4,645,202
Total Outlays	$ 3,691,172	$ 3,487,391

The accompanying notes are an integral part of these statements.

National Science Foundation
Statement of Financing
For the Years Ended September 30, 2001 and 2000
(Amounts in Thousands)

	2001	2000
Obligations and Nonbudgetary Resources		
Obligations Incurred	$ 4,674,880	$ 4,077,152
Less: Spending Authority for Offsetting Collections and Adjustments	(148,098)	(162,072)
Imputed Financing	5,663	4,774
Transfers in (Note 12)	-	227
Exchange Revenue Not in the Budget	(218)	(395)
Nonexchange Revenue Not in the Budget	89	310
Total Obligations and Nonbudgetary Resources	4,532,316	3,919,996
Resources That Do Not Fund Net Cost of Operations		
Changes in Amount of Goods, Services, and Benefits Ordered but not yet Received or Provided	(818,552)	(396,144)
Change in Unfilled Customer Orders	20,141	1,592
Net Cost Capitalized on the Balance Sheet	(47,422)	(76,620)
Prior Period Adjustments	-	24,557
Total Resources That Do Not Fund Net Cost of Operations	(845,833)	(446,615)
Costs That Do Not Require Resources		
Depreciation and Amortization	11,493	10,300
(Gain)/Loss on Disposition of Assets, net	(49)	102
Total Costs that Do Not Require Resources	11,444	10,402
Change in Financing Sources Yet to be Provided (Note 15)	214	727
Net Cost of Operations	$ 3,698,141	$ 3,484,510

The accompanying notes are an integral part of these statements.

Note 1. Summary of Significant Accounting Policies

A. Reporting Entity

The National Science Foundation ("NSF" or "Foundation") is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 U.S.C. 1861-75). Its aim is to promote and advance scientific progress in the United States. NSF initiates and supports basic scientific research and research fundamental to the engineering process and programs to strengthen scientific and engineering research potential. NSF also supports science and engineering education programs at all levels in all fields of science and engineering. NSF funds research and education in science and engineering by awarding grants and contracts to educational and research institutions in all parts of the United States. NSF, by law, cannot operate research facilities. By award, NSF enters into relationships to fund the research operations conducted by grantees.

NSF is led by a presidentially-appointed director and the policy-making National Science Board ("The Board"). This Board, composed of 24 members, represents a cross section of American leaders in science and engineering research and education, who are appointed by the President for six-year terms. The NSF Director is a member *ex officio* of the Board.

NSF is authorized by section 11(f) of the NSF Act [42 U.S.C. 1870(f)], to receive and use funds donated by others, if such funds are donated without restriction other than they be used in the furtherance of the mission of the Foundation. These donations are funds received from foreign governments, private companies, academic institutions, non-profit foundations, and individuals. Donated funds are accepted into the NSF Trust Fund account either as unrestricted or as earmarked contributions to specific NSF programs that the Foundation holds in trust for disbursal to its awardees. Foreign donations are deposited initially in a commercial bank as a convenient wire-transfer depository. When needed for program support purposes, they are transferred into an account at the U.S. Treasury. Interest earnings on the commercial bank deposits are used for the same purposes as the principal donations. Funds are made available for obligation as necessary to support NSF programs.

B. Basis of Presentation

These financial statements have been prepared to report the financial position and results of operations of NSF as required by the Chief Financial Officers Act of 1990, the Government Management Reform Act of 1994, and the Reports Consolidation Act of 2000. They have been prepared from the books and records of NSF in accordance with generally accepted accounting principles in the United States of America. These statements are therefore different from the financial reports, also prepared by NSF pursuant to OMB directives, that are used to monitor and control NSF's use of budgetary resources.

C. Basis of Accounting

The accompanying financial statements have been prepared using the accrual method in addition to recognizing certain budgetary transactions. Under the accrual method, revenues are recognized when earned and expenses are recognized when a liability is incurred, without regard to receipt or payment of cash. Budgetary accounting facilitates compliance with legal constraints and controls over the use of federal funds. NSF records grant expenses from expenditure reports submitted by the grantees. Grantees may be on either an accrual or cash basis of accounting, and NSF records amounts as reported.

D. Revenues and Other Financing Sources

NSF receives the majority of its funding through appropriations contained in the Departments of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Act. NSF receives both annual and multi-year appropriations that may be expended, within statutory limits. Additional amounts are obtained through reimbursements for services provided to and allocation transfers

from other federal agencies and donations to the Trust Fund account. Also, NSF receives interest earned on overdue receivables and excess cash advances to grantees. The interest earned on overdue receivables is returned to the Treasury. Interest earned on excess cash advances to grantees is sent directly to the Department of Health and Human Services (HHS) in accordance with OMB Circular A-110, *Uniform Administrative Requirements for Grants and Agreements with Institutions of Higher Education, Hospitals and Other Non Profit Organizations.*

Appropriations are recognized as a financing source at the time the related "funded" program or administrative expenses are incurred. Appropriations are recognized when used to purchase property, plant and equipment. "Unfunded" liabilities result from Liabilities Not Covered by Budgetary Resources and will be paid when future appropriations are made available for these purposes. Donations are recognized as revenues when funds are received. Revenues from reimbursable agreements are recognized when the services are provided and the related expenditures are incurred. Reimbursable agreements are mainly for grant administrative services provided by NSF on behalf of other federal agencies.

E. Fund Balance with Treasury and Cash

Cash receipts and disbursements are processed by the Treasury. The Fund Balance with Treasury is comprised primarily of appropriated funds that are available to pay current liabilities and finance authorized purchase commitments, but also includes non-appropriated funding sources from donations and other revenue received from an NSF cooperative agreement to register Internet domain names.

NSF has also established commercial bank accounts to hold some donated funds in trust, in interest bearing accounts as permitted by the contributors. These funds are collateralized by the bank through the U.S. Treasury.

F. Accounts Receivable, Net

Accounts Receivable consists of amounts due from governmental agencies, private organizations, and individuals. NSF establishes an allowance for accounts receivable from private sources that are deemed uncollectible, but regards amounts due from other federal agencies as fully collectible. Due to the small number and dollar amount of the private receivables, NSF analyzes each account independently to assess collectability and the need for an offsetting allowance or write-off.

G. Advances

Advances consist of advances to grantees, contractors and employees. Advance payments are made to grant recipients so that recipients may incur expenses related to the approved grant. Payments are only made within the amount of the recorded grant obligation and are intended to cover immediate cash needs. At the end of the fiscal year, the total amount paid to the grantees is compared with total grant expenditures for the year. Total grant expenditures for the year includes an estimate of fourth quarter amounts due and payable to grantees. The estimate is compiled using historical grantee expenditure data. For those grantees with advance payments exceeding expenditures, the aggregate difference is reported as an advance. Additionally, for those grantees with expenditures exceeding advance payments, the aggregate difference is reported as a grant liability. Advances to contractors are payments made in advance of incurring expenses. Advances to employees are related to travel. Advances are reduced when documentation supporting expenditures is received.

H. General Property, Plant and Equipment (PP&E)

General Property

NSF capitalizes acquisitions with costs exceeding $25,000 and useful lives exceeding two years. Acquisitions not meeting these criteria are recorded as operating expenses. NSF currently reports capitalized PP&E at original acquisition cost; assets acquired from General Services Administration's (GSA) excess property schedules are recorded at the value assigned by the donating agency; assets transferred in from other agencies are at the cost recorded by the transferring entity for the asset net of accumulated depreciation or amortization. Depreciation expense is calculated using the straight-line method. The economic life classifications for capitalized assets are as follows:

Equipment

5 years	-	computers and peripheral equipment, fuel storage tanks, laboratory equipment, and vehicles
7 years	-	communications equipment, office furniture and equipment, pumps and compressors
10 years	-	generators, Department of Defense equipment

Aircraft and Satellites

7 years	-	aircraft and satellites

Buildings and Structures

31.5 years	-	buildings and structures placed in service prior to 1993
39 years	-	buildings and structures placed in service after 1993

Internal Use Software

5 years	-	internal use software

Leasehold Improvements

The economic life of Leasehold Improvements is amortized over the number of years remaining on the lease for the NSF headquarters building. In FY 2001, Leasehold Improvements completed during FY 2000 were amortized over 12 years, which represents the remaining years on NSF's lease with GSA.

The PP&E balance consists of Equipment, Aircraft and Satellites, Buildings and Structures, Leasehold Improvements, and Construction in Progress (CIP). Costs are accumulated in construction in progress until such time as the project is completed and at that time capitalized and depreciated over the respective useful life of the assets. These balances are comprised of PP&E maintained "in-house" by NSF to support agency operations and PP&E under the U.S. Antarctic Program (USAP). The majority of USAP property is currently the custodial responsibility of Raytheon Technical Services Company, the NSF contractor for the program. Additionally, the U.S. Navy's Space and Naval Warfare Center also has custodial responsibility for some USAP property.

Office Space

The NSF headquarters building is leased through the General Services Administration (GSA). NSF is billed by GSA for the leased space as rent based upon estimated lease payments made by

GSA plus an administrative fee. The cost of the headquarters building is not capitalized by NSF. The cost of leasehold improvements performed by GSA are financed with NSF appropriated funds. The leasehold improvements are capitalized by NSF as they are transferred from CIP upon completion, if the leasehold improvements meet NSF's capitalization threshold. Amortization is calculated using the straight-line method over the lesser of their useful lives or the unexpired lease term.

Internal Use Software

Effective October 1, 2000, NSF began to control, value and report purchased or developed software as tangible property assets, in accordance with the Statement of Federal Financial Accounting Standards (SFFAS) No. 10 – "Accounting for Internal Use Software". NSF identifies software investments as accountable property for items that, in the aggregate cost $500,000 or more to purchase, develop, enhance or modify a new or existing NSF system. All internal use software meeting the capitalization threshold is amortized over a five-year period using the straight-line method.

Assets Owned by NSF in the Custody of Other Entities

NSF supports five Federally Funded Research and Development Centers (FFRDC's). In accomplishing its mission, NSF engages organizations in cooperative agreements to manage, operate, and maintain research facilities for the benefit of the scientific community. NSF funds the acquisition of property and transfers control to the FFRDC's. NSF is prohibited from operating such property directly. In practice, NSF's ownership interest in the PP&E is similar to a reversionary interest. In accordance with agency specific guidance provided by the Federal Accounting Standards Advisory Board (FASAB), NSF is including the acquisition costs of FFRDC property in the Research and Human Capital Activities costs in the Stewardship Investments section as part of the Required Supplementary Stewardship Information. NSF does not capitalize the carrying value of the FFRDC's PP&E, but discloses such information in its financial statements (Note 5) based on information provided by the organizations holding the assets.

I. Advances from Others

Advances from Others consist of amounts obligated and advanced by other federal entities to NSF for grant administration and other services to be furnished under reimbursable agreements. Balances at the end of the year are adjusted by an allocated amount from the fourth quarter grantee expenditure estimate described under Note G, Advances. The amount to be allocated is based on a percentage of the reimbursable grant expenditures, by partner agencies to NSF, to the total grant expenditures.

J. Accounts Payable

Accounts Payable consist of grant liabilities and liabilities to commercial vendors. Grant liabilities are grantee expenses not yet reimbursed by NSF. Accounts payable to commercial vendors are expenses for goods and services received but not yet paid by NSF at the end of the fiscal year. At year end, NSF accrues for the amount of estimated unreimbursed grantee expenses and estimated unpaid expenses to commercial vendors.

K. Annual, Sick and Other Leave

Annual leave is accrued as it is earned, and the accrual is reduced as leave is taken. Each year, the balance in the accrued annual leave account is adjusted to reflect changes. To the extent current and prior-year appropriations are not available to fund annual leave earned but not taken, funding will be obtained from future Salaries and Expenses appropriations. Sick leave and other types of nonvested leave are expensed as taken.

L. Employee Benefits

A liability is recorded for estimated and actual future payments to be made for workers' compensation pursuant to the Federal Employees' Compensation Act (FECA). The liability consists of the net present value of estimated future payments calculated by the U.S. Department of Labor (DOL) and the actual unreimbursed cost paid by DOL for compensation paid to recipients under FECA. The actual costs incurred are reflected as a liability because NSF will reimburse DOL two years after the actual payment of expenses. Future Salaries and Expenses Appropriations will be used for DOL's estimated reimbursement.

M. Net Position

Net position is the residual difference between assets and liabilities and is composed of unexpended appropriations and cumulative results of operations. Unexpended appropriations represent the amount of unobligated and unexpended budget authority. Unobligated balances are the amount of appropriations or other authority remaining after deducting the cumulative obligations from the amount available for obligation. Cumulative results of operations is the net result of NSF's operations since inception.

N. Retirement Plan

In FY 2001, approximately 35 percent of NSF employees participated in the Civil Service Retirement System (CSRS), to which NSF made matching contributions equal to 8.51 percent of pay. The majority of NSF employees are covered by the Federal Employees Retirement System (FERS) and Social Security. A primary feature of FERS is that it offers a thrift savings plan to which NSF automatically contributes 1 percent of pay and matches employee contributions up to an additional 4 percent of pay. NSF also contributes the employer's matching share for Social Security for FERS participants.

Although NSF funds a portion of the benefits under FERS and CSRS relating to its employees and withholds the necessary payroll deductions, the agency has no liability for future payments to employees under these plans, nor does NSF report CSRS, FERS, or Social Security assets, or accumulated plan benefits, on its financial statements. Reporting such amounts is the responsibility of the Office of Personnel Management (OPM) and The Federal Retirement Thrift Investment Board (FRTIB). In FY 2001, NSF's contributions to CSRS and FERS were $3,082,234 and $5,506,810, respectively. In FY 2000, NSF's contributions to CSRS and FERS were $3,215,242 and $5,124,803, respectively.

SFFAS No. 5, *Accounting for Liabilities of the Federal Government*, requires employing agencies to recognize the cost of pensions and other retirement benefits during their employees' active years of service. OPM actuaries determine pension cost factors by calculating the value of pension benefits expected to be paid in the future, and communicate these factors to the agency for current period expense reporting. Information was also provided by OPM regarding the full cost of health and life insurance benefits. In FY 2001, NSF, utilizing cost factors dated October 15, 2001, recognized $2,731,233 of pension expenses, $2,915,028 of post-retirement health benefits expenses and $17,110 of post-retirement life insurance expenses, beyond amounts actually paid. NSF recognized an offsetting revenue of $5,663,371 as an imputed financing source to the extent that these intragovernmental expenses will be paid by OPM. In FY 2000, NSF recognized $2,108,336 of pension expenses, $2,649,643 of post-retirement health benefits expenses and $15,999 of post-retirement life insurance expenses, beyond amounts actually paid. NSF recognized an offsetting revenue of $4,773,978 as imputed financing sources to the extent that these intragovernmental expenses will be paid by OPM.

O. Commitments, Contingencies and Possible Future Costs

Commitments

Commitments are contractual agreements involving financial obligations. NSF is committed for goods and services that have been ordered, but have not yet been delivered.

Contingencies - Claims and Lawsuits

NSF is a party to various legal actions and claims brought against it. In the opinion of NSF management and legal counsel, the ultimate resolution of the actions and claims will not materially affect the financial position or operations of the Foundation. NSF discloses and recognizes the loss in the financial statements when claims are expected to result in a material loss, whether from the Foundation's appropriations or the "Judgment Fund" administered by the Department of Justice under Section 1304 of Title 31 of the United States Code, and, the payment amounts can be reasonably estimated.
Claims and lawsuits have also been made and filed against awardees of the Foundation by third parties. NSF is not a party to these actions and NSF believes there is no possibility that NSF will be legally required to satisfy such claims. Judgments or settlements of the claims against awardees that impose financial obligation on them may be claimed as costs under the applicable contract, grant, or cooperative agreement and thus may affect the allocation of program funds in future fiscal years. In the event that the likelihood of loss on such claims by awardees becomes probable, these amounts can be reasonably estimated and Foundation management determines that it will probably pay them, NSF will recognize these potential payments as expenses.

Environmental Costs

NSF manages the U.S. Antarctic Program. The Antarctic Conservation Act and its implementing regulations impose requirements for environmental cleanup in the Antarctica. NSF continually monitors the U.S. Antarctic Program in regards to environmental issues. Each year NSF puts forth a plan to assess and correct environmental concerns for projects that took place prior to NSF's operation of the Antarctic Program.

A significant project NSF is currently undertaking is limited clean up of a former research station at Cape Hallett, in cooperation with Antarctic New Zealand. The station was jointly operated by the U.S. and New Zealand from 1957 to 1973. The full extent of the clean up activities required at Cape Hallett has yet to be determined in the context of the Antarctic Conservation Act.

P. Use of Estimates

The preparation of the accompanying financial statements requires management to make estimates and assumptions about certain estimates included in the financial statements. Actual results will invariably differ from those estimates.

Q. Tax Status

NSF, as a federal agency, is not subject to federal, state, or local income taxes and, accordingly, no provision for income taxes is recorded.

R. Reclassifications

Certain reclassifications have been made to prior year amounts to conform to the current year presentation.

S. Accounting Standards Adopted in FY 2001

Effective October 1, 2000, NSF adopted the provision of SFFAS No. 10, *Accounting for Internal Use Software*, and SFFAS No. 21, *Reporting Corrections of Errors and Changes in Accounting Principles*.

Note 2. Fund Balance with Treasury

Fund Balance with Treasury consisted of the following components as of September 30, 2001 and 2000:

(Amounts in Thousands)

	2001				2000
	Appropriated Funds	Trust Funds	Other Funds	Total	Total
Obligated	$ 5,449,887	$ 12,429	$ 18,202	$ 5,480,518	$ 4,644,881
Unobligated Available	135,034	17,675	318	153,027	164,574
Unobligated Unavailable	86,539	-	227	86,766	83,310
Total Fund Balance	$ 5,671,460	$ 30,104	$ 18,747	$ 5,720,311	$ 4,892,765

"Other Funds" consists of $18,202,155 and $28,405,674, as of September 30, 2001and 2000, respectively, received from a corporation that registered second level Internet domain names under NSF cooperative agreement and nonexpenditure transfer authorizations, deposits, holdings, and miscellaneous receipt accounts. The nonexpenditure transfer authorizations are appropriation allocations from other government agencies and include 14,926,765 and 15,826,073 Indian rupees converted as of September 30, 2001 and 2000, respectively, to U.S. dollars at the prevailing Treasury rate of 47 rupees to $1 US, or $317,591 and 45.6 rupees to $1 US, or $347,063, respectively.

The Trust Fund includes amounts donated to NSF. Other Funds and Trust Funds are restricted for intended purposes. Unavailable balances include recovered expired appropriations and other amounts related to expired authority and holdings, which are unavailable for NSF use.

Note 3. Accounts Receivable, Net

Intragovernmental

The Intragovernmental Accounts Receivable consists of reimbursements and repayments due from other government agencies. As of September 30, 2001 and 2000, the amount of intragovernmental accounts receivable was $5,587,648 and $3,996,660, respectively.

Public

As of September 30, 2001 and 2000, Accounts Receivable (net) due from private organizations and individuals consisted of:

(Amounts in Thousands)

	2001	2000
Accounts Receivable	$ 9,058	$ 8,841
Allowance for Uncollectible Accounts	(8,183)	(8,183)
Net Amount Due	$ 875	$ 658

As of September 30, 2001 and 2000, the reconciliation of the allowance for uncollectible accounts is as follows:

(Amounts in Thousands)

	2001	2000
Beginning Allowance	$ 8,183	$ 298
Additions	26	7,929
Reduction (write-offs)	(26)	(44)
Ending Allowance	$ 8,183	$ 8,183

An allowance was set up in FY 2000 for $7,929,465, which represents the allowance for a receivable from a grantee that filed for dissolution. The receivable has been forwarded to the Department of Justice, as required by OMB Circular A-129 and U.S.C. 31 Section 3711, for concurrence on the termination of debt.

Note 4. Advances

As of September 30, 2001 and 2000, Advances consisted of the following components:

(Amounts in Thousands)

	2001	2000
Advances to Grantees	$ 63,004	$ 50,634
Advances to Contractors	677	15,359
Advances to Employees	-	7
Advances to Others – Federal	2,457	3,696
Total Advances	$ 66,138	$ 69,696

Note 5. General Property, Plant and Equipment, Net

The components of General Property, Plant and Equipment as of September 30, 2001 and 2000 were:

(Amounts in Thousands)

	2001			2000
	Acquisition Cost	Accumulated Depreciation	Net Book Value	Net Book Value
Equipment	$ 62,822	49,518	13,304	$ 11,590
Aircraft and Satellites	94,207	87,185	7,022	11,928
Buildings and Structures	84,691	36,786	47,905	49,514
Construction in Progress	133,054	-	133,054	94,330
Internal Use Software	2,175	218	1,957	-
Total PP&E	$ 376,949	173,707	203,242	$ 167,362

As of September 30, 2001 and 2000, the book values (net of accumulated depreciation) of PP&E owned by NSF but in the custody of FFRDC's included the following.

(Amounts in Thousands)

FFRDC	2001	2000
National Astronomy and Ionosphere Center (NAIC)	$ 41,053	$ 43,832
National Center for Atmospheric Research (NCAR)	20,977	25,933
National Optical Astronomy Observatories (NOAO)	37,419	40,974
National Radio Astronomy Observatories (NRAO)	102,829	96,309
The Science and Technology Policy Institute (STPI)	-	-
Total	$ 202,278	$ 207,048

Note 6. Other Liabilities

Other Liabilities represent current accrued employer contributions for payroll and benefits, disbursements in transit, accrued payroll and benefits, and various employee related liabilities for payroll and benefit deductions. As of September 30, 2001 and 2000, Other Liabilities consisted of the following:

(Amounts in Thousands)

	2001	2000
Intragovernmental		
Employer Contributions for Payroll Benefits	$ 244	$ 219
(Deposits)/Disbursements in Transit	(136)	1,000
Total Other Intragovernmental Liabilities	108	1,219
Other Liabilities		
Accrued Payroll and Benefits	2,707	3,312
State and Other Income Taxes Withheld	217	480
Disbursements in Transit	275	91
Employee Deductions for U.S. Savings Bonds	8	7
Total Other Liabilities	$ 3,207	$ 3,890

Note 7. Liabilities Not Covered by Budgetary Resources

Certain liabilities are not funded by current budgetary resources. As of September 30, 2001 and 2000, Liabilities Not Covered by Budgetary Resources consisted of the following:

(Amounts in Thousands)

	2001	2000
Intragovernmental: Employee Benefits	$ 296	$ 335
Employee Benefits	1,806	1,767
Accrued Annual Leave	9,660	9,295
Liabilities Not Covered by Budgetary Resources to Fund Cost of Operations	$ 11,762	$ 11,397
Lease Liabilities	451	602
Total Liabilities Not Covered By Budgetary Resources	$ 12,213	$ 11,999

Note 8. Employee Benefits

Employee Benefits consisted of the following components as of September 30, 2001 and 2000:

(Amounts in Thousands)

	2001	2000
Intragovernmental: Unreimbursed Actual Costs	$ 296	$ 335
Estimated Liability	1,806	1,767
Total Workers' Compensation Benefits	$ 2,102	$ 2,102

For FYs 2001 and 2000, these amounts represent $296,462 and $335,204 respectively, of unreimbursed cost to the Department of Labor (DOL) for actual compensation paid to recipients under Federal Employee's Compensation Act (FECA). FECA provides income and medical cost protection to cover federal employees injured on the job or who have a work-related injury or occupational disease, and beneficiaries of employees whose death is attributable to a job related injury or occupational disease. The U.S. Department of Labor initially pays valid claims and then bills the employing federal agency.

As of September 30, 2001 and 2000 the estimated liability of $1,806,000 and $1,767,000, respectively, are for future worker's compensation calculated by DOL and includes the expected liability for death, disability, medical, and miscellaneous costs for approved compensation cases. The liability is determined using a method that utilizes historical benefit payment patterns related to a specific incurred period and annual benefit payments discounted to present value using OMB's economic assumptions for 10-year Treasury notes and bonds. To account for the effects of inflation on the liability, wage and medical inflation factors are applied to the calculation of future benefits.

Note 9. Lease Liabilities

NSF maintains capital leases for certain equipment. The lease periods range from four to five years and the capitalized cost of the lease payments are amortized over the life of the lease. As of September 30, 2001 and 2000, the capitalized cost of equipment under lease was approximately $797,000. Related accumulated amortization as of September 30, 2001 and 2000, was approximately $372,000 and $211,000, respectively. Capital lease liabilities are considered unfunded as of September 30, 2001 and 2000. As of September 30, 2000, the total Capital Lease Liability was $602,000. Future payments under capital leases as of September 30, 2001 are:

(Amount in thousands)

Future Lease Payments:		
	Fiscal Year 2002	209
	Fiscal Year 2003	165
	Fiscal Year 2004	123
	Fiscal Year 2005	28
Total		525
Less: Imputed Interest		74
Total Capital Lease Liability		$ 451

Note 10. Unexpended Appropriations

Unexpended Appropriations consisted of the following components as of September 30, 2001 and 2000:

(Amounts in Thousands)

	2001	2000
Unobligated:		
Available	$ 135,058	$ 143,010
Unavailable	86,539	82,823
Undelivered Orders	5,121,949	4,315,798
Total Unexpended Appropriations	$ 5,343,547	$ 4,541,631

The Undelivered Orders balance, in the above table, does not include the Undelivered Orders balances of the Trust Fund account. Total undelivered orders as of September 30, 2001 and 2000 amounted to $5,138,405 and $4,329,524, respectively.

Note 11. Statement of Net Cost

Major Program Descriptions

NSF's primary business is to make merit-based grants and cooperative agreements to individual researchers and groups, in partnership with colleges, universities, and other public, private, state, local, and federal institutions, throughout the U.S. By providing these resources, NSF contributes to the health and vitality of the U.S. research and educational systems, which enables and enhances the Nation's capacity to sustain growth and prosperity. These grants are managed through eight programmatic organizations within NSF that review and evaluate competitive proposals submitted by the science and engineering community for its consideration.

NSF is a singular entity for net cost reporting purposes. The NSF programmatic organizations are the Directorates for the Biological Sciences; Computer and Information Science and Engineering; Education and Human Resources; Engineering; Geosciences; Mathematical and Physical Sciences; Social, Behavioral and Economic Sciences; and the Office of Polar Programs.

The Statement of Net Cost was updated in FY 2001 to align with NSF's new strategic outcome goals of People, Ideas and Tools, which represents a change in the cost categorization utilized in FY 2000. These FY 2001 goals are outlined in NSF's Strategic Plan for 2001-2006 (www.nsf.gov/od/grpa) and FY 2001 Budget Request (www.nsf.gov/bfa). In pursuit of its mission, NSF organizations make investments in:

- PEOPLE - to develop a diverse, internationally competitive and globally engaged workforce of scientists, engineers and well-prepared citizens. This goal supports the parts of NSF's mission that are directed at (1) programs to strengthen scientific and engineering research potential; and (2) science and engineering education programs at all levels and in all fields of science and engineering.

- IDEAS - to provide a deep and broad fundamental science and engineering knowledge base. This goal supports the parts of NSF's mission directed at basic scientific research and research fundamental to the engineering process.

- TOOLS - to provide widely accessible, state-of-the-art science and engineering infrastructure. This goal supports the parts of NSF's mission directed at (1) programs to strengthen scientific and engineering research potential; and (2) an information base on science and engineering appropriate for development of national and international policy.

Over 95 percent of NSF's investments are directly related to the People, Ideas, and Tools (PIT) strategic areas of focus. A fourth investment is made to support management and administrative activities of NSF. All costs are assigned to the three strategic PIT areas.

In FY 2000, NSF organizations made investments in science and engineering in two functional program areas: (1) research projects and related programs and (2) education programs. Over 95 percent of NSF's costs are directly related to these investments. A third investment is made to support management and administration activities of NSF. All costs are assigned to these two functional program areas.

- Research programs provide investments in cutting edge research that yields new discoveries. These investments help to maintain the Nation's capacity to excel in science and engineering, particularly in academic institutions. NSF provides support for large, state-of-the-art multi-user research facilities that otherwise would be unavailable to academic scientists, and for staff and support personnel to assist scientists and engineers in conducting research at facilities.

- Education programs help ensure that an adequate, well-prepared workforce of scientists and engineers can maintain leadership in science and technology, both now and in the future and help all students to achieve the mathematics and science skills needed to thrive in an increasingly technological society.

In both FYs 2001 and 2000, support management and administration activities include Salary & Expenses and Inspector General (IG) investments. Salary & Expenses and IG investments provide for salaries and benefits of persons employed at the NSF; general operating expenses, including key activities to advance the NSF information systems technology and to enhance staff training, audit and Inspector General activities, and OPM and DOL benefits costs paid on behalf of NSF. These indirect costs are allocated to NSF programs based on each program's direct costs.

In accordance with crosswalks issued by the Department of the Treasury for this statement in TFM S2-01-02, costs incurred for services provided by other federal entities are reported in the full costs of NSF programs and are identified as "intragovernmental." All earned revenues are funding sources provided through reimbursable agreements with other federal entities and are retained by NSF. Earned revenues are recognized when the related program or administrative expenses are incurred and are deducted from the full cost of the programs to arrive at the net cost of operating NSF's programs.

Gross Cost and Earned Revenue by Budget Functional Classification

Total Gross Cost and Earned Revenue by Budget Functional Classification for FYs 2001 and 2000 were as follows:

(Amounts in Thousands)

	2001		
Budget Functional Classification	Gross Cost	Earned Revenue	Net Cost
NSF – General Science, Space and Technology (Code 250)	$ 3,779,370	81,229	$ 3,698,141

	2000		
Budget Functional Classification	Gross Cost	Earned Revenue	Net Cost
NSF – General Science, Space and Technology (Code 250)	$ 3,568,726	$ 84,216	$ 3,484,510

Intra-governmental Gross Cost and Earned Revenue by Budget Functional Classification for FYs 2001 and 2000 were as follows:

(Amounts in Thousands)

	2001		
Budget Functional Classification	Gross Cost	Earned Revenue	Net Cost
NSF – General Science, Space and Technology (Code 250)	$ 125,823	$ 81,229	$ 44,594

	2000		
Budget Functional Classification	Gross Cost	Earned Revenue	Net Cost
NSF – General Science, Space and Technology (Code 250)	$ 132,790	$ 84,216	$ 48,574

Note 12. Transfers In

In FY 2000, the National Oceanic and Atmospheric Administration transferred to NSF the control over a satellite (GOES-3) with a book value of $226,805 (cost $22,680,503; accumulated depreciation $22,453,695). The GOES-3 provides wideband communications in support of scientific research and mission operations for NSF's U.S. Antarctic Program (USAP).

Note 13. Prior Period Adjustment

FY 2000 financial statements have been restated to capitalize costs amounting to approximately $32,861,000 related to aircraft conversion and modification costs that were previously expensed. Of the capitalized costs, approximately $8,300,000 was incurred in FY 2000 and $24,557,000 was incurred prior to FY 2000. In previous years these costs were expensed as incurred based on the determination that the conversion and modification costs did not meet the criteria for capitalization. The initial book value of the aircraft was determined through independent appraisal evaluation in December of 1998. Conversion costs incurred after the initial valuation appraisal are accumulated in construction in progress until the aircraft modifications are completed and then capitalized and depreciated.

Note 14. Budget Authority

Budget Authority includes $28,093,355 and $39,668,734 of donations and interest as of September 30, 2001 and 2000, respectively. Budget Authority was increased for non-expenditure transfers from the U.S. Agency for International Development for $14,000,000 in 2001, and $15,675,000 in 2000. Budget Authority as of September 30, 2001 and 2000 was also adjusted for Congressional initiated rescissions contained in P.L. 106-554 totaling $9,736,000 and P.L. 106-113 totaling $14,866,000, respectively.

NSF maintains permanent indefinite appropriations for Research and Related Activities - 49x0100, Major Research Equipment - 49x0551, H-1B Nonimmigrant Petitioner fees - 49x5176, and Trust Fund donations - 49x8960.

The status of Budgetary Resources as of September 30, 2001 and 2000, consisted of Budgetary Resources obligated of $4,674,880,022 and $4,077,151,700 respectively, available authority of $152,248,733 and $144,593,277, respectively, and unavailable authority of $87,023,596 and $102,482,687, respectively.

Note 15. Change in Financing Sources Yet to Be Provided

For the years ended September 30, 2001 and 2000, the Changes in Financing Sources Yet to be Provided are represented by changes in Liabilities Not Covered by Budgetary Resources to Fund Cost of Operations as follows:

(Amounts in Thousands)	**2001**	**2000**
Total Liabilities Not Covered by Budgetary Resources, End of year (see Note 7)	$ 12,213	$ 11,999
Less: Total Liabilities Not Covered by Budgetary, Beginning of year (see Note 7)	11,999	11,272
Change in Financing Sources Yet to be Provided	$ 214	$ 727

Required Supplementary Information

Budgetary Resources by Major Budgetary Accounts

In the following table, NSF budgetary information for the fiscal years ended September 30, 2001 and 2000, as presented in the Statement of Budgetary Resources, is disaggregated for each of NSF's major budgetary accounts.

Budgetary Resources by Major Budgetary Accounts (Unaudited)

	2001					2000
	(Amounts in Thousands)					
	Research and Related	**Education**	**Major Research Equipment**	**OIG and Salary Expense**	**Total**	**Total**
Budgetary Resources						
Budget Authority	$ 3,384,377	873,940	121,332	167,352	4,547,001	$ 4,001,238
Unobligated Balances – Beginning of Period	79,702	94,228	70,975	2,171	247,076	187,607
Spending Authority from Offsetting Collections	76,514	20,806	-	3,824	101,144	85,498
Adjustments	15,038	3,558	28	307	18,931	49,885
Total Budgetary Resources	$ 3,555,631	992,532	192,335	173,654	4,914,152	$ 4,324,228
Status of Budgetary Resources						
Obligations Incurred	$ 3,486,830	897,348	119,242	171,460	4,674,880	$ 4,077,152
Unobligated Balances – End of Period – Available	19,146	59,928	73,093	82	152,249	144,593
Unobligated Balances – End of Period – Not Available	49,655	35,256	-	2,112	87,023	102,483
Total Status of Budgetary Resources	$ 3,555,631	992,532	192,335	173,654	4,914,152	$ 4,324,228
Outlays						
Obligations Incurred	$ 3,486,830	897,348	119,242	171,460	4,674,880	$ 4,077,152
Less: Spending Authority from Offsetting Collections and Adjustments	106,277	36,198	28	5,595	148,098	162,072
Obligated Balance, Net – Beginning of Period	3,483,268	1,048,392	86,476	27,066	4,645,202	4,217,513
Less: Obligated Balance, Net – End of Period	3,996,637	1,300,605	158,613	24,957	5,480,812	4,645,202
Total Outlays	$ 2,867,184	608,937	47,077	167,974	3,691,172	$ 3,487,391

Required Supplementary Information

Intragovernmental Balances and Deferred Maintenance

Intragovernmental Assets by Partner Agency (Unaudited)

Intragovernmental assets on this schedule support the intragovernmental asset line items on NSF's Balance Sheets as of September 30, 2001 and 2000. Intragovernmental balances included in Fund Balance with Treasury as of September 30, 2001 and 2000, consisted of the following:

(Amounts in Thousands)

Agency	2001	2000
Department of the Treasury	$ 5,719,993	$ 4,892,598
Department of State	318	167
Total	$ 5,720,311	$ 4,892,765

Intragovernmental Accounts Receivable balances as of September 30, 2001 and 2000, consisted of the following:

Agency	2001	2000
Department of the Air Force	$ 5,155	$ 3,782
Department of Defense	206	182
Department of the Navy	185	17
U.S. Army Corp. Of Engineers	24	-
Department of the Army	18	8
Other	-	8
Total	$ 5,588	$ 3,997

Intragovenmental Liabilities by Partner Agency (Unaudited)

Agency	2001			2000		
	Advances From Others	Accounts Payable	Employee Benefits	Advances from Others	Accounts Payable	Employee Benefits
Department of Education	$ 34,639	$ -	$ -	$ 20,235	$ -	$ -
National Aeronautics and Space Administration	22,499	(80)	-	15,998	-	-
Department of Health and Human Services	19,022	-	-	17,736	-	-
Department of Energy	11,017	-	-	8,012	1,000	-
Department of Commerce	6,072	-	-	7,321	-	-
Office of the Secretary – Defense Agencies	5,664	-	-	10,571	-	-
Department of the Army	2,813	-	-	3,190	-	-
Department of Housing and Urban Development	1,922	-	-	1,525	-	-
Environmental Protection Agency	1,683	-	-	1,342	-	-
Department of the Air Force	1,618	-	-	910	-	-
Department of Transportation	1,490	-	-	1,319	-	-
General Services Administration	1,049	(51)	-	456	-	-
Department of Agriculture	999	(1)	-	1,219	-	-
Department of the Interior	891	-	-	876	-	-
Department of State	677	-	-	597	-	-
Department of the Navy	608	-	-	1,211	-	-
National Foundation on the Arts and Humanities	443	-	-	1,214	-	-
National Archives and Records Administration	414	-	-	402	-	-
Department of Labor	331	-	296	470	-	335
Department of Justice	327	-	-	451	-	-
Federal Emergency Management Agency	277	-	-	476	-	-
Department of the Treasury	180	(4)	-	250	-	-
Central Intelligence Agency	126	-	-	274	-	-
Office of Personnel Management	-	244	-	-	219	-
Other	364	-	-	328	-	-
Total	$ 115,125	$ 108	$ 296	$ 96,383	$ 1,219	$ 335

Deferred Maintenance (Unaudited)

NSF performs condition assessment surveys of capitalized property, plant and equipment to determine if any maintenance is needed to keep an asset in an acceptable condition or restore an asset to a specific level of performance. NSF considers deferred maintenance to be any maintenance that is not performed on schedule, unless it is determined from the condition of the asset that scheduled maintenance does not have to be performed. Also, deferred maintenance includes any other type of maintenance that, if not performed, would render the PP&E non-operational. Circumstances such as non-availability of parts or funding are considered reasons for deferring maintenance. Maintenance is not considered deferred if an asset is classified as non-critical and non-operational.

NSF considered whether any scheduled maintenance necessary to keep fixed assets of the agency in an acceptable condition was deferred at the end of FYs, 2001 and 2000. NSF defines acceptable operating condition in accordance with standards comparable to those used in the private industry.

In FY 2000, the total amount of deferred maintenance was $7,000 for one item of heavy mobile equipment.

During FY 2001, NSF completed the maintenance deferred from FY 2000. In addition, NSF determined that scheduled maintenance on twelve items of equipment was not completed and was deferred or delayed for a future period. The items included, four pieces of heavy mobile equipment, seven pieces of light mobile equipment and one generator. All the equipment is considered to be in fair condition and critical to NSF's operations. NSF estimated that the equipment requires $84,050 in maintenance.

Required Supplementary Stewardship Information

Stewardship Investments

Stewardship Investments
Research and Human Capital

(Amounts in Thousands)
(Unaudited)

	2001	2000	1999	1998
Research and Human Capital Activities				
Basic Research	$ 2,692,243	$ 2,636,518	$ 2,507569	$ 2,411,774
Applied Research	211,421	173,670	188,742	209,719
Education and Training	704,949	596,517	599,323	588,158
Non-Investing Activities	170,757	162,021	143,980	147,617
Total Research and Human Capital Activities	$ 3,779,370	$ 3,568,726	$ 3,439,614	$ 3,357,268
Inputs, Outputs and/or Outcomes				
Research and Human Capital Activities				
Investments In:				
Universities	$ 2,631,405	$ 2,470,300	$ 2,385,492	$ 2,215,535
Industry	162,176	160,573	154,555	151,064
Federal Agencies	125,823	132,790	150,959	163,101
Small Business	130,977	119,345	110,884	105,247
Others	728,989	685,718	637,724	722,321
	$ 3,779,370	$ 3,568,726	$ 3,439,614	$ 3,357,268
Support to:				
Scientist	$ 355,261	$ 359,228	$ 350,841	$ 352,513
Postdoctoral Programs	128,499	117,504	120,386	120,862
Graduate Students	362,820	315,583	323,324	322,298
	$ 846,580	$ 792,315	$ 794,551	$ 795,673
Outputs & Outcomes: Number of:				
Awards	20,357	19,673	19,518	17,994
Years of Scientist Support	5,759	5,518	5,054	5,056
Scientists Supported	27,215	24,134	23,108	23,213
Postdoctorals Supported	5,576	4,781	4,391	4,459
Graduate Students Supported	25,479	21,663	20,156	19,517

NSF's role in achieving performance goals in science and engineering leads to investments in integrative research and human capital activities to enhance the potential for important discoveries or new knowledge with expected future benefits to our society. Because of the close connections between the investments in performing research and building a research base of skilled scientist and engineers through academic and training opportunities, expenses incurred by NSF are presented as overall stewardship investments for NSF for performance measurement. The outputs and outcomes of NSF investments in the research and academic community resulted in a number of grants awarded and scientists and students supported.

III. INDEPENDENT AUDITORS' REPORT AND MANAGEMENT'S RESPONSE

February 26, 2002

To: Dr. Eamon M. Kelly
Chairman, National Science Board

Dr. Rita Colwell
Director, National Science Foundation

From: Christine C. Boesz, Dr. P.H.
Inspector General

Subject: Audit of the National Science Foundation's
Fiscal Years 2001 and 2000 Financial Statements

This memorandum transmits KPMG LLP's report on its Fiscal Years 2001 and 2000 financial statement audit of the National Science Foundation (NSF).

Results of Independent Audit

The Chief Financial Officer's (CFO) Act of 1990 (P.L. 101-576), as amended, requires NSF's Inspector General or an independent external auditor, as determined by the Inspector General, to audit the Foundation's financial statements. Under a contract monitored by the Office of Inspector General (OIG), KPMG, an independent public accounting firm, performed an audit of NSF's Fiscal Years 2001 and 2000 financial statements. The contract required that the audit be performed in accordance with the Government Auditing Standards issued by the Comptroller General of the United States, and Bulletin 01-02, *Audit Requirements for Federal Financial Statements*, issued by the United States Office of Management and Budget.

KPMG issued an unqualified opinion on NSF's financial statements. In its Report on Internal Controls Over Financial Reporting, KPMG identified two reportable conditions relating to (1) post-award procedures for monitoring awardees' administrative and financial management practices and tracking of NSF-owned property, plant and equipment in the custody of awardees, and (2) entity-wide information security. In its Report on Compliance with Laws and Regulations, KPMG identified one instance of noncompliance with the Federal Financial Management Improvement Act of 1996 (FFMIA) relating to Federal financial management system requirements. This noncompliance pertains to the finding reported in the Report on Internal Control concerning physical and logical access controls.

NSF management disagrees with the facts and circumstances regarding each of the reportable conditions, as well as the designation of these matters as reportable conditions.

NSF management also disagrees with the finding of non-compliance with FFMIA. Management's response is located in Attachment 1.

Evaluation of KPMG's Audit Performance

To fulfill our responsibilities under the CFO Act of 1990, as amended, and other related financial management legislation, the Office of Inspector General:

- Reviewed KPMG's approach and planning of the audit;
- Evaluated the qualifications and independence of the auditors;
- Monitored the progress of the audit at key points;
- Examined working papers related to assessing internal controls over NSF's financial reporting process;
- Coordinated periodic meetings with NSF management to discuss audit progress, findings and recommendations;
- Reviewed KPMG's audit report to ensure compliance with Government Auditing Standards and Office of Management and Budget Bulletin No. 01-02;
- Coordinated issuance of the audit report; and
- Performed other procedures that we deemed necessary.

Due to the timing for completing the NSF Fiscal Year 2001 Accountability Report, we have not yet completed our review of the working papers prepared by KPMG.

KPMG is responsible for the attached auditor's report, dated January 18, 2002, and the conclusions expressed therein. Our review, as differentiated from an audit in accordance with auditing standards generally accepted in the United States of America, was not intended to enable us to express, and accordingly we do not express, an opinion on NSF's financial statements and report on NSF's internal control over financial reporting and compliance with laws and regulations. Nevertheless, we believe that KPMG's work provides a reasonable basis for its report.

The Office of Inspector General appreciates the courtesies and cooperation extended to KPMG LLP and OIG staff by NSF during the audit. If you or your staff have any questions, please contact me or Deborah H. Cureton, Associate Inspector General for Audit.

cc: Dr. Stanley V. Jaskolski, Chair, Audit and Oversight Committee

2001 M Street, N.W.
Washington, D.C. 20036

INDEPENDENT AUDITORS' REPORT

Dr. Eamon M. Kelly
Chairman, National Science Board

Dr. Rita Colwell
Director, National Science Foundation

We have audited the accompanying balance sheets of the National Science Foundation (NSF) as of September 30, 2001 and 2000, and the related statements of net cost, changes in net position, budgetary resources, and financing (hereinafter collectively referred to as the "financial statements") for the years then ended. The objective of our audits was to express an opinion on the fair presentation of these financial statements. In connection with our audits, we also considered NSF's internal control over financial reporting and tested NSF's compliance with certain provisions of applicable laws and regulations that could have a direct and material effect on its financial statements.

SUMMARY

As stated in our opinion on the financial statements, we conclude that NSF's financial statements as of and for the years ended September 30, 2001 and 2000, are presented fairly, in all material respects, in conformity with accounting principles generally accepted in the United States of America.

As a result of our consideration of internal control over financial reporting, we identified the following conditions that we consider to be reportable conditions but not material weaknesses:

- ***Post-award Management*** - Adequate procedures for monitoring (i) awardees' administrative and financial management practices and compliance with laws and regulations, and (ii) NSF-owned property, plant and equipment in awardees' custody are not in place.

- ***Information Security*** - NSF has several weaknesses in its entity-wide information security that result in vulnerabilities in logical and physical access controls.

The results of our tests of compliance with certain provisions of laws and regulations, exclusive of those referred to in the Federal Financial Management Improvement Act (FFMIA) of 1996, disclosed one instance of potential noncompliance in Fiscal Year (FY) 2000 that was required to be reported under *Government Auditing Standards,* issued by the

Comptroller of the United States, and Office of Management and Budget (OMB) Bulletin No. 01-02, *Audit Requirements for Federal Financial Statements.* This matter related to potential noncompliance with Federal appropriations law arising from NSF expending funds from its Research and Related Activities appropriation to supplement potential shortfalls in its Major Research Equipment appropriation for a large international project. This potential noncompliance with law was identified in a report issued by the NSF Office of Inspector General in December 2000. This condition was resolved during FY 2001.

Our tests of compliance with FFMIA section 803(a) requirements disclosed an instance where NSF's financial management systems did not substantially comply with Federal financial management systems requirements.

NSF management disagrees with the facts and circumstances regarding each of the reportable conditions, as well as the designation of these matters as reportable conditions. NSF management also disagrees with the finding of non-compliance with FFMIA. Management's response is located in Attachment 1.

The following sections discuss our opinion on NSF's financial statements, our consideration of NSF's internal control over financial reporting, our tests of NSF's compliance with certain provisions of applicable laws and regulations, and management's and our responsibilities.

OPINION ON FINANCIAL STATEMENTS

We have audited the accompanying balance sheets of the National Science Foundation as of September 30, 2001 and 2000, and the related statements of net cost, changes in net position, budgetary resources, and financing for the years then ended.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the National Science Foundation as of September 30, 2001 and 2000, and its net cost, changes in net position, budgetary resources, and reconciliation of net cost to budgetary obligations for the years then ended, in conformity with accounting principles generally accepted in the United States of America.

NSF adopted the provisions of Statement of Federal Financial Accounting Standards (SFFAS) No. 10, *Accounting for Internal Use Software*, and SFFAS No. 21, *Reporting Corrections of Errors and Changes in Accounting Principles*, effective October 1, 2000.

The information in the *Management's Discussion and Analysis*, *Required Supplementary Information,* and *Required Supplementary Stewardship Information* sections is not a required part of the financial statements but is supplementary information required by the Federal Accounting Standards Advisory Board and OMB Bulletin No. 97-01, *Form and Content of Agency Financial Statements*, as amended. We have applied certain limited procedures, which consisted principally of inquiries of management, regarding the methods of measurement and presentation of this information. However, we did not audit this information, and accordingly, we express no opinion on it. Based upon our limited procedures, we determined that NSF did not complete the intragovernmental balance

reconciliations with its governmental trading partners, as specified by the January 2000 technical amendment to OMB Bulletin No. 97-01, because, although NSF issued confirmations to its major partners, such partners did not respond with adequate information to assist in reconciling balances.

INTERNAL CONTROL OVER FINANCIAL REPORTING

Our consideration of internal control over financial reporting would not necessarily disclose all matters in the internal control over financial reporting that might be reportable conditions. Under standards issued by the American Institute of Certified Public Accountants and OMB Bulletin No. 01-02, reportable conditions are matters coming to our attention relating to significant deficiencies in the design or operation of the internal control over financial reporting that, in our judgment, could adversely affect NSF's ability to record, process, summarize, and report financial data consistent with the assertions by management in the financial statements.

Material weaknesses are reportable conditions in which the design or operation of one or more of the internal control components does not reduce to a relatively low level the risk that misstatements, in amounts that would be material in relation to the financial statements being audited, may occur and not be detected within a timely period by employees in the normal course of performing their assigned functions. Because of inherent limitations in internal control, misstatements due to error or fraud may nevertheless occur and not be detected.

We noted certain matters, described in Exhibit 1, involving the internal control over financial reporting and its operation that we consider to be reportable conditions. However, none of the reportable conditions are believed to be material weaknesses.

We also noted other matters involving internal control over financial reporting and its operation, which we do not consider to be reportable conditions, that we have reported to the management of NSF in a separate letter dated January 18, 2002.

COMPLIANCE WITH LAWS AND REGULATIONS

The results of our tests of compliance with certain provisions of laws and regulations, exclusive of those referred to in the FFMIA of 1996, disclosed one instance of potential noncompliance in FY 2000 that was required to be reported under *Government Auditing Standards* and OMB Bulletin No. 01-02. This matter related to potential noncompliance with Federal appropriations law arising from NSF expending funds from its Research and Related Activities appropriation to supplement potential shortfalls in its Major Research Equipment appropriation for a large international project. This potential noncompliance was identified in a report issued by the NSF Office of Inspector General in December 2000. This condition was resolved in FY 2001.

The results of our tests of compliance with certain provisions of other laws and regulations, exclusive of FFMIA, disclosed no instances of noncompliance that are required to be reported under *Government Auditing Standards* or OMB Bulletin No. 01-02.

The results of our tests of compliance with FFMIA Section 803(a) requirements disclosed an instance, described in Exhibits 1 and 2, in which NSF's financial management systems did not substantially comply with Federal financial management systems requirements. As agreed with NSF management, the descriptions in Exhibits 1 and 2 do not address certain matters required by FFMIA Section 803 (b)(2) because of the sensitivity of such matters. These matters were provided in separate oral communications and a written communication to management dated December 7, 2001. The results of our tests disclosed no instances in which NSF's financial management systems did not substantially comply with applicable Federal accounting standards or the United States Government Standard General Ledger at the transaction level.

We noted other matters involving compliance with laws and regulations that we do not consider to be material non-compliance, which have been reported to the management of NSF in a separate letter dated January 18, 2002.

RESPONSIBILITIES

Management's Responsibilities. The Government Management Reform Act (GMRA) of 1994 requires Federal agencies to report annually to Congress on their financial status and any other information needed to fairly present the agencies' financial position and results of operations. To meet the GMRA reporting requirements, NSF prepares annual financial statements.

Management is responsible for:

- Preparing the financial statements in conformity with accounting principles generally accepted in the United States of America, and for preparing the other information contained in the FY 2001 Accountability Report.

- Establishing and maintaining internal controls over financial reporting, Required Supplementary Information, Required Supplementary Stewardship Information, and performance measures.

- Complying with laws and regulations, including FFMIA.

In fulfilling this responsibility, estimates and judgments by management are required to assess the expected benefits and related costs of internal control policies.

Auditors' Responsibilities. Our responsibility is to express an opinion on the financial statements of NSF as of and for the years ended September 30, 2001 and 2000, based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America; the standards applicable to financial audits contained in *Government Auditing Standards*; and OMB Bulletin No. 01-02. Those standards and OMB Bulletin No. 01-02 require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement.

An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In planning and performing our FY 2001 audit, we considered NSF's internal control over financial reporting by obtaining an understanding of NSF's internal control, determining whether internal controls had been placed in operation, assessing control risk, and performing tests of controls in order to determine our auditing procedures for the purpose of expressing our opinion on the financial statements. We limited our internal control testing to those controls necessary to achieve the objectives described in OMB Bulletin No. 01-02 and *Government Auditing Standards*. We did not test all internal controls relevant to operating objectives as broadly defined by the Federal Managers' Financial Integrity Act of 1982. The objective of our audit was not to provide assurance on NSF's internal control over financial reporting. Consequently, we do not provide an opinion on internal control over financial reporting.

As required by OMB Bulletin No. 01-02, we considered NSF's internal control over *Required Supplementary Stewardship Information* by obtaining an understanding of NSF's internal control, determining whether these internal controls had been placed in operation, assessing control risk, and performing tests of controls. Our procedures were not designed to provide assurance on internal control over *Required Supplementary Stewardship Information*, and, accordingly, we do not provide an opinion on such controls.

As further required by OMB Bulletin No. 01-02, with respect to internal control related to performance measures determined by management to be key and reported in *Management's Discussion and Analysis*, we obtained an understanding of the design of significant internal controls relating to the existence and completeness assertions and determined whether they had been placed in operation. Our procedures were not designed to provide assurance on internal control over reported performance measures, and, accordingly, we do not provide an opinion on such controls.

As part of obtaining reasonable assurance about whether the NSF's financial statements are free of material misstatement, we performed tests of NSF's compliance with certain provisions of laws and regulations, noncompliance with which could have a direct and material effect on the determination of the financial statement amounts, and certain provisions of other laws and regulations specified on OMB Bulletin No. 01-02, including certain requirements referred to in FFMIA. We limited our tests of compliance to these provisions described in the preceding sentence, and did not test compliance with all laws and regulations applicable to NSF. However, providing an opinion on compliance with laws and regulations was not an objective of our audit, and, accordingly, we do not express such an opinion.

Under OMB Bulletin No. 01-02 and FFMIA, we are required to report whether NSF's financial management systems substantially comply with (1) Federal financial management systems requirements, (2) applicable Federal accounting standards, and (3) the United States

Government Standard General Ledger at the transaction level. To meet this requirement, we performed tests of compliance with FFMIA Section 803(a) requirements.

DISTRIBUTION

This report is intended solely for the information and use of NSF's management, the NSF Office of Inspector General, OMB, and the U.S. Congress, and is not intended to be and should not be used by anyone other than these specified parties.

KPMG LLP

January 18, 2002

Exhibit 1

Reportable Conditions

01-01 Post-award Management

The National Science Foundation (NSF) awards grants to various organizations, including colleges and universities, non-profit organizations, state and local governments, Federally Funded Research and Development Centers, and private foundations that are intended to promote and advance scientific progress in the United States. Through an award, NSF enters into relationships to fund a particular research activity conducted by grantees. NSF expends approximately 90% of its appropriated funds on grants in a given year. The following paragraphs discuss weaknesses noted in internal control over post-award management.

A. Financial Monitoring of Grant Awards

Our audit revealed that even though NSF has a robust system of award management over its pre-award and award phases, NSF does not have a comprehensive, risk-based internal grants management program to monitor its post-award phase, which should include more in-depth reviews of the administrative and financial management practices and compliance with laws and regulations at awardee institutions. At any point in time, NSF staff is engaged in administering as many as 20,000 active awards. This is a formidable task, in addition to their responsibility for soliciting and awarding approximately 10,000 new grants and cooperative agreements annually.

Over the years, NSF has utilized an award management system that strikes a careful balance of invested resources and oversight through an integrated process involving programmatic, financial and administrative staff. NSF's award management system includes a financial and administrative monitoring component, including the submission of financial status reports throughout the award continuum, but post-award monitoring is not systematic, risk-based, documented in writing, or consistently applied. In addition, NSF's awards are becoming larger, more cross-disciplinary and more complex in nature. Federal requirements are increasingly calling for improved accountability and Federal management of payments through improved internal controls.

NSF's post-award grantee monitoring procedures primarily consist of reviews of the grantee's Office of Management and Budget (OMB) Circular A-133, *Audits of States, Local Governments and Non Profit Organizations* audit reports, cost-incurred audits conducted on selected grantees by the NSF Office of Inspector General, and site visits to a few grantees that have been conducted by NSF staff as a result of concerns identified by NSF administrative and program office staff.

Our review of NSF's grant monitoring processes revealed that in general NSF should improve post-award monitoring by establishing written policies and procedures to ensure awardees' financial and administrative compliance with award terms and conditions. Specifically:

- There is no comprehensive risk-based program for financial monitoring of awards, which describes who will conduct the monitoring, the manner in which it will be performed, and when and what type of monitoring activities are planned;
- There are no systemic risk assessment processes in place to classify grantees into various risk categories, i.e., low, medium, and high; and
- Monitoring tools are not utilized to ensure that periodic and consistent review procedures are conducted to assess the financial management practices of grantees and to review financial information reported by grantees.

As a result, awardees' use of Federal funds may not be consistent with the objectives of the grant; programs and resources may not be protected from waste, fraud, and mismanagement; laws and regulations may not be followed; and reliable and timely information may not be obtained, maintained, reported, or used for decision-making. Additionally, since NSF grantee expenditures represent approximately 90% of total NSF expenditures for the year, the integrity and accuracy of grantee expenditures recorded by NSF may be compromised. NSF's Office of Inspector General's Semiannual reports continue to reveal material non-compliance with Federal regulations and awardee terms and conditions and material internal control weaknesses at awardee institutions. Instances noted at awardee institutions include missing or insufficient documentation for costs claimed on the awards; inadequate accounting systems, which do not properly record timekeeping, monitored workload systems, indirect costs, and cost-sharing allocations; and inadequate monitoring of subawards.

OMB Circular A-123, *Management Accountability and Control*, states that as Federal employees develop and execute strategies for implementing or re-engineering agency programs and operations, they should design management structures that help ensure accountability for results. As part of this process, agencies and individual Federal managers must take systematic and proactive measures to develop and implement appropriate, cost-effective management controls.

Management controls are the organization, policies, and procedures used to reasonably ensure that (i) programs achieve their intended results; (ii) resources used are consistent with agency mission; (iii) programs and resources are protected from waste, fraud, and mismanagement; (iv) laws and regulations are followed; and (v) reliable and timely information is obtained, maintained, reported, and used for decision making.

NSF is responsible for ensuring that grantees comply with applicable laws and regulations related to the administration of the respective grant awards, including those related to Federal cash management requirements. Because OMB Circular A-133 audits leave the identification of major programs, which are the only programs subject to compliance testing, to the judgment of the grantees' independent auditors, there is no assurance that NSF's programs will be selected for review during OMB Circular A-133 audits. Further, some of NSF's grantees fall below the $300,000 threshold of Federal expenditures that trigger an audit under OMB Circular A-133 requirements. Therefore, a combination of an internal program of grantee oversight, including risk-based site visits to review grantee financial management

compliance, and review of OMB Circular A-133 audit reports, is required to ensure effective grantee oversight is maintained.

Recommendations

We have the following recommendations:

1. Review current monitoring practices and develop a risk based monitoring program, which should also include an assessment of the financial and programmatic risks of every NSF grantee. The monitoring program should include a combination of site visits or other monitoring procedures such as desk reviews performed at regular intervals on grantees in the various risk categories;

2. Update the current written grant monitoring procedures to include specific monitoring and documentation requirements:

   (i) Monitoring procedures should include a description of who will conduct the monitoring, the manner in which it will be done, and what type of monitoring activities should be conducted on the grantees depending on the type and level of risk; and

   (ii) Documentation procedures should require grant managers to maintain documentation in grant files on their monitoring activities, using such techniques as written reports of on-site reviews and follow up, and telephone interview write ups.

3. Develop site visit monitoring tools to aid in the grantee monitoring process. Site monitoring tools should guide the reviewer and ensure that specific financial objectives are achieved, and include steps such as:

   (i) Review of the accuracy of the amounts reported on grantee Financial Status Reports/Progress reports submitted to NSF by comparing the information in the reports to the grantee's general ledger or some other equivalent data;

   (ii) Assessment of the adequacy of financial management procedures in place at the grantee to ensure grantees have complied with the terms of their grant agreements; and

   (iii) Assessment of grantees' monitoring practices over the accuracy of amounts reported by subgrantees through review of supporting documentation or other equivalent means of review.

4. Establish a program for follow-up procedures to address concerns raised by program personnel in a timely manner.

B. Monitoring of Assets Owned by NSF in the Custody of Other Entities

Funds provided by NSF to its grantees are used in certain cases to purchase or construct Property, Plant, and Equipment (PP&E) to be used by the grantee for operations or research on the projects or programs sponsored by NSF. In most cases the title of the asset transfers to the grantee, however, in some cases, NSF retains ownership to the PP&E. In those cases, in accordance with grant terms and conditions, NSF grantees are required to submit an annual inventory listing of NSF-owned property in their custody. Although certain procedures are in place to monitor these assets, significant improvement of current policies and procedures is necessary to ensure that such assets are protected from loss, misuse, or theft, and reliable and timely information is obtained on the value of these assets.

Current accounting standards do not adequately address accounting for such assets, so NSF received interim guidance in December 1997 from the Federal Accounting Standards Advisory Board (FASAB), which requires NSF to disclose the dollar value of these assets based on information contained in audited financial statements of organizations holding the assets, if available. Additionally, OMB Circular A-110, *Uniform Administrative Requirements for Grants and Agreements with Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations,* requires grantees to comply with the property management standards prescribed. However, NSF has not reported all such assets in the notes to the financial statements, and also has not reviewed grantee's compliance with property management standards. The following specific deficiencies were noted concerning the management of PP&E owned by NSF in the custody of grantees:

- Current procedures are inadequate to ensure that all of NSF's grantees, i.e., colleges and universities, non-profit organizations, state and local governments, Federally Funded Research and Development Centers (FFRDC), and private foundations that have custody of NSF-owned assets, report the relevant information to NSF, as required by grant agreements and OMB Circular A-110. NSF's PP&E in the custody of FFRDCs was reported in the notes to the FY 2001 financial statements as approximately $202 million and $207 million as of September 2001 and 2000, respectively. However, NSF was unable to disclose the value of NSF-owned property in the custody of colleges and universities, non- profit organizations, state and local governments, or private foundations due to the lack of such information; and

- There are no procedures within NSF to assess the accuracy of the inventory listings of NSF-owned property that are submitted by grantees or to assess the existence and condition of these assets.

Inadequate monitoring of such PP&E could result in potential loss, misuse, or theft of NSF-owned PP&E in the custody of others as well as misstatement of the PP&E held by others that is reported in the notes to the financial statements. NSF is responsible for ensuring that its grantees comply with applicable laws and regulations related to the administration of the respective grant awards. In order to ensure proper accountability and to meet reporting requirements, grantee oversight that includes site visits to review grantee financial

management compliance is needed to ensure that recipients comply with FASAB guidance and property management standards as prescribed in OMB Circular A-110.

Recommendations

We have the following recommendations:

1. Develop procedures to ensure that all grantees report information on the PP&E that they hold but is owned by NSF. Such procedures should include the use of a checklist of grantees to identify those that have not submitted the information required. This checklist should be periodically updated so that it reflects a complete listing of grantees that have custody of NSF-owned PP&E;
2. Establish standard footnote disclosure for grantees' use to ensure that the required information is disclosed separately in each grantees' audited financial statements;
3. Establish internal procedures for an annual review of the asset inventory listings submitted by grantees for accuracy and reasonableness. These procedures should include a reconciliation to amounts disclosed as NSF's PP&E in the grantee's audited financial statements;
4. Develop procedures to periodically confirm the existence and condition of these assets. These procedures should be carried out in conjunction with other grant monitoring activities conducted during grantee site visits. Grantee's property management systems must also be reviewed during site visits to ensure compliance with OMB Circular A-110 property management standards; and
5. Request guidance from FASAB with respect to accounting and reporting of assets in the custody of others to replace the interim guidance issued in 1997.

01-02 Information Security

NSF faces the challenging task of facilitating an open research culture while protecting its critical information assets against unauthorized intrusion. Although NSF has enhanced its security program by contracting for a managed Intrusion Detection Service and appointing a Security Officer, further improvements are needed to strengthen its security environment. As agreed with NSF management, the description herein of the issue does not address certain matters required by FFMIA Section 803 (b)(2) because of the sensitivity of such matters. These matters were provided in separate oral communications and a written communication to management dated December 7, 2001. Our review of the logical and physical access controls over NSF facilities, information system resources, applications, and data identified certain vulnerabilities in the design, administration, and monitoring of these controls. Specifically, we have noted weaknesses in:

- Application security design;
- Database security;

- Intrusion detection;
- Network infrastructure security;
- File sharing and remote access;
- Read and write access to certain application source code;
- Physical access; and
- Administration of access privileges.

The Computer Security Act requires Federal agencies to identify and provide security protection commensurate with the risk resulting from the loss of, misuse of, or unauthorized access to, or modification of, information collected or maintained by or on behalf of the agency. The Government Information Security Reform Act (GISRA) re-emphasizes that, as part of an agency-wide security program, agencies need to ensure that proper security controls are in place to manage information systems security throughout the life cycle of a system.

To accomplish NSF's mission of promoting science and engineering, research, and education, an open and distributed computing environment is a means for collaboration and knowledge sharing. Implementing and maintaining a secure computing environment is a significant challenge and requires senior management sponsorship and dedicated resources.

Although certain improvements to security were made subsequent to year-end, and NSF has been extremely responsive in initiating corrective actions for vulnerabilities identified during the audit, the mainframe to client-server migration of NSF's financial applications, limited resources, and competing management priorities are some of the reasons for the noted vulnerabilities. As a result, information security weaknesses could adversely affect NSF's ability to produce accurate data for decision-making and financial reporting because such weaknesses could compromise the reliability and availability of data that are recorded in or transmitted by NSF's financial management systems.

These vulnerabilities increase the risk of unauthorized viewing, modification, and deletion of financial and other sensitive data, accidentally or intentionally, by internal and external parties.

Recommendations

We recommend that NSF ensure that:

1. The security design framework for client server applications is further reviewed to assess the risk of unauthorized viewing, modification, and deletion of financial and other sensitive data. Options should then be evaluated to either correct the vulnerabilities noted or implement mitigating security controls;

2. Access controls to critical database tables, as well as their configuration, is strengthened;

3. Intrusion detection capabilities are further refined and implemented;

4. An entity-wide software patch management process is implemented whereby vulnerabilities are identified and related patches tested and applied in a timely manner;

5. File sharing and remote access policies prohibiting the use of unauthorized connections are established, enforced, and monitored;

6. Software libraries are protected from unauthorized viewing and modification of application source code;

7. An assessment of physical controls is performed utilizing a cost-benefit analysis to identify options to limit further the access to facilities and information system resources. Based on the option selected, implement the applicable controls to enhance NSF physical access; and

8. Access privileges to the facilities and information systems are revoked in a timely manner when a user leaves NSF.

Exhibit 2

Compliance with Laws and Regulations

FY 2001 Non-Compliance with Laws and Regulations

Federal Financial Management Improvement Act of 1996 (FFMIA): FFMIA requires NSF to implement and maintain a financial management system that complies substantially with: (1) Federal requirements for financial management systems; (2) applicable Federal accounting standards; and (3) requirements to post transactions to the United States Standard General Ledger at the transaction level. These requirements are detailed in OMB Circular A-127, *Policies and Standards for Financial Management Systems.* Section 7 of this Circular identifies the requirements or characteristics that Federal financial management systems should possess. Additionally, the *Revised Implementation Guidance for FFMIA*, dated January 4, 2001 issued by the Office of Management and Budget, provides factors in determining the level of compliance required by Federal agencies.

NSF's noncompliance with FFMIA requirements relates to Federal financial management system requirements. As discussed separately in the report on internal control, NSF has several weaknesses in its entity-wide security that contribute to noncompliance with OMB Circular A-130, *Management of Federal Information Resources.* As agreed with NSF management, the description herein of the issue does not address certain matters required by FFMIA Section 803 (b)(2) because of the sensitivity of such matters. These matters were provided in separate oral communications and a written communication to management dated December 7, 2001. NSF has been extremely responsive in initiating corrective actions for vulnerabilities identified during the audit. We have been informed that certain improvements to security were made subsequent to year-end, but we have not tested this assertion. The mainframe to client-server migration of NSF's financial applications, limited resources, and competing management priorities are some of the reasons for the noted vulnerabilities. NSF should continue to improve its security-related management control processes to better protect physical and logical assets from unauthorized access or improper use.

Recommendations

We recommend that NSF management institute appropriate procedures to ensure compliance with FFMIA requirements.

Status of FY 2000 Potential Non-Compliance with Laws and Regulations

Federal Appropriations Law: This instance of reportable potential noncompliance with Federal appropriations law arose from NSF expending funds from its Research and Related Activities appropriation to supplement potential shortfalls in its Major Research Equipment appropriation for a large international project. This potential noncompliance with law was identified in a report issued by the NSF Office of Inspector General in December 2000. This condition was resolved in FY 2001.

Attachment 1

Management's Response to Auditors' Report

February 26, 2001

To: Christine C. Boesz
Inspector General

From: Thomas Cooley
Chief Financial Officer

Subject Management's Response to Independent Auditors' Report
Fiscal Years 2001 and 2000

This memorandum and attachments transmit NSF management's response to KPMG LLP's audit report for fiscal years 2001 and 2000. We understand that our responses will be included as an attachment to your report.

SUMMARY

The auditors' report concluded that NSF's financial statements as of and for the years ended September 30, 2001 and 2000, are presented fairly, in all material respects, in conformity with generally accepted accounting principles in the United States of America.

Reportable Conditions

The auditors' report identified the following conditions that they consider to be reportable conditions.

- ***Post-Award Management*** - Adequate procedures for monitoring (i) awardees' administrative and financial management practices and compliance with laws and regulations, and (ii) NSF-owned property, plant and equipment in awardees' custody are not in place.

- ***Information Security*** - NSF has several weaknesses in its entity-wide information security that result in vulnerabilities in logical and physical access controls.

NSF Management Response*: NSF management believes that the identified conditions are not "significant deficiencies in the design or operation of the internal control over financial reporting that . . . could adversely affect NSF's ability to record, process, summarize, and report financial data consistent with the assertions by management in the financial statements". As detailed in Attachment 1, our procedures for grant monitoring are demonstratively effective and our comprehensive approach for assuring the security*

of information and assets includes layers of controls that mitigate the risk of a vulnerability that would result in a significant misstatement of the NSF Financial Statement that would also not be detected by systems controls or employees in the normal course of performing their functions.

Compliance with Laws and Regulations

Tests of compliance with certain provisions of laws and regulations, exclusive of those referred to in the Federal Financial Management Improvement Act (FFMIA) of 1996, disclosed no instance of noncompliance in Fiscal Year (FY) 2001. Tests of compliance with FFMIA Section 803(a) requirements, however, were believed to disclose instances where NSF's financial management systems did not substantially comply with Federal financial management systems requirements.

***NSF Management Response**: NSF management disagrees with the assertion that our financial management systems do not substantially comply with Federal financial management systems requirements. As noted above and detailed in Attachment 1, our comprehensive approach to information security is compliant with OMB Circular A-130, Management of Federal Information Resources, and with the FFMIA. Moreover, even if a reportable condition existed as to information security, under the guidance provided by OMB that does not justify a finding of noncompliance with the FFMIA. The Director of NSF has determined that the agency is in substantial compliance with the FFMIA.*

NSF management appreciates the cooperation extended by both the Office of Inspector General and KPMG throughout the audit process.

cc: Dr. Eamon M. Kelly

Attachment 1

Management's Responses to Auditors' Report

Management's Response to 01-01 Post-Award Management

NSF management does not agree that "[a]dequate procedures for monitoring (i) awardees' administrative and financial management practices and compliance with laws and regulations; and (ii) NSF-owned property, plant and equipment in awardees' custody are not in place" as asserted in the summary and expanded on later in the report. The assertion is unsupported by the record and does not accurately represent the processes, policies and procedures that govern NSF's award management system, including the documented internal controls that exist throughout that system. Indeed, NSF's post-award management internal controls are neither materially nor significantly weak; NSF post-award oversight of grants is as robust and effective as NSF pre-award and award oversight.

a. Financial Monitoring of Grant Awards

For fifty-two years the National Science Foundation has utilized an award management system that strikes a careful balance of invested resources and oversight. Through an integrated process involving programmatic, financial, and administrative staff, NSF monitors its awardees' expenditures. This approach has proved remarkably, though not surprisingly, effective.

The Office of Inspector General has tested NSF's award management over the past four years by auditing over $1.5 billion in grant awards. As a result of those audits for fiscal years 1998 - 2001, approximately .2% of audited award funds were "recovered" due to misspending. Given the likelihood that these audits were undertaken for NSF's higher risk activities, we believe that an audit of every dollar of funds awarded and managed by NSF would result in no higher a recovery. Based on this record alone, we do not agree that an award management system in which approximately 99.8 percent of financial assistance was properly spent can be reasonably characterized as having a significant deficiency in its design or operation.

Notwithstanding the de minimus level of misspending found by the Office of Inspector General, NSF seeks always to improve our processes. To that end, we are refining our award management process to include a more structured risk-based monitoring element. This effort includes the development of standard tools and protocols, specifically for on-site monitoring; an FTE analysis to identify additional staff resources needed; and a staff training component

Overview

Consistent with the government-wide purposes of Federal financial assistance programs, specific methods for monitoring and oversight are not codified in statute or regulation. Rather, award monitoring activity relies on individual agency policies and practices and is subject to established agency internal controls. In fact, the Administrative Requirements of OMB Circulars A-102 and A-110 vest primary responsibility for post-award financial oversight with the recipient of Federal funding. Loosely put, the overall purpose of Federal oversight is to provide accountability for Federal funds primarily by ensuring that the funding provided is used

in support of the respective programmatic effort described in the grant or cooperative agreement, consistent with any terms and conditions attached.

This does not mean, however, that there are not carefully-constructed government-wide mechanisms for assuring awardee compliance with the administrative and financial requirements imposed on all recipients of Federal assistance. Indeed, in recognition of the need for government-wide efficiency and in the interest of minimizing the reporting burden born by awardees, OMB implemented the A-133 process. By design, the A-133 process allows Federal awarding agencies to rely on a cognizant (or oversight) agency for audit responsibilities to oversee an awardee's financial and administrative processes. (See subpart D in the circular.) Most NSF awardees are overseen by either the Department of Health and Human Services or the Department of Defense. These agencies assure that awardees' systems fulfill Federal requirements.

The bedrock of NSF's post-award management is the program officer's certification that the funded science and engineering research and education has been demonstrated. Funds are not obligated absent this front-line review of substantive progress. This inherent control is fundamental to NSF's oversight process. NSF, the principal investigator and the grantee share a common interest in advancing the inquiry/education proposed by the principal investigator. A grantee cannot complete a proposed project without expending our funds properly — on researchers' salaries, equipment cost, and so forth. This process is described in chapter X, Award and Administration, of the Proposal and Award Manual and explained to all new program officers when they join the Foundation. The periodic reports on which the program officer's certification is based document both the grantee's progress and the program officer review.

Programmatic grant oversight is complemented by the work of NSF's Budget, Finance, and Award Management staff (BFA) and Division of Grants and Agreements staff (DGA). For example, prior to approving continuing grant increments that involve changes to the original commitment amount, grants officers perform financial and administrative reviews for compliance with terms and conditions, including compliance with reporting requirements. In cooperation with program staff, BFA and DGA ensure that resources are used consistent with agency mission; that laws and regulations are followed; and that timely information is obtained and maintained. Policies and procedures governing these awards management activities are documented in the following:

- The Proposal and Award Manual
- The Grant Policy Manual
- DGA Standing Operating Guidance
- The Grant Proposal Guide
- NSF Bulletins

Not a Reportable Condition

OMB Bulletin 01-02 defines a "reportable condition" as a matter coming to the auditor's attention that, in the auditor's judgment, should be communicated because it represents a significant deficiency in the design or operation of internal control, that could adversely affect

the organization's ability to record, process, summarize, and report financial data consistent with the assertions by management in the financial statements. The fact that the Foundation's grant oversight procedures have consistently resulted in a de minimus level of misspending supports management's position that there are no significant deficiencies in the design or operation of our post-award monitoring processes. The risk that substantial funds could be misspent in any one project without timely detection by a Program Officer or Grants and Agreements Officer is very small. The risk that such misspending could occur under enough grants to total a significant sum is even smaller.

A specific discussion of the major points made in section 01-01.A and a fuller explanation of NSF's grant monitoring process follows.

1. The need for a comprehensive, risk-based internal grants management program to monitor grantee administrative and financial management

The auditors say that "NSF should improve post-award monitoring by establishing written policies and procedures to ensure awardees' financial and administrative compliance with award terms and conditions". They claim:

- There is no comprehensive risk-based program for financial monitoring of awards, which describes who will conduct the monitoring, the manner in which it will be performed, and when and what type of monitoring activities are planned;
- There are no systemic risk assessment processes in place to classify grantees into various risk categories, i.e., low, medium, and high; and
- Monitoring tools are not utilized to ensure that periodic and consistent review procedures are conducted to assess the financial management practices of grantees and to review financial information reported by grantees.

The auditors conclude from the above assertions that grantees' use of Federal funds may not be consistent with the objectives of the grant; programs and resources may not be protected from waste, fraud, and mismanagement; laws and regulations may not be followed, and reliable and timely information may not be obtained, reported, or used for decision-making.

NSF Management Response

During the past year, the Division of Grants and Agreements (DGA) within the Office of Budget, Finance and Award Management (BFA) has taken steps to increase its award monitoring activity particularly in the areas of post-award review, risk assessment methodology, and on-site reviews. We have presented our plan of action in a variety of forums over the past six months, and the Office of Inspector General has agreed to our approach, including the broad categories of risk we are targeting. These included presentations to the Audit and Oversight Committee of the National Science Board, the October 2001 Audit Control Committee meeting, the October 2001 Management Controls Committee Meeting, the Fall 2001 Business and Operations Advisory Committee and a recent January 2002 meeting between the Division Director, DGA and the Deputy Inspector General and IG staff.

The categories of risk we have developed include the following:

- Financial: including an assessment of accounting systems, cost sharing activity, and indirect cost application;
- Administrative: including type of awardee institution, property oversight, cognizant agency responsibility, reporting requirements, and assessment of compliance with terms and conditions of an award;
- Programmatic: addressing oversight needs for large multi-user facilities, new innovative project requirements, and specific ad-hoc review requests.

As further demonstration of management's commitment to instituting a formal risk assessment to post-award, on-site financial and administrative monitoring, DGA has established two positions focused on these efforts. DGA completed its recruitment for a Senior Advisor for Workforce Planning, Operations, and Risk Management established in October 2001. The incumbent is developing the comprehensive risk-based assessment methodology for financial and administrative monitoring of all awards which will be used to determine which awards require close monitoring as well as priority site visits. Data analysis is currently underway to identify the subset of awards that have a relatively higher risk potential and, thus, require a greater degree of oversight.

DGA has established and filled the position of the Advisor for Facilities Monitoring and Oversight. The incumbent has led the development of specialized tools that will be used in conducting Total Business System Reviews of all large facilities. The incumbent is also part of a Foundation effort to develop Oversight Policies and Procedures for Large Facilities.

In addition to these DGA positions, NSF is currently recruiting for a Large Facilities Project Deputy Director in BFA. This individual will be responsible for business oversight for large facilities, already identified by the OIG as NSF's highest risk awards, i.e., those with considerable costs, schedule, and performance issues. The targeted oversight contemplated through the Large Facilities staffing complement will substantially mitigate NSF's existing risk.

The Chief Financial Officer has provided additional staffing, training, and travel resources devoted to monitoring and oversight activities and has committed to increase those resources as we continue expansion of grant monitoring activities. We recognize the value to be gained by increasing our grant monitoring oversight activities and are taking steps to improve it.

Equally important is a contextual discussion of the long-standing risk assessment activities and internal controls that are currently integrated into NSF's awards management practices and system. This detailed discussion follows.

2. Grantee compliance through internal oversight, including risk-based site visits and a review of OMB Circular A-133 audit reports

"NSF is responsible for ensuring that grantees comply with applicable laws and regulations related to the administration of the respective grant awards, including those related to Federal cash management requirements. . . . [A] combination of an internal program of grantee

oversight, including risk-based site visits to review grantee financial management compliance, and review of OMB Circular A-133 audit reports, is required to ensure effective grantee oversight is maintained."

NSF Management Response

NSF management agrees there is a need to increase risk-based, on-site grant monitoring and agrees with its categorization as a management challenge. Our earlier discussion of the NSF risk assessment plan for on-site financial monitoring describes the broad categories of risk that motivate the plan. These on-site activities will supplement our current awards management system that includes a substantial financial and administrative monitoring component, including the submission of financial status reports, throughout the award continuum.

The risk assessment methodology being employed to develop DGA's on-site monitoring plan is merely an extension of existing agency protocols. The awards management continuum and the internal controls that safeguard Federal funds is a thoroughly documented business system. In addition, the business rules and internal controls that are programmed into the automated award system implement these official NSF policies and procedures and document each transaction, by institution and award.

Financial and administrative management integrating risk assessment begins pre-award, with the assignment of each pending action to an appropriately warranted DGA specialist. The specialist warrant level, I-IV, limits those actions by type and dollar value that the respective grants officer may process, review, and sign. Warrant levels are memorialized in the official "Delegation of Grants Officer Authority" and they are recorded in the awards system User Profile that ensures the proper exercise of delegated authority to obligate Federal funds.

Grants officers analyze 100% of proposed project budgets to ensure compliance with the OMB circulars governing cost principles. In order to make a determination on the type of award instrument with appropriate terms and conditions consistent with Federal law and guidelines and NSF policy, the grants officer analyzes such risk factors as institutional type, proposed dollar amount and project type. Consistent with chapter 63 of title 31 of the United States Code (originally enacted as the "Federal Grant and Cooperative Agreement Act of 1977"), grant agreements are used to support respective programmatic efforts when no substantial Federal involvement is contemplated. Funding is provided through cooperative agreements for those projects where substantial Federal involvement is contemplated.

When special conditions concerning such items as equipment or indirect cost rates are attached to an award, special attention flags are set in the award system. Prior to award close-out, these conditions must be satisfied.

Grants officers, with Cost Analysis and Audit Resolution (CAAR) staff, conduct an additional level of review for all new awardees in order to assess financial capability and business system adequacy. DGA may determine, as a result of these reviews, that specialized award language to limit expenditures must be applied to higher risk awards. This would trigger post award review and oversight, prior to the release of additional funds.

These pre-award monitoring processes provide the foundation for the integrity of NSF's post-award oversight.

The procedures for all of the foregoing financial and administrative award management activities are fully documented in NSF policy documents and DGA standing operating guidelines. These, in turn, are consistent with all applicable OMB Circulars governing the award and management of Federal financial assistance.

BFA has the responsibility for A-133 audit review and resolution. This Federal Government-wide required process supplements our award management activities. The $300,000 threshold for A-133 audit review is a government-wide threshold of acceptable risk. This threshold was established after careful consideration of cost efficiency and effectiveness. Based on studies done by the General Accounting Office (GAO), the audit threshold of $300,000 captures more than 90% of Federal awards expended. We do not intend to review those awards not subject to A-133 audit requirements unless they possess characteristics identified through application of the risk-based criteria.

b. Monitoring of Assets Owned by NSF in the Custody of Other Entities

Management disagrees with the finding in section 01-01.B that the monitoring of assets owned by NSF in the custody of other entities is a reportable condition.

Overview

NSF takes title to property purchased under a grant for a number of reasons, but always with the intention that it remain in the custody of the grantee for its useful life and be used by researchers. The continued existence and usefulness of such property is continually attested to by our receipt of proposed research projects employing it. We can rely on our grantee to inform us, through a request for upgrade or replacement, when the property deteriorates, even if only compared to newly-available devices. We have no need to track the historic or current value of NSF-owned property because we never depreciate or sell it. As discussed below, the annual addition to this total value is immaterial. Although the total value of such property might seem significant, it is actually a "sunk cost".

Not a Reportable Condition

Again, OMB Bulletin 01-02 defines a "reportable condition" as a matter coming to the auditor's attention that, in the auditor's judgment, should be communicated because it represents a significant deficiency in the design or operation of internal control, that could adversely affect the organization's ability to record, process, summarize, and report financial data consistent with the assertions by management in the financial statements.

A specific discussion of the major points made in section 01-01.B and a fuller explanation of NSF's property monitoring process follows.

1. Current procedures are inadequate to ensure that all of NSF grantees…that have custody of NSF assets report the relevant information to NSF, as required by grant agreements. …NSF was unable to disclose the value of NSF owned property in the custody of colleges and universities and other non-profit entities in Fiscal Year 2001 as required due to the lack of such information.

NSF Management Response

The Foundation supports the scientific infrastructure at academic institutions by providing equipment to support these activities. Title to this property remains vested with the institution in accordance with established Federal administrative requirements governing grant-funded property. The institutions are required to inventory this equipment and maintain this inventory for review. These inventories have been site tested and we have relied on A-133 audit system reviews to insure that appropriate processes and procedures are in place to insure compliance with the requirement.

However, during the pre-award monitoring review, there are a few instances where a program identifies certain items of equipment for which the Government should retain title. Specifically, title to equipment purchased by profit makers, by policy, rests with the Government. Appropriate terms and conditions are applied to the award requiring awardee notification to NSF of the item of equipment. These instances are flagged in our database. A recent review of the database indicates that there are currently nine active grant awards (other than the Federally Funded Research and Development Centers (FFDRC), large facility activities, and contracts) with government-owned property requirements. These include five profit makers, one non-profit, and three academic institutions. The total amount of equipment budgeted in these awards amounts to less than $500,000 out of almost $334 million funded for equipment in FY 2001. There are some cases that have expired and are in the process of being reviewed for disposition. The equipment budget amount for these represents $1.8 million — that is less than 1% of the universe of equipment dollars awarded in FY 2001. In our opinion, this does not rise to the level of significance and no problem with it would have a significant effect on our financial or performance reporting or compliance with applicable laws or regulations.

We should point out that there is no current requirement for recordation as an asset in NSF's financial statements for NSF owned property in the custody of colleges, universities, and other nonprofit organizations. The interim guidance provided us by the Federal Accounting Standards Advisory Board merely says we should disclose that information if it is available.

2. There are no procedures within NSF to assess the accuracy of the inventory listings of NSF-owned property that are submitted by grantees or to assess the existence and condition of these assets.

NSF Management Response

We do monitor inventories of our FFRDCs and have included totals for government owned property in our financial statements. Government owned property maintained by the FFRDCs totals almost $202 million. We have conducted periodic site visit reviews to test the inventories

listings and have included these reviews as part of our developing Total Business System Review (TBSR) protocols that will be used for our large centers and facilities. Finally, we have identified on-site property review in our risk assessment protocol and our business review instrument to ensure compliance with A-110 requirements.

NSF Management Response to Recommendations in 01-01

We appreciate the substance of the four recommendations on Financial Monitoring of Grant Awards, as they relate to risk-based monitoring. As the Office of the Inspector General is fully aware, the Division of Grants and Agreements is diligently developing a comprehensive methodology. Those efforts have been substantiated in the foregoing discussion. Nonetheless, we invite OIG's participation in the review of our risk assessment methodology and procedures beginning in April 2002. Furthermore, many of the documentation issues within the recommendations are being addressed in the electronic jacket initiative.

Management agrees with your recommendations to develop effective monitoring tools to ensure compliance with property reporting requirements, and we will put in place additional internal procedures to review the annual listing from awardees for accuracy and reasonableness. We have also identified on-site property review in our risk assessment protocol and our business review instrument to ensure compliance with A-110 requirements.

Management's Response to 01-02 Information Security

Management strongly disagrees with the finding that the items mentioned as weaknesses represent significant deficiencies that rise to the level of a "reportable condition." NSF has a comprehensive approach for assuring the security of its information and assets. Layers of controls mitigate the risk of a vulnerability that would result in a significant misstatement of the NSF Financial Statement that would also not be detected by systems controls or employees in the normal course of performing their functions. The auditors' report fails to demonstrate any significant deficiencies in the design or operation of NSF's security controls.

Specifically, the FFMIA – Computer Security Act Requirements that are the subject of the finding and recommendations are part of a larger Information Technology Security program at the National Science Foundation. The National Science Foundation is focused on assuring that NSF infrastructure and critical assets are appropriately protected while maintaining an open and collaborative environment for scientific research and discovery. We have established a strong and comprehensive Information Technology Security program that is consistent with Government-wide guidance and patterned after industry best practices. The majority of NSF's significant information technology assets are managed within the Office of Information and Resource Management, which is thus the organizational focus of NSF's Information Technology Security program. OIRM administers NSF's sophisticated technological infrastructure, providing the hardware, software and support systems necessary to manage the Foundation's grant-making process and to maintain advanced financial and accounting systems. The NSF Chief Information Officer (CIO) provides overall leadership for the Information Technology Security Program, and ensures that policy, procedures, and activities are coordinated among OIRM Divisions and other NSF program management and research initiatives.

NSF's information security approach is based on a fundamental philosophy of risk management where Information Technology Security risks are assessed, understood, and mitigated appropriately. This approach allows NSF to implement appropriate layers of protective measures and controls to ensure the privacy, integrity, and security of information and information technology resources needed by NSF and the broader research community while allowing appropriate access and availability to users. This layered approach effectively reduces the risk of unauthorized access to systems and information using various manual and automated checkpoints and controls.

NSF's Information Technology Security program encompasses all aspects of information security, including policy and procedures, risk assessments and security plans, managed intrusion detection services, vulnerability assessments, and technical and management security controls, as highlighted below.

- Policies and Procedures. NSF has established Information Technology Security policy, which is consistent with law, regulation, best practices, and NSF's particular requirements. NSF systems are constructed to maximize the protection of sensitive information such as the names of scientific reviewers and confidential proposal information. Operational procedures and controls are also in place to ensure the security, reliability, and integrity of information technology resources that support NSF operations.

- Security Assessments, Plans, and Controls. NSF has a comprehensive framework for establishing appropriate safeguards and controls and ensuring that they are integrated into existing and new information technology assets and resources. These include requirements for managers of mission critical systems to perform self-assessments of their systems' security posture, conduct risk assessments and develop commensurate security in accordance with OMB Circular A-130, "Management of Federal Information Resources," and have their systems certified and accredited. In the unlikely event of a major disaster, NSF has comprehensive disaster recovery plans and capabilities, which are tested on an annual basis at a hot-site location.

- Incident Detection and Response. NSF has implemented technologies and processes to ensure it is alert to intrusion attempts and is positioned to take effective action to thwart them. These include a comprehensive firewall architecture, strong network and application authentication, virus protection services, general systems security and administration and a Computer Incident Response Team (CIRT) and CIRT procedures. This team is composed of managerial and technical contacts throughout the agency who work collaboratively to respond immediately to security alerts. In FY01, NSF contracted with an independent vendor to provide managed-intrusion detection services. NSF routinely monitors security alerts from the General Services Administration FedCIRC, and the Federal Bureau of Investigation's National Information Protection Center to identify new and emerging vulnerabilities and ensure that NSF has necessary protection against threats to Information Technology Security infrastructure.

- Audits and Penetration Tests. NSF has proactively implemented scheduled vulnerability scans, penetration testing and a new intrusion detection system capability as part of the overall Information Technology Security program. These proactive measures are in addition to the annual OIG assessment using the Federal Information System Controls Audit Manual (FISCAM) and independent penetration test. Information gained from these activities and lessons learned are incorporated into ongoing operational processes and protocols.

- Training and Education. This year, NSF established computer security awareness training and made it available for all employees and on-site contractors and provided specialized courses that focused on NT and Unix security. As part of the security awareness campaign, NSF also conducted a Computer Security Awareness Day that all employees were invited to attend, brown bag seminars on various Information Technology Security related issues, and managed an ongoing security communications and outreach program for NSF employees and on-site contractors.

While much has been accomplished in each of the above areas, the Information Technology Security program must continue to be diligent and evolve to meet the inevitable threats to NSF assets and resources. Security is a global issue affecting all organizations. For example, a survey of 538 companies, universities, and government agencies by the Computer Security Institute and the FBI said that 85% of the networks were breached in the previous year ("Implementing an Information Security Program" by Kevin L. Nichols, August 2001). NSF continues to assess and evaluate improvements that can be made to improve its overall security posture. We continue to appreciate the close coordination with the OIG and its assistance in working with NSF to identify areas where improvements are appropriate, and to identify steps

that can be taken to reasonably address any areas of significant risk. Our approach is to focus on the areas which we believe are the highest risk – and to take prudent steps to mitigate them.

The presence of some vulnerabilities or risks does not necessarily constitute a "reportable condition" – rather it is an unfortunate reality of today's environment. In fact, in a recent report by the Subcommittee on Government Efficiency, Financial Management and Intergovernmental Relations of the House Committee on Government Reform, two-thirds of all federal agencies were given a failing grade for efforts to secure information systems — a worse showing than last year. NSF's program was rated the best in the Federal Government, with an overall grade of "B+." This assessment, which used standard criteria across all major Government organizations, demonstrates the strength of NSF's program. The grade of "B+" also shows that we are not perfect and that there are still areas where improvements should be made. The key is to focus resources on establishing and maintaining prudent protections for those assets that are most valuable and reducing or mitigating risk to a level that is acceptable.

In addition to our position that our IT security program is comprehensive, credible, and effective, we do not believe the findings in NFR 01-02 demonstrate a "reportable condition." In OMB Bulletin No. 01-02, "Audit Requirements for Federal Financial Statements," (Dated October 16, 2000), the definition of a reportable condition is:

> "Reportable conditions" are matters coming to the auditor's attention that, in the auditor's judgment, should be communicated because they represent significant deficiencies in the design or operation of internal control, that could adversely affect the organization's ability to meet the objectives in paragraph 2.g. of this Bulletin.

In a document titled, "DRAFT –Sensitive Details Supporting Vulnerabilities in FISCAM 01-01, titled 'Physical and Logical Access Controls to Restrict Unauthorized Access Need Improvement'", the auditors provided information on eight vulnerabilities identified during their assessment of NSF's information systems environment. Those eight vulnerabilities formed the basis for this reportable condition finding. For a finding to be classified as a "reportable condition," there must be a showing of "… significant deficiencies in the design or operation of internal control …". While the auditors identify particular vulnerabilities, they fail to demonstrate that the vulnerabilities are the result of " significant deficiencies in the design or operation of internal control". . Specifically, the eight vulnerabilities identified are:

1) Application security design. The auditors found that the design of a third-party, commercial, off-the-shelf product allowed access to certain information. To identify this flaw, the auditors required significant knowledge of the NSF infrastructure and detailed knowledge of the NSF environment. Significant, unencumbered, internal access over a long period of time would have been required to attempt to successfully exploit this flaw. This flaw has already been permanently fixed. NSF does not consider this flaw in the third-party software to be a part of, "…significant deficiencies in the (NSF) design or operation of internal control …".

2) Database security. In this vulnerability, the auditors found that if a person were able to obtain information as a result of the flaw discussed above, they might be able to access additional information. Because of the structure of the NSF environment and the layers

of security involved, successfully using this information to carry out nefarious acts would be a difficult task. Again, this flaw has already been permanently fixed. NSF does not consider this flaw to be a part of, "…significant deficiencies in the (NSF) design or operation of internal control …".

3) Intrusion Detection. The auditors noted that the Intrusion Detection System used at NSF was not as robust as it should be. During the audit, NSF was in the midst of replacing the existing Intrusion Detection System with its first sophisticated Intrusion Detection System. The contractor encountered technical problems that delayed transition to a production status. To reduce risk further, NSF required additional work to assure that the System was adequately configured and tested for the NSF environment. While this delayed implementation for a short time, the Intrusion Detection System has been fully implemented and is working as expected, providing additional levels of defense for NSF systems. In short, the system critiqued by the auditors was being replaced during the audit by a more robust system that addresses the auditors' concerns. NSF's Intrusion Detection System is not a "…significant deficiency in the (NSF) design or operation of internal control …".

4) Network infrastructure security. This vulnerability identified by the auditors involved security upgrades provided by vendors not being installed on various systems throughout NSF on a timely basis. With over 100 servers at NSF and hundreds of third-party security flaws being fixed annually, the auditors identified eight upgrades that had not been installed on one or more systems. Of the systems identified, only four were accessible from outside NSF. On each of these systems, it would have been difficult, if not impossible to successfully exploit the vulnerability. The limited number of vulnerabilities, the extremely small risk that any of the vulnerabilities could or would be exploited, and the ability of the Intrusion Detection System to identify these types of problems indicate that this vulnerability is not a, "… significant deficiency in the design or operation of internal control …".

5) File sharing and remote access. Of the more than 1500 staff and contractors at NSF, the auditors identified one person who was not following established NSF policy, which resulted in a potential vulnerability. The one potential problem found, which was in violation of NSF policy, does not represent a, "…significant deficiency in the design or operation of internal control …".

6) Read and write access to certain application source code. The auditors stated that more Information Technology staff and contractors than was necessary had access to certain application source code. Access was given to staff and contractors based on their potential needs to access the information and to facilitate software development efforts. As a result of the auditors' recommendation, we have further limited the number of staff and contractors having access. The fact that staff and contractors may have inadvertently had access to more items than was absolutely necessary to do their job does not represent a, "… significant deficiency in the design or operation of internal control …".

7) Physical access. The auditors reference three problems that they identified regarding physical access to the NSF facilities in Ballston. Physical security is a problem for every

organization. A GAO study found that virtually every Federal Government building, even those with the tightest security, could be easily accessed. Improvements to the physical security of the NSF buildings have been made each of the last several years. Many physical security measures that are found to have problems are a result of human error. While training and education can help reduce the potential vulnerabilities, it will be extremely difficult and expensive to eliminate them. Each of the problems identified by the auditors were the result of human error that was in violation of existing NSF policy. This does not represent a, "… significant deficiency in the design or operation of internal control …".

8) Administration of access privileges to information systems and facilities. The auditors found access to NSF systems was not immediately revoked for a few persons when they stopped working for the agency. This is in comparison to hundreds of staff and contractors who leave the agency annually. In the past year, NSF has taken many measures to improve the procedures. In this year's assessment, the number of problems identified had been reduced substantially from previous years. We plan to implement stronger automated processes in an attempt to reduce the human errors that are the source of the remaining problems. The fact that a few former staff and contractors did not have all of their various accesses immediately revoked is not a, "… significant deficiency in the design or operation of internal control …".

We are pleased to report that corrective action has already been taken to minimize or eliminate each of the specific vulnerabilities mentioned. Where appropriate, additional procedures will be implemented during FY02 to limit the possibility of similar vulnerabilities occurring in the future.

NSF management believes that our systems' multi-layered controls (such as network access controls, systems access controls, inter-system access controls, database access controls, user access controls, file access controls, segregation of duties controls, application systems logical access controls, and others) ensure the reliability and availability of data that are recorded or transmitted by NSF's financial management systems.

For example, in their discussion of vulnerabilities from an outsider, the KPMG auditors state,

> While we exploited these vulnerabilities, mitigating controls, including a firewall team that reviews security logs and the NSF's outsourced intrusion detection system, exist thereby reducing the risks of unauthorized access occurring without NSF detection.

For any significant fraudulent financial transaction to not be noticed by employees in the normal course of performing their assigned functions would be extremely difficult. NSF has a series of internal controls that are used to assess any potential problems with financial management information. The controls include FAS-provided on-line management reports used by offices to monitor financial transactions as well as timely reconciliation of financial transactions made by DFM. Both are sufficient to detect any inconsistencies with the NSF financial system. Offices routinely review obligations made against their allocations and would alert DFM to potential inconstancies within their Budget Execution Plans. This would result in quick detection of any potential misuse of funds. Also, to accomplish a fraudulent NSF payment transaction, someone

must have both the Treasury certification knowledge, access, and passwords controls as well as detailed knowledge of NSF financial systems. The multi-layered nature of controls among various systems contributes to the adequacy of the design and operation of NSF's logical and physical access controls.

There is a low level of risk of a serious incident occurring. Any serious incident would be noticed by those responsible for the many layers of controls that are in place. While the audit identified some vulnerabilities in certain layers of controls, other layers of controls are in place and functioning properly to detect and mitigate this. We will continue to monitor and strengthen these controls.

In 01-02, the auditors state the seriousness of all the problems they identified by saying in summary,

> "As a result, information security weaknesses could adversely affect NSF's ability to produce accurate data for decision-making and financial reporting because such weaknesses could compromise the reliability and availability of data that are recorded in or transmitted by NSF's financial management systems."

and,

> "These vulnerabilities increase the risk of unauthorized viewing, modification, and deletion of financial and other sensitive data, accidentally or intentionally, by internal or external parties."

These statements do not identify or discuss any significant deficiencies in the design or operation of internal controls. They simply assert that security weaknesses can lead to problems. This seems to be the standard to which NSF is being held – that any security weakness can lead to problems that might be significant. Thus, it seems the auditors have classified the presence of any security weaknesses as a "significant deficiency" and therefore, a "reportable condition."

The National Science Foundation remains committed to a reliable and secure information technology infrastructure. We will continue to expand and refine the program to provide even better safeguards in the future. We appreciate all of the work that was done by the Office of the Inspector General as part of this year's assessment of the information technology environment. This work is extremely valuable to the agency in assisting in the identification of any problems that may not have yet been resolved. The results are very beneficial to NSF and have already resulted in an improved infrastructure.

NSF Management Response to Recommendations in 01-02

Because of the sensitive nature of management's response to the auditors' recommendations, they have been provided under separate cover to the Office of the Inspector General.

Management Response to Non-Compliance with Laws and Regulations

NSF management disagrees with the assertion that several weaknesses in the Foundation's entity-wide security render the agency noncompliant with OMB Circular A-130, Management of Federal Information Resources, and therefore the Federal Financial Management Improvement Act of 1996 (FFMIA). As detailed in our response to the material in 01-02 Information Security, NSF's information security program is comprehensive, credible, and effective and substantially complies with all relevant requirements.

The auditors' report fails to support its assertion of noncompliance. The report simply states that NSF's noncompliance "relates to Federal financial management system requirements" and then concludes, "NSF has several weaknesses in its entity-wide security that contribute to noncompliance with OMB Circular A-130". The report references the weaknesses that provide the basis for the auditors' reportable condition finding but fails to link those particular vulnerabilities to the finding of noncompliance. As discussed in Management's Response to 01-02 Information Security, the auditors have identified eight information security vulnerabilities, but they have not identified a failed or missing management control.

OMB's *Revised Implementation Guidance for FFMIA*, issued January 4, 2001, specifically addresses A-130 compliance, and lists the presence of the following four elements as indicators of compliance with A-130 and therefore FFMIA: (1) Assign Responsibility for Security; (2) System Security Plan; (3) Review of Security Controls; and (4) Authorize Processing. The Guidance makes clear that the presence of these four elements renders an agency A-130 compliant. This standard carefully tracks the A-130 Appendix III definition for a "deficiency". Section B. 3) provides in part, "[W]eaknesses identified during the review of **security controls** (emphasis added) should be reported as deficiencies in accordance with OMB Circular No. A-123 …. In particular, if a basic management control such as assignment of responsibility, a workable security plan, or management authorization are missing, then consideration should be given to identifying a deficiency." None of these management controls is missing at NSF, and OIG's audit report does not suggest otherwise.

A finding that information security is a reportable condition does not lead to a determination of FFMIA noncompliance. Three of the four agencies, besides NSF, determined to be substantially compliant with the statute last year (Department of Energy, General Services Administration, and Small Business Administration) had information security as a reportable condition. Only if the reportable condition prevents the agency from (1) preparing financial statements, (2) providing reliable and timely financial information for managing current operations, (3) properly protecting its assets from loss, misappropriation, or destruction — all in a way that is consistent with Federal accounting standards and the Standard General Ledger — will an agency not be in substantial compliance with FFMIA.

NSF firmly believes that its financial management systems substantially comply with FFMIA; but strongly supports and continues to work toward additional improvements in these systems. Because we find the auditors' finding of noncompliance unconvincing, NSF management can determine that the Foundation is in substantial compliance with FFMIA and does so in the Director's Statement of Assurance for FY 2001. As always, NSF will continue to

work professionally and diligently with OIG in improving the agency's financial management systems, and we look forward to continuing our substantial compliance with FFMIA requirements.

IV. OTHER REPORTING REQUIREMENTS

IV. OTHER REPORTING REQUIREMENTS

Debt Collection Improvement Act of 1996

Net Accounts Receivable totaled $6,462,958 at September 30, 2001. Of that amount, $5,587,648 was receivable from other federal agencies. The remaining $875,310 was receivable from the public. NSF fully participates in the Department of the Treasury Cross-Servicing Program. In accordance with the Debt Collection Improvement Act, this program allows NSF to refer debts that are delinquent more than 180 days to the Department of the Treasury for appropriate action to collect those accounts. Additionally, NSF seeks Department of Justice concurrence for action on items over $100,000.

Civil Monetary Penalty Act

There were no Civil Monetary Penalties assessed by NSF during the relevant financial statement reporting period.

Prompt Payment Act

NSF continues to strive for the highest levels of electronic fund transfers (EFT) payments required by the Prompt Payment Act. Payroll, vendor and grantee payment transactions are made by EFT. Only payments made to foreign banks were made by paper check. Our FastLane system utilized for grants enables the grantees to draw cash as required for execution of the grant. Interest payments for commercial vendors under the Prompt Payment Act in FY 2001 were minimal.

Cash Management Improvement Act

In FY 2001, NSF had only one Treasury-State Agreement covered under the Act. NSF's FastLane system with grantee draws of cash make the timeliness of payments issue under the Act essentially not applicable to the agency.

Patents and Inventions Resulting From NSF Support

The following information about inventions is being reported in compliance with Section 3(f) of the National Science Foundation Act of 1950, as amended [42 U.S.C. 1862(f)]. In FY 2001, the Foundation received 691 invention disclosures. Rights to these inventions were allocated in accordance with Chapter 18 of Title 35 of the United States Code, commonly called the "Bayh-Dole Act."

Management and Performance Challenges

As required by the Reports Consolidation Act of 2000, the following is the Inspector General's Statement Concerning NSF's Most Serious Management and Performance Challenges, followed by the Director's Response.

January 30, 2002

MEMORANDUM

To: Dr. Eamon M. Kelly
Chair, National Science Board

Dr. Rita R. Colwell
Director, National Science Foundation

From: Dr. Christine C. Boesz
Inspector General, National Science Foundation

As required by 31 U.S.C. § 3516(d), I am pleased to submit our annual statement summarizing what the Office of Inspector General considers to be the most serious management and performance challenges facing the National Science Foundation (NSF). As the result of September 11, we face a vastly different set of national priorities and a budget environment in which every dollar must be spent even more effectively than before. I continue to believe that NSF is one of the most cost-effective agencies in the federal government.

However, the challenges we have identified include some difficult issues that NSF will need to address in the near future to maintain its reputation as one of the best government agencies. Based on my discussions with NSF managers, I have every confidence that they understand the importance of these challenges and are taking proactive measures to address them. We look forward to working closely with the agency to preempt these potential issues and to remedy the existing ones.

The ten challenges which the OIG has identified through audits and general knowledge of NSF's operations fall into five general categories, four of which can be linked to the President's Management Agenda: 1) Strategic Management of Human Capital; 2) Improved Financial Performance; 3) Expanded Electronic Government; 4) Budget and Performance Integration. The fifth is specific to NSF programs.

1. Strategic Management of Human Capital

Workforce Planning and Training

The strategic management of human capital is recognized as an important priority throughout government and is an important element of the President's Management Agenda. This past year,

the General Accounting Office (GAO) also added human capital management to the government-wide high-risk list. NSF management has acknowledged the seriousness of its human resource management challenge. The agency is vulnerable to a wave of retirements in key areas as 63% of the agency's executive workforce, as well as a large percentage of the science and engineering staff, are eligible to retire within 5 years. Meanwhile NSF's budget for salaries and expenses continues to lag behind the growth of NSF's overall program budget. NSF's Management Controls Committee evaluated this issue as a medium risk, and warned that it could worsen in the not too distant future. The agency is expected to begin to address these issues as part of a 5 year plan it is submitting to the Office of Management and Budget (OMB). The plan will serve as a blueprint for enabling the agency to cope with the increase in workload that NSF has received during the past few years. As part of the OIG's FY 2002 appropriations bill, Congress requested that our office analyze the adequacy of the agency's staffing and management plan. Planning for our review is underway, and our final report is due in the summer of 2002.

In the interim, NSF reports that it is engaged in an effort to introduce fundamental changes in NSF business processes and practices, including redefining NSF position descriptions. The agency is also in the process of establishing an NSF Academy to provide all education and training needed by the agency. We view the development of a training program appropriate for NSF's needs as an urgent priority, particularly in light of NSF's dependence on Intergovernmental Personnel Act (IPA) personnel, who serve at NSF on a temporary basis and comprise a significant percentage of the workforce that requires continual training.

2. Improved Financial Performance

Management of Large Infrastructure Projects

In response to an OIG audit report, as well as concerns expressed by Congress and OMB, NSF began updating its policies and procedures during 2001 to strengthen the management and oversight of large facility projects. As part of this process, NSF developed a *Large Facility Projects Management and Oversight Plan*. NSF sought OIG input as it developed this plan, and we believe it is an important first step in ensuring that NSF's large facility projects provide appropriate stewardship over public funds, while not unduly constraining the freedom needed to pursue scientific research.

However, much work lies ahead. The plan constitutes a broad outline of NSF's intentions and more-detailed guidelines are required in order for corrective action to be effective. Congress has indicated its concern over the implementation of the plan and expressed a desire for NSF to demonstrate significant progress in implementing it before February 28, 2002. We will continue to monitor NSF's progress, particularly with regard to areas of accountability, authority, and post-award project management, to ensure that sound business and management practices are employed in advancing NSF's scientific goals.

Award Administration

At any point in time, approximately 1,150 NSF staff are engaged in administering as many as 20,000 active awards. This is in addition to their responsibility for soliciting and awarding approximately 10,000 new grants and cooperative agreements annually. While NSF has

demonstrated its efficiency in making awards, we believe that the agency should improve post-award monitoring by establishing written policies and procedures to ensure financial and administrative compliance.

In the course of performing financial and compliance audits on a variety of awardees, we have found that some are at greater risk for compliance problems than others. Since NSF staff resources are limited, factors such as award size, type of entity, and amount of experience with federal grants should be considered when determining which awardees should be accorded greater oversight. For awardees deemed to be higher risk, the procedures might include conducting a more rigorous analysis of their grant management systems prior to the start of an award, providing more-detailed instruction to high risk awardees, and monitoring award activity more closely to assure financial and administrative compliance. NSF's Division of Grants and Agreements (DGA) is developing a risk-management approach to post-award monitoring activities. We look forward to working with DGA on the development of new procedures that will address this challenge.

Cost Sharing

Cost sharing leverages the government's investment in basic research by obtaining contributions from grantees and others. In FY 2000 NSF made 3,111 awards that required cost sharing amounting to $508,516,513. Our audits of awardees continue to reveal problems with cost sharing that include shortfalls in contributions, instances of missing or insufficient documentation, and systems that are inadequate to ensure their proper accounting.

Given the large amount of these commitments, the failure to honor cost sharing obligations or to keep proper accounts can have serious consequences for NSF's awards. When an awardee promises cost sharing, it accepts an obligation to contribute a certain amount of money and/or resources to the project costs. The government requires that these funds be fully accounted for so it can determine whether the obligation has been fulfilled. Therefore, if promised cost sharing is not realized, either the programmatic objectives are not met or the project is not funded as originally projected. In either case, NSF has paid a larger share than what was agreed to and opportunities for the agency to fund other awards are curtailed. For these reasons, we believe that NSF should re-examine its policies on the reporting of cost sharing and resolving of any questioned amounts to ensure compliance with federal guidelines.

3. Expanded Electronic Government

Data Security

NSF faces the challenging task of facilitating an open research culture while protecting its critical information assets against unauthorized intrusion. Although NSF has enhanced its security program by establishing an Intrusion Detection Service and appointing a Security Officer, continuing efforts are needed to improve system security. Our review of NSF's information security program indicates that there may be weaknesses that increase security risks. NSF has concurred with our recommendations and has initiated corrective action.

We commend the agency for making many improvements to its innovative FastLane program in the past year. FastLane allows NSF's customers to use the Internet to exchange information with

NSF in the performance of a variety of tasks, including preparing and submitting proposals, proposal reviews and project reports. Given its vital role as the primary vehicle for transacting NSF business, we listed FastLane as a management challenge last year and emphasized the need for NSF to continue to monitor its progress, paying particular attention to making it as user-friendly and reliable as possible. NSF states that the problem in servicing requests for help from FastLane users was addressed through increased staff, better procedures, and improved on-line documentation.

However, NSF management needs to continue to address some important emerging issues. NSF is participating with other federal agencies in a project to provide grant applicants with a single information exchange portal for all grant-making agencies, called the "Federal Commons." The implementation of the system will begin in FY 2003 and will require significant commitments from NSF before it is operational. While the Federal Commons is under development, the agency is planning to continue to improve FastLane by increasing the number of critical agency functions it supports. In general, the rapid growth of FastLane and other information technology applications at NSF increases the need for an effective information security program.

4. Budget and Performance Integration

GPRA Data Quality

The President's Management Agenda outlines plans to formally link performance review with budget decisions beginning in FY 2003. This initiative complements the objectives of the Government Performance and Results Act (GPRA) enacted in 1993 to focus federal programs on performance. While NSF is making steady progress in complying with GPRA, the agency needs to evaluate and improve, as appropriate, both its formulation of GPRA measures and its verification of data in order to facilitate the integration of budget and performance information.

In a report issued in June 2001, GAO found that while most strategies for achieving NSF's key outcomes were generally clear and reasonable, some are vague and do not identify specific steps for achieving their goal. GAO also observed that NSF did not provide information on the strategic human capital management strategies necessary to achieve some of the outcomes.

In addition, the validity of NSF's GPRA data and outcome measures has not been firmly established. In order to address these concerns, which were raised by GAO in a report on NSF's FY1999 Performance Report, the agency retained a contractor to verify and validate selected GPRA performance data, including outcome measures. These measures are based on the reports of various external expert panels including the Committees of Visitors (COVs) and Advisory Committees (ACs), which conduct evaluations of program activities. Although the contractor concluded that NSF's processes were adequate, we found that the contractor did not assess the process used by the committees to make their determinations, nor did it evaluate the underlying data used by the committees in making their judgments. NSF states that it understands the importance of data quality and is implementing a COV data project that will substantially improve the information used by NSF committees. Our office is planning to conduct a review of the COV process during the current fiscal year.

Cost Accounting Systems

Good cost accounting information can help management make fully informed decisions based on evaluating the cost of an activity or project against its benefits. At present, NSF's information systems do not readily provide the basic cost accounting information needed to effectively manage and report on agency operations, such as the cost of NSF's various grantmaking activities (e.g., proposal processing, peer review, post-award administration) or large infrastructure projects.

The OIG's FY 2000 Management Letter Report recommended that NSF develop performance measures and goals that can be linked to NSF's budget, actual cost of operations, and the management challenges. NSF's ability to measure agency performance, link its costs to its results, and fully implement GPRA, is dependent on an effective financial and cost accounting system. Therefore, NSF should modify its accounting systems so they can capture total costs and readily supply total cost information useful to NSF management, the National Science Board, and Congress.

5. NSF Program-Specific Challenges

Management of U.S. Antarctic Program

The U.S. Antarctic Program (USAP) should deliver its services as effectively and efficiently as possible in order to facilitate the impressive scientific discoveries that are taking place in the Antarctic. NSF's Office of Polar Programs (OPP) oversees the USAP and manages all U.S. activities in the Antarctic serving the scientific community as a single program. It also supports most of the polar research funded by the National Science Foundation. OPP accomplishes most of its responsibilities by contracting with private companies and governmental organizations. With responsibilities similar in some respects to those of a local government, OPP provides all the infrastructure, instrumentation, and logistics necessary to enable the research efforts of more than 2,000 scientists from around the world.

The successful operation of the USAP requires unique management and administrative skills that are responsive to the special needs of Antarctic scientific research. OPP staff must not only know the science, but must also manage contractors engaged in delivering a broad range of services to the American scientific community located in a difficult and dangerous environment. Our audit work has focused on reviewing these support activities because of their many inherent risks. From our perspective, NSF's polar programs involve not only a large expenditure of money, but also the safety of scientists and workers, environmental concerns, and the national interests of the U.S. Government. For example, we are currently reviewing USAP's safety and health program, regarded as a high-risk activity because of the difficulties of delivering medical services in such a remote location. Another challenge for the program is the tracking and accounting for items associated with the USAP's large and distant infrastructure, which includes equipment, planes, ships and buildings. Capturing the correct information requires close coordination among OPP, its contractors, and NSF financial staff.

Merit Review and its Role in Fostering Diversity

The effectiveness and integrity of the merit review system may be NSF's most valuable asset. The agency considers this system "the keystone for award selection" and focuses many of its

management activities on issues related to merit review. We endorse those efforts and believe that maintaining and improving the quality and integrity of the merit review process will remain a significant challenge for NSF management for years to come.

During the past year the National Academy of Public Administration released a report on the agency's criteria for project selection, focusing in particular on the impact of Criterion 2, which is aimed at evaluating the potential societal impact of a project. While NAPA concluded that it is too soon to judge the impact of Criterion 2, it made several recommendations regarding its use. Specifically, NAPA stated that NSF needed to develop clearer objectives for the new criterion and adopt quantitative measures and performance indicators to track those objectives. Noting that the ultimate issues raised by implementation of Criterion 2 are not those of language but philosophy, NAPA suggested broader-based review panels with participants drawn from a wider range of institutions, disciplines, and underrepresented minorities.

NSF has initiated several changes to the merit review process in the past year to ensure that more attention is paid to Criterion 2, and we understand that further changes are being considered. NSF also states that it is adding new GPRA measures to track progress in encouraging participation in the merit review process by a broader range of institutions and underrepresented minority researchers. Because of its importance to the success of NSF's mission, the merit review system remains on the list of management challenges.

The Math and Science Partnership Program

NSF has been designated the lead agency on a key element of the President's initiative, *No Child Left Behind*, aimed at strengthening and reforming K-12 education. As the performance of American school children on math and science tests continues to disappoint, NSF is preparing to launch the Math and Science Partnership Program. The partnerships will provide $160 million this year for state and local school districts to join with colleges and universities to improve math and science education at the grade school level. A defining feature of the program will be the development of the partnerships between school districts, state and local governments, and institutions of higher learning.

Although we are confident that NSF is striving to achieve success with this initiative, implementation of the program will pose several challenges to NSF. On a practical level, it requires NSF to articulate expectations clearly at the outset and make many awards within a short time frame. Once the selections are made, NSF program officers will need to provide extensive coaching of projects in their formative stage to ensure that awardees do effective project planning. Because the success of the program will depend on a sustained collaboration between institutions that may not be used to working together, NSF staff will also need to assist project partners in building a shared sense of purpose and coordinating efforts.

Also, NSF's experience with projects such as the Urban Systems Initiative indicates that projects involving innovative partnering among awardees with limited experience in handling federal funds will require close monitoring of all aspects of their project, including financial and administrative matters. Therefore, the involvement of NSF on a continuing basis is essential. NSF staff will need to help coordinate the efforts of the various parties, monitor the progress of the projects, and ensure that federal funds are handled properly.

In closing, I am pleased to report that NSF continues to improve its operations as it responds to the above challenges. If you have any questions regarding these challenges, please contact me at your convenience.

MEMORANDUM

DATE: February 12, 2002

FROM: Dr. Rita R. Colwell
Director

SUBJECT: Response to the Inspector General's Statement of the National Science Foundation's Most Serious Management and Performance Challenges

TO: Dr. Christine C. Boesz
Inspector General

Thank you for your memorandum dated January 30,2002 on the National Science Foundation's performance and management challenges as authorized by the Reports Consolidation Act of 2000.

We are pleased with your continued recognition that the Foundation is one of the most cost-effective agencies in the federal government. This is reflected in the "green light" we received from OMB on the President's management scorecard for our financial management system. In addition, external panels have found our programs to be "of high quality and efficiently managed." We can all take pride in these accomplishments.

Nonetheless, we recognize that there is more we can do. We are challenged in an ever-increasing complex world situation to insure that we maintain our high standards and focus on our efficiency and effectiveness. Over its 50-plus year history, NSF's commitment to excellence in supporting research and education has consistently been matched by its high standards and commitment to innovation in administration and management. Continuing this tradition of excellent stewardship requires new approaches and new investments that reflect NSF's increasing responsibilities, the growing complexity of its workload, and new requirements for both IT and physical security, as discussed in NSF's FY 2003 Budget Request.

The five broad areas of management and performance challenges that you have identified are consistent, in many respects, with those identified by NSF's senior management as areas that require our constant attention to assure improvement of our long-term operating performance. Furthermore, four of these areas are directly connected to the President's Management Agenda: Strategic Management of Human Capital; Improved Financial Performance; Expanded Electronic Government; Budget Performance and Integration. The NSF Program –Specific Challenges are likewise consistent with areas that we recognize as requiring increased attention.

We began to address many of these challenges last year and continue to do so. For example, we are addressing workforce planning and training in the five-year Administration and Management plan being prepared for the Office of Management and Budget (OMB). We are refining our award management process to include a more structured, risk-based monitoring element. Increasing management efficiency is a highlight of our FY2003 budget request for Administration and Management (A&M). We remain committed to a reliable and secure information technology infrastructure and will continue to expand and refine our systems to provide even better safeguards.

We continue to develop solid strategic implementation plans to address the challenges before us and, as you point out, the plan to address these challenges must include the need and fulfillment of additional agency resources to keep pace with our increasing workload.

I am pleased that you recognize the great strides that NSF has taken over the past year to improve our operations in response to these challenges. Your office's support and analysis were vital to our successfully making the case to OMB for increased staffing and resources for A&M in the FY 2003 Request. In this spirit, we look forward to continuing to work together to improve the efficiency and effectiveness of the operations of the Foundation.

Rita Colwell

V. APPENDICES

DESCRIPTION OF NSF DIRECTORATES AND MANAGEMENT OFFICES

The **Directorate for Biological Sciences (BIO)** supports research programs ranging from the study of the structure and dynamics of biological molecules, such as proteins and nucleic acids, through cells, organs and organisms, to studies of populations and ecosystems. It encompasses processes that are internal to the organism as well as those that are external, and includes temporal frameworks ranging from measurements in real time through individual life spans, to the full scope of evolutionary times. Among the research programs BIO supports is fundamental academic research on biodiversity, environmental biology, and plant biology, including providing leadership for the Multinational Coordinated *Arabidopsis* Genome Project.

The **Directorate for Computer and Information Sciences and Engineering (CISE)** supports research on the theory and foundations of computing, system software and computer system design, human-computer interaction, as well as prototyping, testing and development of cutting-edge computing and communications systems to address complex research problems. CISE also provides the advanced computing and networking capabilities needed by academic researchers for cutting-edge research in all science and engineering fields.

The **Directorate for Education and Human Resources (EHR)** supports a cohesive and comprehensive set of activities that encompass every level of education and every region of the country. EHR promotes public science literacy and plays a major role in the Foundation's long-standing commitment to developing our nation's human resources for the science and engineering workforce of the future. Focus is given to programs that encourage the participation and achievement of groups underrepresented in science and engineering. NSF-supported education and training programs cover a broad spectrum -- from supporting students and teachers to creating new ways of teaching and learning to assisting school districts and other systems forge greater gains in learning.

The **Directorate for Engineering (ENG)** supports research and education activities that spur new technological innovations and create new products and services and more productive enterprises. ENG also makes critical investments in facilities, networks and people to assure diversity and quality in the nation's infrastructure for engineering education and research.

The **Directorate for Geosciences** (GEO) supports research in the atmospheric, Earth and ocean sciences. Basic research in the Geosciences advances our scientific knowledge of the Earth and advances our ability to predict natural phenomena of economic and human significance, such as climate change, weather, earthquakes, fish-stock fluctuations, and disruptive events in the solar-terrestrial environment. GEO also supports the operation of national user facilities.

The **Directorate for Mathematical and Physical Sciences (MPS)** supports research and education in astronomical sciences, chemistry, materials research, mathematical sciences and physics. Major equipment and instrumentation such as telescopes and particle accelerators are provided to support the needs of individual investigators. MPS also supports state-of-the-art facilities that enable research at the cutting edge of science and research opportunities in totally new directions.

The **Directorate for Social, Behavioral and Economic Sciences (SBE)** supports to research to build fundamental scientific knowledge about human behavior, interaction, and social and economic systems, organizations and institutions. SBE also facilitates NSF's international activities by promoting partnerships between U.S. and foreign researchers, enhancing access to critical research conducted outside the U.S. and increasing knowledge of mutually beneficial research opportunities abroad. To improve understanding of the science and engineering enterprise, SBE also supports science resources studies that are the nation's primary source of data on the science and engineering enterprise.

The **Office of Polar Programs (OPP)**, which includes the U.S. Polar Research Programs and U.S. Antarctic Logistical Support Activities, supports multidisciplinary research in Arctic and Antarctic regions. These

geographic frontiers—premier natural laboratories—are the areas predicted to be the first affected by global change. They are vital to understanding past, present, and future responses of Earth systems to natural and man-made changes. Polar Programs support provides unique research opportunities ranging from studies of the Earth ice and oceans to research in atmospheric sciences and astronomy.

The **Office of Budget, Finance and Award Management (BFA)** is headed by the Chief Financial Officer who has responsibility for budget, financial management, grants administration and procurement operations and related policy. Budget responsibilities include the development of the Foundation's annual budget, long range planning and budget operations and control. BFA's financial, grants and other administrative management systems ensure that the Foundation's resources are well managed and that efficient, streamlined business and management practices are in place. NSF has been acknowledged as a leader in the federal research administration community, especially in its pursuit of a paperless environment that provides more timely, efficient awards administration.

The **Office of Information and Resource Management (OIRM)** provides information systems, human resource management, and general administrative and logistic support functions to the NSF community of scientists, engineers, and educators as well as to the general public. OIRM is responsible for supporting staffing and personnel service requirements for staff members including visiting scientists; NSF's physical infrastructure; dissemination of information about NSF programs to the external community; and administration of NSF's sophisticated technological infrastructure, providing the hardware, software and support systems necessary to manage the Foundation's grant-making process and to maintain advance financial and accounting systems.

National Science Foundation
President's Management Agenda Scorecard

Baseline Results as of September 30, 2001

Initiative	Current Status
Human Capital: NSF received a red because its agency human capital strategy is not integrated into its budget and strategic plans and the agency does not implement succession plans. NSF does use staffing flexibilities well, such as that provided for in the Intergovernmental Personnel Act. NSF is moving expeditiously to develop a Training Academy and to conduct an Organizational Assessment Survey. The agency also will initiate a significant workforce analysis in 2002. The Foundation is developing a five-year administration and management strategic plan to lay out how it plans to address its workforce issues in the coming years.	RED
Competitive Sourcing: NSF has not launched a viable competitive sourcing initiative. In its 2000 analysis of workforce activities, NSF identified 533 positions as performing commercial functions. NSF has not decided if it will compete any positions at this time. The agency wants to wait until it gets results from its upcoming workforce analysis before it makes a decision on competing positions. At that rate it will be difficult for the agency to meet 2003 competition goals. NSF must develop and submit a competitive sourcing plan to meet near-term goals.	RED
Financial Management: NSF is a leader in financial management and has met all core criteria for a green rating for financial management. NSF's financial management systems meet federal financial management system requirements and it has received unqualified and timely audit opinions on its annual financial statements. NSF expedts to maintain this position.	GREEN
E-Government: NSF meets most, but not all, of the standard core criteria for expanding E-Government. All major information technology projects provided sufficient business cases. However, NSF's Government Information Security Reform Act report reflects deficiencies in a number of important areas of security. These concerns include failure to implement information and risk of disruption of essential services. NSF has submitted its corrective action plans and will be reallocating 2002 funds to quickly correct identified problems.	YELLOW
Budget/Performance Integration: NSF's budget does not tie resources to results, provides limited focus on outcomes, and does not charge the full budgetary cost to individual activities. There are inherent difficulties in integrating the budget with performance, given the long-term nature of research in which results may not occur for ten years or more. Nonetheless, NSF could do more. In spring 2002, OMB and the While House office of Science and Technology Policy will work with major research agencies to develop criteria for evaluating basic research during the formulation of the 2004 budget.	RED

KEY:
- Green indicates agency as met all core criteria for that initiative.
- Yellow indicates agency achievement of some but not all of OB's core criteria for the initiative and agency has no red conditions.
- Red indicates that at least one of the conditions identified by OMB for that initiative is in need of correction.

For a more detailed discussion of the President's Management Agenda, see the Budget of the United States Government, FY 2003.

HOW RESEARCH RESULTS ARE ASSESSED

NSF's Strategic Outcome Goals address how NSF investments have led to results important to the broad mission of the agency. These outcome goals do not lend themselves to quantitative reporting, therefore NSF has developed an alternative format--a qualitative scale that allows NSF to report whether or not the agency has been successful in achieving its outcome goals. Also, because many research results appear long after an investment is made, in some cases ten years or more, this assessment report of NSF's program performance is retrospective. That is, the outcome results reported in FY 2001 are from investments made prior to FY 2001. The results of the investments made in FY 2001 will not begin to be reported until beyond FY 2001.

In FY 2001, NSF's Strategic Outcome Goals of Ideas and Tools are expressed in a non-quantitative, qualitative form, each critical to ensure the progress of science. The results reported for the year are collected, tabulated and summarized by aggregating many individual reports prepared by committees of external experts assessing individual programs or clusters of programs throughout the fiscal year. The assessment is retrospective, covering a subset of one-third of NSF's programs that represent activities spanning the entire agency and covering a period of three years or more.

The Strategic Outcome Goal of People includes three performance indicators, of which two are quantitative measures.

The Assessment of Research Results: Committees of external experts are carefully selected to provide NSF with an objective, independent assessment of program results. These committees, known as Committees of Visitors (COVs) and Advisory Committees (ACs), assess approximately one-third of NSF's programs each year. In FY 2001, they were asked to evaluate the progress made by the programs in achieving each of NSF's outcome goals as well as the decision process leading to awards.

Programs are evaluated on a three-year cycle, thus for FY 2001, the years 1998, 1999 and 2000 were most likely to be the years reviewed by the COVs. This process means that each year a different subset of NSF's programs is evaluated by a different group of experts. Hence, in FY 2000, evaluators assessed one-third of NSF's programs and in FY 2001, evaluators assessed a different one-third subset of NSF's programs.

In addition to the programmatic assessments conducted by the COVs and ACs each year, there are program evaluations carried out by independent contractors to address specific issues. These program evaluations provide important information that enables NSF program staff to make better decisions about how to best invest NSF resources. These programmatic assessments do not directly address NSF's GPRA goals.

FY 2001 RESULTS OF NSF'S STRATEGIC OUTCOME GOALS

Strategic Outcome	FY 2001 Annual Performance Goal	Results for National Science Foundation
People Strategic Outcome **Outcome Goal:** Development of "a diverse, internationally competitive and globally-engaged workforce of scientists, engineers, and well-prepared citizens."	***Performance Goal:*** **NSF is successful when, in the aggregate, results reported in the period demonstrate significant achievement in one or more of the following indicators:** • Improved mathematics, science, and technology skills for U.S. students at the K-12 level, and for citizens of all ages, so that they can be competitive in a technological society. • A science and technology and instructional workforce that reflects America's diversity. • Globally engaged science and engineering professionals who are among the best in the world. • A public that is provided access to the benefits of science and engineering research and education. FY 2001 Result: Reports prepared by external experts during FY 2001 GPRA reporting provide assessments and retrospective examples of NSF-supported projects that document significant achievement. *A number of these assessments were emphatic that NSF must continue and increase its efforts related to diversity.	New goal in FY 2001 **FY 2001: NSF is successful.** • Demonstrated significant achievement • Demonstrated significant achievement* • Demonstrated significant achievement • Demonstrated significant achievement
	Performance Goal: Over 80 % of schools participating in systemic initiative programs will, after three years of NSF support: (1) implement a standard-based curriculum in science and mathematics; (2) further professional development of the instructional workforce; and (3) improve student achievement on a selected battery of tests. FY 2001 Result:** The curriculum, instructional workforce, and improved achievement in science components of the goal were successful. However, less than 80% of schools met the goal of improved student achievement in mathematics. In FY 2002, appropriate technical assistance will be provided to schools not meeting the goal.	**FY 1999:** NSF successful **FY 2000:** NSF successful **FY 2001: NSF is not successful. ******
	Performance Goal: Through systemic initiatives and related teacher enhancement programs, NSF will provide intensive professional development experiences for at least 65,000 pre-college teachers. FY 2001 Result: In school year 1999-2000, EHR awards provided intensive professional development (60 hours or more) to a total of 79,000 teachers, exceeding substantially the GPRA goal of 65,000.	**FY 1999:** NSF successful **FY 2000:** NSF successful **FY 2001: NSF is successful.**

FY 2001 RESULTS OF NSF'S STRATEGIC OUTCOME GOALS (continued)

Strategic Outcome	FY 2001 Annual Performance Goal	Results for National Science Foundation
Ideas Strategic Outcome: **Outcome Goal:** Enabling "discovery across the frontier of science and engineering, connected to learning, innovation and service to society."	***Performance Goal:*** **NSF is successful when, in the aggregate, results reported in the period demonstrate significant achievement in one or more of the following indicators:** • A robust and growing fundamental knowledge base that enhances progress in all science and engineering areas including the science of learning. • Discoveries that advance the frontiers of science, engineering and technology. • Partnerships connecting discovery to innovation, learning, and societal advancement. • Research and education processes that are synergistic. FY 2001 Result: Reports prepared by external experts during FY 2001 GPRA reporting provide assessments and retrospective examples of NSF-supported projects that document significant achievement.	New goal in FY 2001 **FY 2001: NSF is successful.** • Demonstrated significant achievement • Demonstrated significant achievement • Demonstrated significant achievement • Demonstrated significant achievement
Tools Strategic Outcome **Outcome Goal:** Providing "broadly accessible, state-of-the art and shared research and education tools."	***Performance Goal:*** **NSF is successful when, in the aggregate, results reported in the period demonstrate significant achievement in one or more of the following indicators:** • Shared use platforms, facilities, instruments, and databases that enable discovery and enhance the productivity and effectiveness of the science and engineering workforce. • Networking and connectivity that take full advantage of the Internet and make SMET information available to all citizens. • Information and policy analyses that contribute to the effective use of science and engineering resources. FY 2001 Result: Reports prepared by external experts during FY 2001 GPRA reporting provide assessments and retrospective examples of NSF-supported projects that document significant achievement. *There are very limited contributions and limited involvement of agency programs other than Science Resources Statistics (SRS) in developing information and other materials fundamental to national policy debates.	New goal in FY 2001 **FY 2001: NSF is successful.** • Demonstrated significant achievement • Demonstrated significant achievement • Demonstrated significant achievement*

FY 2001 RESULTS OF NSF'S MANAGEMENT GOALS

Performance Area	FY 2001 Annual Performance Goal	Results for National Science Foundation
NSF Business Practices		
Electronic Proposal Submission	***Performance Goal:*** 95% of full proposals will be received electronically through FastLane. FY 1998 Baseline 17% FY 1999 Result 44% FY 2000 Goal 60% FY 2000 Result 81% FY 2001 Goal 95% FY 2001 Result 99%	**FY 1999**: NSF successful **FY 2000:** NSF successful **FY 2001: NSF is successful.**
Electronic Proposal Processing	***Performance Goal:*** In FY 2001, NSF will conduct ten pilot paperless projects that manage the competitive review process in an electronic environment. FY 2001 Result: Ten pilot paperless projects were completed.	New goal in FY 2001 **FY 2001: NSF is successful.**
Video-Conference/Long-Distance Communications	***Performance Goal:*** By the end of FY 2001, NSF will increase usage of a broad range of video-conferencing / long distance communications technology by 100 % over the FY 1999 level. FY 2001 Result: 142 videoconferences were conducted, an increase of 184 % over the 1999 level.	New goal in FY 2001 **FY 2001: NSF is successful.**
NSF Staff		
Diversity	***Performance Goal:*** NSF will show an increase over 1997 in the total number of hires to science and engineering positions from underrepresented groups. FY 1997 Baseline: 16 females and 15 members of underrepresented minority groups were hired. FY 2000 Result: 35 females and 19 members of underrepresented minority groups were hired. FY 2001 Result: 38 females and 22 members of underrepresented minority groups were hired.	Goal revised in FY 2000 **FY 1999**: NSF successful for related goal **FY 2000:** NSF successful **FY 2001: NSF is successful.**

FY 2001 RESULTS OF NSF'S MANAGEMENT GOALS (continued)

Performance Area	FY 2001 Annual Performance Goal	Results for National Science Foundation
Work Environment	***Performance Goal:*** NSF will establish various baselines that will enable management to better assess the quality of worklife and work environment within the Foundation. FY 2001 Result: Development of an employee survey is underway. This survey will provide baseline information on the quality of worklife and work environment at NSF. In FY 2002, the survey will be made available to employees.	New goal in FY 2001 **FY 2001: NSF is not successful.**

FY 2001 RESULTS OF NSF'S INVESTMENT PROCESS GOALS

Performance Area	FY 2001 Annual Performance Goal	Results for National Science Foundation
Proposal and Award Processes		
Use of Merit Review	***Performance Goal:*** At least 85 % of basic and applied research funds will be allocated to projects that undergo merit review. * FY 2000 Goal 80% FY 2000 Result 87% FY 2001 Goal 85% FY 2001 Result 88% **During FY 2000, OMB re-defined what constitutes a merit-reviewed project and established a new target level of 70-90%.*	Goal revised in FY 2000 **FY 1999**: NSF successful for related goal **FY 2000:** NSF successful **FY 2001: NSF is successful.**
Implementation of Merit Review Criteria – Reviewers	***Performance Goal:*** NSF performance in implementation of the merit review criteria is successful when reviewers address the elements of both generic review criteria. FY 2001 Result: Program reports prepared by external experts during FY 2001 GPRA reporting provide assessment of implementation of merit review criteria for reviewers. In FY 1998 – FY 2000, reviewers did not consistently address the broader impacts criterion. In FY 2001, NSF added separate review screens to FastLane to enable reviewers to address each merit -review criterion separately. NSF also established an internal task force to examine strategies to improve both proposer and reviewer attention to the broader impacts criterion. A number of FY 2001 reports note that reviewers are making significant progress in utilizing both merit review criteria. In FY 2002, NSF will continue to develop and apply recommendations that focus on strategies that stress the importance of using both criteria. It will also collect and make available examples of broader impacts and develop a plan to disseminate them.	Goal revised in FY 2001. **FY 2001: NSF is not successful.**
Implementation of Merit Review Criteria – Program Officers	***Performance Goal.*** NSF performance in implementation of the merit review criteria is successful when program officers address the elements of both generic review criteria when making their award decisions. FY 2001 Result: Program reports prepared by external experts during FY 2001 GPRA reporting result in an assessment of successful for the foundation in implementation of both merit review criteria for program managers.	Goal revised in FY 2001. **FY 2001: NSF is successful.**

FY 2001 RESULTS OF NSF'S INVESTMENT PROCESS GOALS (continued)

Performance Area	FY 2001 Annual Performance Goal	Results for National Science Foundation
Customer Service: Time to Prepare Proposals	***Performance Goal:*** 95 % of program announcements will be available to relevant individuals and organizations at least three months prior to the proposal deadline or target date. FY 1998 Baseline 66% FY 1999 Result 75% FY 2000 Goal 95% FY 2000 Result 89% FY 2001 Goal 95% FY 2001 Result 100%	**FY 1999**: NSF not successful **FY 2000:** NSF not successful **FY 2001: NSF is successful.**
Customer Service: Time to Decision	***Performance Goal:*** For 70 % of proposals, be able to tell applicants whether their proposals have been declined or recommended for funding within six months of receipt. FY 1998 Baseline 59% FY 1999 Result 58% FY 2000 Goal 70% FY 2000 Result 54% FY 2001 Goal 70% FY 2001 Result 62% FY 2001 Result: In FY 2001, 62% of proposals were processed within 6 months of receipt. In FY 2002, NSF will continue to focus on improving the efficiency of proposal processing, including the dissemination of best practices to program staff.	**FY 1999:** NSF not successful **FY 2000:** NSF not successful **FY 2001: NSF is not successful.**
Award Size	***Performance Goal:*** NSF will increase the average annualized award size for research projects to $110,000. FY 1998 $90,000 FY 1999 $94,000 FY 2000 $105,800 FY 2001 Goal $110,000 FY 2001 Result $113,601	New goal in FY 2001. **FY 2001: NSF is successful.**

RESULTS OF NSF'S INVESTMENT PROCESS GOALS
(continued)

Performance Area	FY 2001 Annual Performance Goal	Results for National Science Foundation
Award Duration	***Performance Goal:*** NSF will increase the average duration of awards for research projects to at least three years. FY 1998 Baseline 2.7 years FY 1999 Goal 2.8 years FY 1999 Result 2.8 years FY 2000 Result 2.8 years FY 2001 Goal 3.0 years FY 2001 Result 2.9 years FY 2001 Result: Resource limitations impacted NSF's ability to achieve both the award size and award duration goals. NSF focused its efforts on increasing average annualized award size. In FY 2002, NSF will continue to focus on increasing award size and duration in order to improve the efficiency of the research process.	**FY 1999:** NSF successful **FY 2000:** Not applicable **FY 2001: NSF is not successful**.
Maintaining Openness in the System	***Performance Goal:*** NSF will award 30 % of its research grants to new investigators. FY 1997 Baseline 27% FY 1998 27% FY 1999 Goal 30% FY 1999 Result 27% FY 2000 Goal 30% FY 2000 Result 28% FY 2001 Goal 30% FY 2001 Result 28% In FY 2002, NSF will continue its outreach to new investigators to promote awareness of research funding and to encourage new investigators to submit proposals.	**FY 1999:** NSF not successful **FY 2000:** NSF not successful **FY 2001: NSF is not successful.**

FY 2001 RESULTS OF NSF'S INVESTMENT PROCESS GOALS
(continued)

Performance Area	FY 2001 Annual Performance Goal	Results for National Science Foundation
Broadening Participation		
Reviewer Pool	***Performance Goal:*** NSF will begin to request voluntary demographic data electronically from all reviewers to determine participation levels of members of underrepresented groups in the NSF reviewer pool. FY 2001 Result: The reviewer system in FastLane was revised to gather voluntary demographic data.	New goal in FY 2001. **FY 2001: NSF is successful.**
Facilities Oversight		
Construction and Upgrade	***Performance Goal:*** For 90 % of facilities, keep construction and upgrades within annual expenditure plan, not to exceed 110 % of estimates. FY 1999 Result: Majority of facilities within 110 % of annual spending estimates. FY 2000 Result: Of the 11 construction and upgrade projects, all were within annual expenditure plans; most were under budget. FY 2001 Result: Of 25 construction and upgrade projects, 24 (96 %) were within 110 % of annual expenditure plans.	Goal revised in FY 2001 **FY 1999:** NSF successful for related goal **FY 2000:** NSF successful **FY 2001: NSF is successful.**

FY 2001 RESUTLS OF NSF'S INVESTMENT PROCESS GOALS
(continued)

Performance Area	FY 2001 Annual Performance Goal	Results for National Science Foundation
Construction and Upgrade	***Performance Goal:*** 90% of facilities will meet all annual schedule milestones by the end of the reporting period. FY 1999 Result: Majority of facilities on schedule. FY 2000 Result: Majority (7 of 11) of construction/upgrade projects within the annual schedule goal. FY 2001 Result: Of the 25 construction and upgrade projects, 21 (84 %) met all annual schedule milestones by the end of the reporting period. Project delays were caused in part by circumstances beyond the control of the facility, technical problems and personnel issues. In FY 2002, NSF will work with awardees to identify obstacles to successful performance and implement plans to avoid or mitigate their consequences in the future.	Goal revised in FY 2001. **FY 1999:** NSF successful for related goal **FY 2000:** NSF not successful for related goal **FY 2001: NSF is not successful.**
Construction and Upgrade	***Performance Goal:*** For all construction and upgrade projects initiated after 1996, keep total cost within 110 % of estimates made at the initiation of construction. FY 2001 Result: One project was completed. The actual total cost was equal to the estimated total cost.	**FY 1999 and FY 2000:** There were no projects completed, therefore this goal did not apply. **FY 2001: NSF is successful.**
Operations and Management of Facilities	*Performance Goal:* For 90 % of facilities, keep operating time lost due to unscheduled downtime to less than 10 % of the total scheduled operating time. FY 1999 Result: Reporting database under development. FY 2000 Result: Of the 26 reporting facilities, 22 (85%) met the goal of keeping unscheduled downtime to below 10% of the total scheduled operating time. FY 2001 Result: Of the 29 reporting facilities, 25 (86 %) met the goal of keeping unscheduled downtime to below 10 % of the total scheduled operating time. Some causes of failure were outside the control of the facility or were related to technical problems. In FY 2002, NSF will continue to work with awardees to identify obstacles to successful performance and develop plans to avoid or mitigate their consequences in the future.	Goal revised in FY 2001. **FY 1999:** Inconclusive for related goal **FY 2000:** NSF not successful for related goal **FY 2001: NSF is not successful.**

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List of Acronyms

AC	Advisory Committee
AGI	*Arabidopsis* Genome Initiative
AMORE	Arctic Mid-Ocean Ridge Expedition
BFA	Office of Budget, Finance and Award Management
BIO	Directorate for Biological Sciences
CAREER	Faculty Career Early Development Program
CFO	Chief Financial Officer
CIO	Chief Information Officer
CIP	Construction in Progress
CISE	Directorate for Computer and Information Science and Engineering
CMB	Cosmic Microwave Background
COV	Committee of Visitors
CSRS	Civil Service Retirement System
DGA	Division of Grants and Agreements
DOL	U.S. Department of Labor
EFT	Electronic Fund Transfer
EHR	Directorate for Education and Human Resources
ENG	Directorate for Engineering
FASAB	Federal Accounting Standards Advisory Board
FECA	Federal Employees Compensation Act
FERS	Federal Employees Retirement System
FFMIA	Federal Financial Management Improvement Act of 1996
FFRDC	Federally Funded Research and Development Centers
FMFIA	Federal Managers' Financial Integrity Act of 1982
FRTIB	Federal Retirement Thrift Investment Board
GAO	General Accounting Office
GEO	Directorate for Geosciences
GPRA	Government Performance and Results Act of 1993
GSA	General Services Administration
HHS	U.S. Department of Health and Human Services
H-1B	Nonimmigrant Petitioner Visa
IG	Inspector General
IPA	Intergovernmental Personnel Act
IPAY	Integrated Payroll System
ITAS	Integrated Time and Attendance System
K-12	Kindergarten through Grade 12
LTER	Long-term Ecological Research
MCC	Management Controls Committee
MPS	Directorate for Mathematical and Physical Sciences
MRE	Major Research Equipment
MRI	Magnetic Resonance Imaging
NAIC	National Astronomy and Ionosphere Center
NAPA	National Academy of Public Administration
NOAA	National Oceanic and Atmospheric Administration
NOAO	National Optical Astronomy Observatories
NRAO	National Radio Astronomy Observatories
NSB	National Science Board
NSF	National Science Foundation
OIG	Office of Inspector General
OIRM	Office of Information and Resource Management
OMB	White House Office of Management and Budget
OPAC	On-line Payment and Collection
OPM	Office of Personnel Management
OPP	Office of Polar Programs
PATS	Program Announcement Template
PIT	People, Ideas Tools
PP&E	Property, Plant and Equipment
PwC	PricewaterhouseCoopers LLP
R&RA	Research and Related Activities
SBE	Directorate for Social, Behavioral and Economic Sciences
SBIR	Small Business Innovation Research
S&E	Salaries and Expenses
SFFAS	Statement of Federal Financial Accounting Standards
UCAR	National Center for Atmospheric Research
USC	United States Code
USAP	U.S. Antarctic Program
USI	Urban Systemic Initiative
VSEE	Visiting Scientists, Engineers and Educators
WTC	World Trade Center