

◀ This computer-generated image of minimal surface area illustrates how advanced imaging technologies have opened new frontiers in mathematics and other disciplines

# Management's Discussion & Analysis

## Agency Profile

This year, the National Science Foundation (NSF) celebrated its 50th Anniversary as leader and steward of the nation’s science and engineering enterprise. These fifty years have been marked by path-breaking advances in science and engineering knowledge that have spurred innovation, fueled economic growth, and led to the highest standard of living in U.S. history. Discoveries at the frontiers of knowledge have transformed agriculture, communications, transportation, and industry. They have contributed to significant improvements in a broad array of areas—among them public safety, national defense, health, and the environment—that have secured greater social well being for everyone in the U.S.

In just the past decade, the U.S. has enjoyed an unprecedented period of economic expansion that Federal Reserve Chairman Alan Greenspan has attributed to advances in science, engineering, and technology. More than ever before in history, strengthening national capabilities to create and make use of knowledge will determine U.S. prospects for the future. Building on its record of achievement, NSF aims in its next fifty years to advance fundamental research and learning in all fields of science, mathematics and engineering to ensure that future generations will enjoy sustained prosperity and a higher quality of life.

### The NSF Mission: Enabling the Nation’s future through discovery, learning and innovation

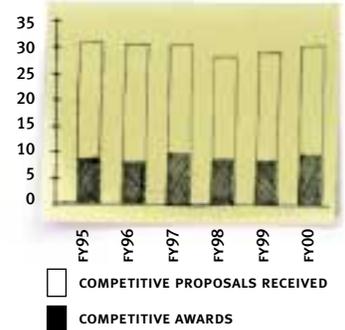
President Franklin D. Roosevelt, recognizing the important role that science and technology played in the war effort, foresaw the potential contribution of the science and engineering enterprise to the postwar world. At President Roosevelt’s request, Vannevar Bush, then director of the wartime Office of Scientific Research and Development, wrote a report, *Science- the Endless Frontier* (1945), which laid the groundwork for the establishment of the Foundation. On May 10, 1950, President Harry S. Truman signed into law The National Science Foundation Act of 1950 (P.L. 81-507) which created NSF and its mission “to promote the progress of science; to advance the national health, prosperity, and welfare; and for other purposes.” The Act authorizes and 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; and education programs at all levels in all fields of science and engineering. The Act also authorizes the establishment of an information base for science and engineering appropriate for development of national and international policy. Over time, additional responsibilities have been added, such as developing computer science and other methodologies; providing Antarctic research, facilities and logistic support; and addressing issues of equal opportunity in science and engineering. Today, NSF stands alone as the only agency of the federal government devoted to supporting basic science and engineering research and education in all fields of science and engineering at all levels.

## What NSF Does and How We Do It

NSF supports research and education via grants, contracts, and cooperative agreements to about 1,800 colleges, universities, K-12 schools, academic consortia, nonprofit organizations, small businesses and other research institutions in all parts of the United States. The Foundation 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.

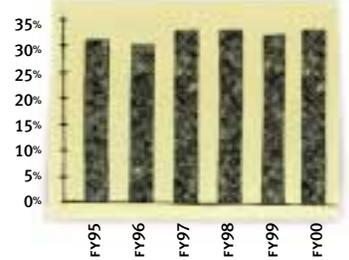
Each year NSF receives nearly 30,000 proposals for research and educational projects. Given NSF's available resources only about one in three new proposals are funded. In addition to funding individuals and small groups, NSF funds national research centers and state-of-the art research facilities and instrumentation, such as the National Astronomy Centers, oceanographic research ships and Antarctic research stations. NSF also supports cooperative research between universities and industry as well as U.S. participation in international scientific efforts. Education and training activities supported by the Foundation benefit students from kindergarten through the post-doctoral level, including the funding of about 900 new graduate research fellowships each year.

Proposals and Awards (in thousands)

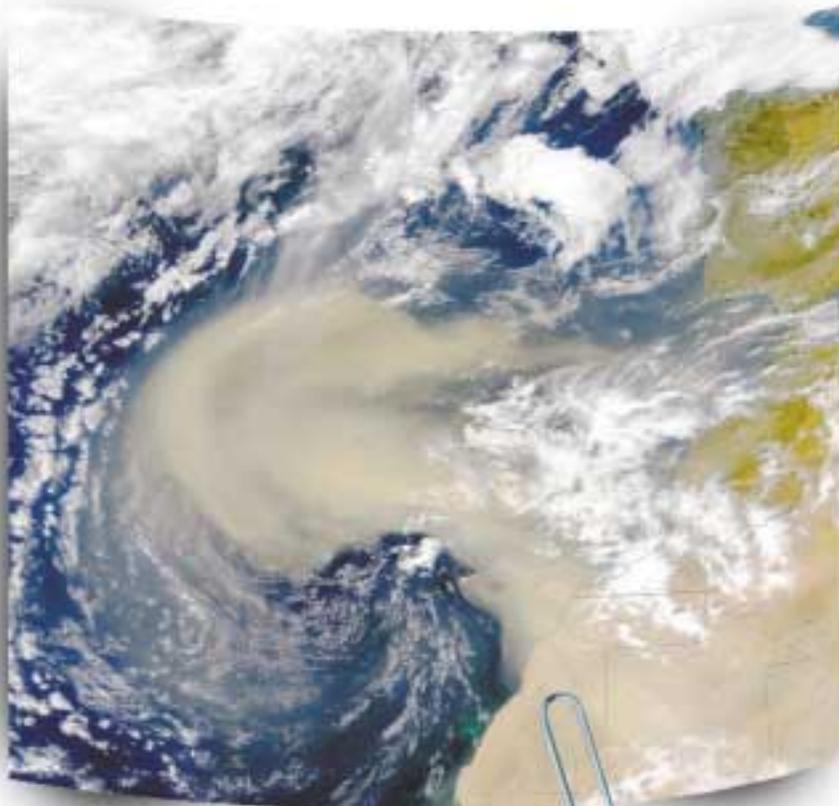


In FY 2000, NSF funded nearly 9,800 proposals from a wide range of fields in science, engineering, and education.

Funding Rate for all Competitive Proposals (percent)



In FY 2000, NSF funded 33% of the proposals received. In the last six years the funding rate has ranged from 30% to 33%. Awards are selected through a rigorous peer evaluation and merit review process.



In 1999, NSF initiated *Biocomplexity in the Environment*, a research thrust to study complex phenomena that arise as a result of dynamic interactions that involve biological systems and their physical environment. In one project, researchers at the University of Southern California are investigating a possible feedback system that involves dust, marine nitrogen fixation, and global climate. Shown here is dust from deserts swirling into the open ocean.

Photo courtesy of A. Michaels and D. Capone, University of Southern California.



## News – December 9, 1999

NSF PR 99-72

**Media contact:** Peter West (703) 292-8070

[pwest@nsf.gov](mailto:pwest@nsf.gov)

**Program contact:** Polly Penhale (703) 306-1033

[ppenhale@nsf.gov](mailto:ppenhale@nsf.gov)

### Bacteria May Thrive in Antarctic Lake

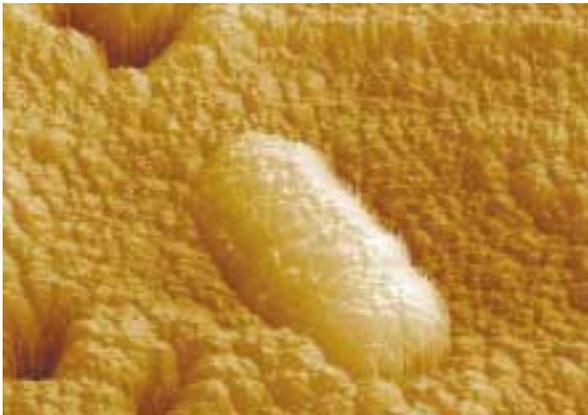
#### Holds Implications for Search for Life in the Solar System

Two separate investigations of ice drilled at Lake Vostok, a suspected body of subglacial water deep in the Antarctic interior, indicate that bacteria may live thousands of meters below the ice sheet. The findings by two National Science Foundation-funded researchers are scheduled for publication in the Dec. 10 issue of *Science*.

Two research teams, led by David M. Karl from the University of Hawaii and John C. Priscu of Montana State University, examined fragments of ice taken from roughly 3,600 meters (11,700 feet) below the surface—about 120 meters (393 feet) above the interface of ice and suspected water. Both teams found bacteria in “accreted” ice, or ice believed to be refrozen lake water.

Microscopic images of bacteria found in melt samples taken from ice thought to be refrozen from the waters of Lake Vostok.

Photos courtesy of David M. Karl, et. al.

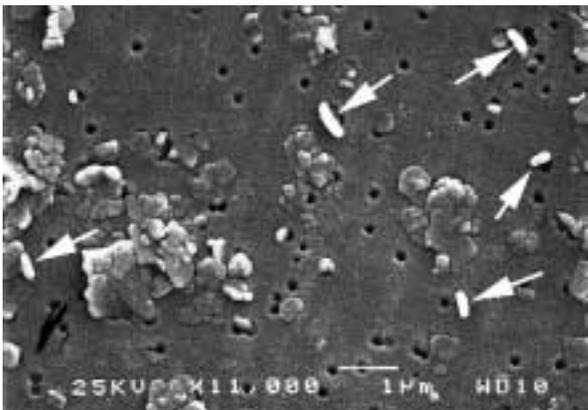


The teams conclude that a potentially large and diverse population of bacteria may be present in the lake. If so, this bacteria answers an intriguing scientific question about whether an extremely cold, dark environment which is cut off from a ready supply of nutrients can support life. The DNA analysis by Priscu's team indicates that although the bacteria have been isolated for millions of years, they are biologically similar to known organisms. The teams also conclude microbes could thrive in other, similarly hostile places in the solar system.

Evidence from radar mapping and other sources indicates that under several thousand meters of ice, liquid water may exist in Lake Vostok, possibly warmed by the pressure of the ice above or by thermal features below. The lake is roughly the size of Lake Ontario in North America.

Karl notes at least one outstanding question about Lake Vostok: whether the ice in which the bacteria were found is sufficiently similar to the water in the lake to allow scientists to conclude that a similar population—or an even larger, more diverse one—might thrive in the suspected liquid water

There are other scientific reasons to explore the lake itself. Ice cores have helped scientists assemble a climate record stretching back more than 400,000 years. Sediment samples from the bottom of Lake Vostok could extend that record to cover millions of years.



Rigorous merit review is a critical component of NSF's decision making process for funding research and education projects. Award selections based on a competitive merit review process with peer evaluation ensure that the best ideas from the strongest researchers and educators will be identified for funding. NSF awards directly engage an estimated 200,000 research scientists, engineers, mathematicians, teachers and students, ranging from K-12 to post-doctoral associates. Recipients of NSF funds are wholly responsible for conducting their project activities and preparing the results for publication.

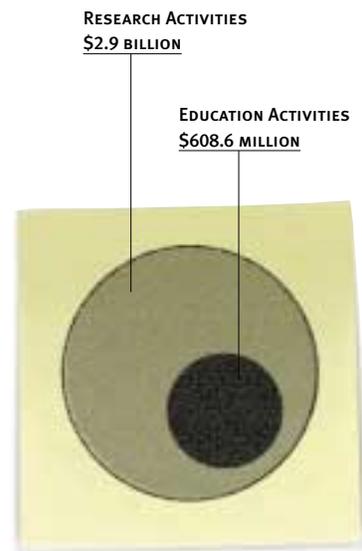
In FY 2000, NSF support of research activities totaled \$2.9 billion and NSF support of education activities totaled \$0.6 billion, as indicated in the Statement of Net Cost. Investment priorities focused on augmenting the nation's information technology (IT) knowledge base and strengthening the IT workforce, and fostering research in Biocomplexity in the Environment to better understand the dynamic interactions among the biological, physical and social components of the Earth's diverse systems. A new program initiated in FY 2000 was Partnerships for Innovation (PFI). PFI's goal is to build creative interactions in local communities between colleges and universities, government agencies, foundations and private corporations that will act as catalysts in helping communities transform new knowledge into innovations, create opportunities for new wealth, and build strong local and regional economies.

NSF is committed to ensuring that the U.S. has world class scientists and engineers, a national workforce that is scientifically, technically and mathematically strong, and a citizenry that understands and can take full advantage of basic concepts in science, math, engineering and technology (SMET). NSF supports education and training efforts in all regions of the country, focusing on developing new initiatives and instituting change, such as curriculum and instructional materials development and comprehensive systemic improvement efforts at the pre-college and undergraduate levels. NSF-supported informal science programs reach a wide and diverse audience of millions, such as *Galapagos*, a 3-D film currently being shown at the Smithsonian that shares with viewers the experience of traveling with a team of researchers to a field site in the exotic Galapagos Islands. In FY 2000, NSF also provided support for development of a National SMET Digital Library, a virtual facility to link students, teachers, and university faculty and provide broad access to standards-based science and math educational materials and learning tools for schools and academic institutions nationwide.

**Number of People Directly Engaged in NSF Activities**

SENIOR RESEARCHERS.....	24,100
OTHER PROFESSIONALS.....	8,900
POSTDOCTORAL ASSOCIATES.....	4,800
GRADUATE/UNDERGRADUATE STUDENTS.....	51,500
K-12 STUDENTS.....	11,500
K-12 TEACHERS.....	83,000
<b>Total.....</b>	<b>183,800</b>

*In FY 2000, an estimated 200,000 people were directly engaged in NSF-supported activities, and millions indirectly involved through NSF-supported activities such as science museums and television and radio programs.*



*NSF supports research and education activities, although given the integrative nature of research and education, research activities often include an education component.*

**NSF's Organizational Structure**

NSF is headed by a Director who is appointed by the President and confirmed by the U.S. Senate to serve a six-year term. 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 NSF. A 24-member National Science Board (NSB) oversees the policies and programs of the Foundation. Members are appointed by the President with the consent of the Senate, and serve six-year terms. The NSF Director is a member *ex officio* of the Board.



## News – November 29, 1999

NSF PR 99-71

**Media contacts:** Amber Jones (NSF) (703) 292-8070 [aljones@nsf.gov](mailto:aljones@nsf.gov)  
 Donald Savage (NASA) (202) 358-1547 [don.savage@hq.nasa.gov](mailto:don.savage@hq.nasa.gov)  
**Program contact:** Vernon Pankonin (NSF) (703) 306-1826 [vpankoni@nsf.gov](mailto:vpankoni@nsf.gov)

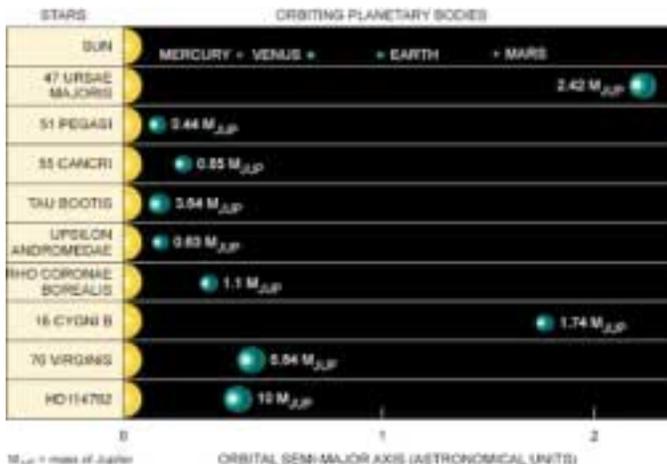
### Astronomers Discover Six Planets Orbiting Nearby Stars

A team of astronomers searching the galaxy with powerful telescopic instruments has found six new planets orbiting nearby stars. This increases by more than 25 percent the number of planets astronomers have discovered outside our solar system, to a total of 28 planets. All 28 have been found within the last five years.

The astronomers made the discoveries as part of a long-term project supported by NSF and NASA to survey 500 nearby stars for orbiting planets. Steven Vogt, University of California, Santa Cruz, Geoffrey Marcy of University of California, Berkeley, and Paul Butler, Carnegie Institution, along with Kevin Apps, a student at the University of Sussex, England, used the Keck I telescope in Hawaii outfitted with the “HIRES” spectrometer. They will report their findings in the *Astrophysical Journal*.

The six planets orbit stars that are similar in size, age, and brightness to the sun and are at distances ranging from 65 to 192 light years from earth. The planets themselves range in mass from slightly smaller to several times larger than the planet Jupiter. They are probably also similar to Jupiter in their compositions—basically giant balls of hydrogen and helium gas, according to researcher Steven Vogt. Their orbits tend to be quite eccentric, tracing oval rather than circular paths.

The presence of a planet around a star is revealed by the variation in the star’s velocity through space as a result of the gravitational force exerted on it by the orbiting planet. Vogt and his coworkers independently confirmed this method for detecting planets recently when they were able to measure the dimming of a star as a planet passed in front of it.



In addition to the discovery of six new planets, the researchers gathered new data on four known planets, whose orbits they had previously studied. Two of them showed long-term trends in their orbits indicating the presence of a companion, which could be an additional planet. These findings are significant because previously only one other system of multiple planets, around the star Upsilon Andromedae, had been identified outside our solar system.

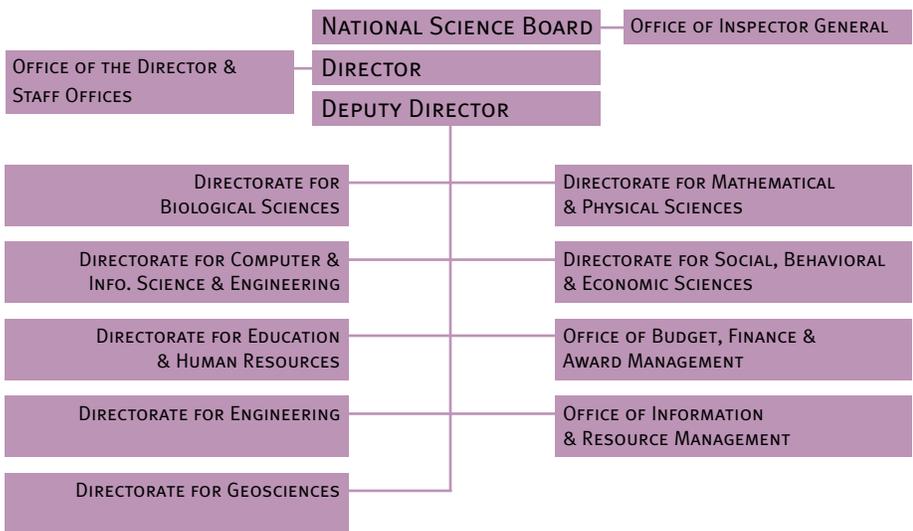
Visual Image courtesy of Geoffrey W. Marcy, University of California-Berkeley

The NSB also serves the President and the Congress as an independent advisory body on policies affecting the health of U.S. science and engineering in research and education.

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, two management offices and an Office of Polar Programs. More detailed information is provided in the Appendix, “Description of NSF Directorates and Management Offices.”

NSF is funded primarily by Congressional appropriations and maintains a staff of about 1,200 (full-time equivalents). 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 periods, who bring with them new and innovative ideas.

NSF is a well-managed, cost-effective agency, with internal operations consuming only 4% of its total budget. However, workload has become a management issue as the Foundation’s budget, workload volume and workload complexity have increased significantly while staffing has remained relatively stable over the past decade. In an attempt to accommodate an increased workload, NSF has been reengineering the way it does business, streamlining and simplifying work processes. In its pursuit of a paperless proposal and award process, NSF has been recognized as a leader in the use of advanced information technologies to improve internal operations and business transactions with the academic research community. In FY 2000, 81% of full proposal submissions were received and processed electronically and over 90% of grantee project reports were submitted to NSF through the new Internet-based Project Reporting System.



# Performance Results

This discussion of NSF's FY 2000 program and management performance provides a summary overview of the Foundation's GPRA (Government Performance and Results Act of 1993) results. For a more detailed explanation of each of NSF's performance goals and results, see the section on "Performance Results and Related Issues." This section also includes additional information required by the Office of Management and Budget (OMB) *Circular A-11*. However, for a complete and comprehensive discussion of the Foundation's performance goals and final results, see NSF's *FY 2000 GPRA Performance Report* ([www.nsf.gov/od/gpra/](http://www.nsf.gov/od/gpra/)).

This is the second year that NSF is reporting GPRA performance results. NSF began implementing GPRA in 1997, by developing a GPRA Strategic Plan. NSF's GPRA Strategic Plan serves as the guiding framework for NSF's FY 2000 Performance Plan ([www.nsf.gov/od/gpra/](http://www.nsf.gov/od/gpra/)), which was developed in conjunction with the development of NSF's FY 2000 budget. The concurrent development of the performance plan and the budget creates a direct link between programmatic activities and the achievement of NSF's strategic goals.

For NSF and other agencies whose mission involves research activities, GPRA implementation has been a particular challenge because: (1) it is difficult to link research outcomes to annual investments and the agency's annual budget and, (2) assessing the results of research is inherently retrospective and requires qualitative judgments of expertise.

NSF has developed an alternative format 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 evaluate research results and outcomes is a common, long-standing practice used by the academic research community. In FY 2000, committees of external experts 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 2000, the years 1997, 1998 and 1999 were the years most likely to be reviewed.

## NSF's Performance Goals

NSF has three mutually supportive sets of performance goals and measures for research and education outcomes, investment processes and management.

- ▶ **Outcome Goals** focus on the results of NSF's grants for research and education in science and engineering and relate directly to the mission of the agency. These Outcome Goals are also NSF's long-term strategic goals from NSF's Strategic Plan, FY 1997-2003. In FY 2000, a new goal addressing data quality measures for reporting Science Resource Studies (SRS) products was added.
- ▶ **Management Goals** address the efficiency and effectiveness of administrative activities in support of the NSF mission. Two new goals addressing electronic proposal processing and staff diversity were added in FY 2000.
- ▶ **Investment Process Goals** focus on the means and strategies NSF uses to achieve its Outcome Goals and sets performance targets for the investment processes by which NSF shapes its portfolio of awards. Several new goals were added in FY 2000 to address customer service, the integration of research and education, and diversity.

These three sets of goals are mutually supportive. 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 the Management Goals are necessary to ensure that the longer term Outcome Goals will be achieved.

NSF's key strategy 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 NSF's Performance Goals are Linked to Areas of Emphasis and to the Budget Structure

NSF's five Outcome Goals address the results of NSF's grants for research and education in science and engineering and relate directly to the mission of the agency. Outcome Goal 1 (*Discoveries at and across the frontier of science and engineering*) and Outcome Goal 2 (*Connections between discoveries and their use in service to society*) address NSF's research activities. Outcome Goal 3 (*A diverse, globally oriented workforce of scientists and engineers*) and Outcome Goal 4 (*Improved achievement in mathematics and science skills needed by all Americans*) address NSF's education activities. Outcome Goal 5 (*Timely and relevant information on the national and international science and engineering enterprise*) addresses NSF's legislative mandate to collect, interpret and analyze data on scientific and engineering resources, and to provide a source of information for federal policy formulation. This goal applies to both research and education activities.

NSF receives five Congressional appropriations: Research and Related Activities (RRA); Major Research Equipment (MRE); Education and Human Resources (EHR); and

Salaries and Expenses (S&E). The fifth appropriation funds the Office of Inspector General. Outcome Goals 1,2 and 5 are funded through the RRA and MRE appropriations, and Outcome Goals 3 and 4 are funded through the EHR appropriation. Because the S&E appropriation funds the internal administration and management of the agency, S&E funding applies to all the Outcome Goals, and as reflected in the Statement of Net Cost, is proportionately prorated between research and education programs based on each program's direct cost. For a schematic presentation of how NSF's performance goals are linked to its investment areas of emphasis—research and education—and to the budget structure, see page 76.

### Data Verification and Validation

In FY 2000, NSF engaged PricewaterhouseCoopers LLP (PwC), to verify and validate selected GPRA performance data as well the process through which supporting data was compiled. In their final reports, PwC concluded that NSF was reporting its GPRA measures with “sufficient accuracy such that any errors, should they exist, would not be significant enough to change the reader’s interpretation as to the Foundation’s success in meeting the supporting performance goal. . .” Furthermore, PwC concluded that NSF “relies on sound business processes, system and application controls, and manual checks of system queries to confirm the accuracy of reported data. We believe that these processes are valid and verifiable.”

## Performance Results

Compared with FY 1999, in FY 2000 NSF was much more rigorous in evaluating goal achievement. Options for grading were limited to either successful or not successful, and full justifications were required for successful grades to be counted for those goals that used qualitative measures. For the Outcome Goals, PricewaterhouseCoopers LLP verified and validated the goal achievement data tables. While NSF was successful in achieving 64% of its goals in FY 2000 as compared with achieving 78% for FY 1999, the results of the second year are very similar to the first. Positive trends were evident in some of the goals, indicating movement in the desirable direction. The areas identified as needing improvement continue to be: (1) use of both merit review criteria by reviewers and applicants; and (2) the customer service goals such as decreasing time to decision on proposals. Both these areas will be focal points in FY 2001.

### FY 2000 Performance Results

	Number of Goals Achieved
Outcome Goals	6 out of 8 (75%)
Management Goals	5 out of 6 (83%)
Investment Process Goals	7 out of 14 (50%); one goal did not apply
Total	18 out of 28 (64%)

## Results for NSF's Outcome Goals

Six of the eight Outcome Goals were achieved in FY 2000. In FY 1999, all Outcome Goals were achieved. Overall, results are similar to those obtained in FY 1999, with trends beginning to appear in this second year of assessment. Reports by external evaluators indicate that NSF successfully achieved the first two Outcome Goals (Goal 1 and Goal 2), and achieved with limited success the second two Outcome Goals (Goal 3 and Goal 4a). FY 2000 evaluators identified the same areas as having limited success and in need of improvement as in FY 1999. In general, programs are showing improvement over FY 1999 performance in the area of increasing diversity through increased participation of underrepresented groups, but reports indicate that the numbers are still lower than expected. The evaluators commented that increasing participation of underrepresented groups is an area needing more attention for NSF. Other areas needing further improvement include: (1) balance of portfolio by taking more risk; and (2) use of the NSF's merit review criteria by reviewers and applicants. Several reports noted that there are clear indications that use of the merit review criteria is evident in making decisions to fund or not fund applications. Common issues identified in some reports that may result in negative impact on program performance, in general, include workload and delays in processing proposals.

## Results for NSF's Management Goals

Five of NSF's six Management Goals were achieved in FY 2000, compared with three out of five in the prior year. Areas identified as improving include orientation and training of NSF staff using FastLane, NSF's electronic system for proposal submission, proposal review, and project reporting; and increasing the use of the new electronic Project Reporting System for project reporting by awardees. The one Management Goal that was not achieved involves the technological capability to submit proposals electronically. The difficulty encountered in FY 2000 which prevented this goal from being achieved was related to the establishing of protocols for electronic signature. NSF piloted two models for electronic certification of proposals and is currently assessing which model will best serve the agency.

## Results for NSF's Investment Process Goals

Seven of NSF's Investment Process Goals were achieved in FY 2000; seven were not achieved and, as in FY 1999, one of the facilities management goals did not apply because there were no construction projects completed during the year. In FY 1999, nine Investment Process Goals were achieved, four were not achieved and as previously mentioned, one did not apply. Areas identified as needing improvement include use of the new merit review criteria in some programs; identifying best practices and training for improving customer service; allowing three months time to prepare proposals; decreasing the time to decision; increasing the percentage of awards to new investigators; maintaining facility upgrades and construction on schedule; and keeping operating time lost due to unscheduled downtime to less than 10% of the total scheduled operating time.

The following chart lists NSF's FY 2000 GPRA goals and results. For a more detailed explanation of these goals and results, see the section on "Performance Results and Related Issues."

## Annual Performance Goals for Outcome Results

Outcome	FY2000 Annual Performance Goals	Aggregated Results
<p><b>Outcome Goal 1</b> Discoveries at and across the frontier of science and engineering</p>	<p><i>NSF is judged successful when</i></p> <p><b>Performance Goal 1</b> NSF awards lead to important discoveries; new knowledge and techniques, both expected and unexpected, within and across traditional disciplinary boundaries; and high-potential links across these boundaries, as judged by independent external experts.</p>	<p><b>Baseline:</b> Experiments using FY 1997 and FY 1998 information indicated successful achievement.  <b>FY 1999:</b> Goal achieved. Judged successful by external experts in all reports.  <b>FY 2000:</b> Goal achieved. Reports by external experts indicate NSF is successful in achieving this goal in the aggregate.</p>
<p><b>Outcome Goal 2</b> Connections between discoveries and their use in service to society</p>	<p><b>Performance Goal 2</b> The results of NSF awards are rapidly and readily available and feed, as appropriate, into education, policy development, or use by other federal agencies or the private sector, as judged by independent external experts.</p>	<p><b>Baseline:</b> Experiments using FY 1997 and FY 1998 information indicated successful achievement.  <b>FY 1999:</b> Goal achieved. Judged successful in the aggregate by external experts who noted improvements could be made in some programs.  <b>FY 2000:</b> Goal achieved. Judged successful in the aggregate by external experts who noted improvements could be made in some programs, as in FY 1999.</p>
<p><b>Outcome Goal 3</b> A diverse, globally-oriented workforce of scientists and engineers</p>	<p><b>Performance Goal 3</b> Participants in NSF activities experience world-class professional practices in research and education, using modern technologies and incorporating international points of reference; when academia, government, business, and industry recognize their quality; and when the science and engineering workforce shows increased participation of underrepresented groups, as judged by independent external experts.</p>	<p><b>Baseline:</b> Experiments using FY 1997 and FY 1998 information indicated successful achievement.  <b>FY 1999:</b> Goal achieved. Judged successful in most areas by external experts.  <b>FY 2000:</b> Goal judged successful in the aggregate by external experts with respect to achieving a globally oriented workforce, and not fully successful with respect to achieving diversity or increased participation of underrepresented groups, therefore goal is successful in a limited context but not fully achieved. FY 2000 results indicate improvements over FY 1999 performance, but improvements are still needed in the same areas identified in FY 1999.            For FY 2001, this goal has been incorporated into a broader goal that focuses on achieving NSF's desired outcome of a diverse, internationally competitive and globally engaged workforce of scientists, engineers, and well-prepared citizens.</p>
<p><b>Outcome Goal 4</b> Improved achievement in mathematics and science skills needed by all Americans</p>	<p><b>Performance Goal 4a</b> NSF awards lead to the development, adoption, adaptation, and implementation of effective models, products, and practices that address the needs of all students; well-trained teachers who implement standards-based approaches in their classrooms; and improved student performance in participating schools and districts, as judged by independent external experts.</p>	<p><b>Baseline:</b> Preliminary pilot efforts did not provide sufficient information to yield a valid baseline.  <b>FY 1999:</b> Goal achieved. Judged successful in the aggregate by external experts for programs to which goal applies.  <b>FY 2000:</b> Goal judged successful in a limited context in the aggregate by external experts. Where programs did not have funds directed to these objectives, external evaluators were uncertain how to assess performance, resulting in an assessment of less than successful or no assessment. In FY 2001, performance measures/indicators for this goal will be better defined to eliminate confusion by evaluators.</p>

## Annual Performance Goals for Outcome Results continued...

Outcome	FY2000 Annual Performance Goals	Aggregated Results
Outcome Goal 4 continued...	<i>NSF is judged successful when</i>	
	<p><b>Performance Goal 4b</b> Over 80% of schools participating in a systemic initiative program will: implement a standards-based curriculum in science and mathematics; further professional development of the instructional workforce; and improve student achievement on a selected battery of tests, after three years of NSF support.</p>	<p><b>FY 1999:</b> Goal achieved. <b>FY 2000:</b> Goal achieved.</p>
	<p><b>Performance Goal 4c</b> Through systemic initiatives and related teacher enhancement programs, NSF will provide intensive professional development experiences annually for at least 65,000 pre-college teachers.</p>	<p><b>FY 1999:</b> Goal achieved. <b>FY 2000:</b> Goal achieved.</p>
<p><b>Outcome Goal 5</b> Timely and relevant information on the national and international science and engineering enterprise.</p>	<p><b>Performance Goal 5a</b> Maintain FY 1999 gains in timeliness for an average of 486 days the time interval between reference period (the time to which the data refer) and reporting of data.</p>	<p><b>FY 1999:</b> Goal achieved. <b>FY 2000:</b> Goal achieved.</p>
	<p><b>FY 1995-96</b> Baseline .....540 days</p>	
	<p><b>FY 1999-2000</b> Goal.....486 days Actual.....461 days</p>	
	<p><b>Performance Goal 5b</b> Establish a standard set of data quality measures for reporting of Science Resource Studies (SRS) products. Prepare reports on these measures for all SRS surveys and publish them in electronic formats to inform users of SRS data quality. New in FY 2000, replacing the FY 1999 goal on relevance.</p>	<p>New in FY 2000 <b>FY 2000:</b> Goal achieved.</p>
	<p><b>Baseline:</b> None prior to goal setting.</p>	

## Annual Performance Goals for Management

New and Emerging Technologies	Critical Factors for Success	Aggregated Results
<b>Electronic proposal submission</b>	<p><b>Management Goal 1</b> NSF will receive at least 60% of full proposal submissions electronically through FastLane.</p> <p>FY 1998 Baseline.....17% FY 1999 .....44% FY 2000 Goal .....60% FY 2000 Result.....81%</p>	<p><b>FY 1999:</b> Goal achieved. <b>FY 2000:</b> Goal achieved.</p>
<b>Electronic proposal processing</b>	<p><b>Management Goal 2</b> By the end of FY 2000, NSF will have the technological capability to take competitive proposals submitted electronically through the entire proposal and award/declination process without generating paper within NSF.</p>	<p>New in FY 2000 <b>FY 2000:</b> Goal not achieved.</p> <p>In FY 2001, NSF will be testing use of an electronic signature for funding approval, the one remaining barrier to a completely electronic processing of awards.</p>
NSF Staff	Critical Factors for Success	Aggregated Results
<b>Diversity</b>	<p><b>Management Goal 3</b> In FY 2000, NSF will show an increase over 1997 in the total number of hires to science and engineering (S&amp;E) positions from underrepresented groups. (Revised goal.)</p> <p>FY 1997 Baseline: Of 54 S&amp;E hires, 22% were female and 19% were from underrepresented minority groups.</p> <p>FY 2000 Result: Of 113 S&amp;E hires, 35 were female and 19 were from minority groups. Compared with FY 1997 baseline, this represents a 120% increase in female hires and a 27% increase in minority hires.</p>	<p><b>FY 1999:</b> Goal achieved. <b>FY 2000:</b> Goal achieved.</p>
<b>Capability in use of information technology</b>	<p><b>Management Goal 4</b> By the end of FY 2000, all staff will receive an orientation to FastLane, and at least 80% of program and program support staff will receive practice in using its key modules.</p> <p><b>Orientation</b> FY 1999 .....80% FY 2000 Goal.....100% FY 2000 Result.....100%</p> <p><b>Training</b> FY 1999 .....43% FY 2000 Goal.....80% FY 2000 Result.....90%</p>	<p><b>FY 1999:</b> Goal not achieved. <b>FY 2000:</b> Goal achieved.</p>

Annual Performance Goals for Management continued...

Implementation of Management Reforms	Critical Factors for Success	Aggregated Results
<p><b>Year 2000 Compliance</b></p>	<p><b>Management Goal 5</b> NSF will complete all activities needed to address the Year 2000 problem for its information systems according to plan, on schedule and within budget. (Revised goal for FY 2000.)</p> <p><b>FY 2000 Result:</b> All activities needed to address the Year 2000 problem were completed according to plan, on schedule, and within budget.</p>	<p><b>FY 1999:</b> Goal achieved. <b>FY 2000:</b> Goal achieved.</p>
<p><b>Project Reporting System</b></p>	<p><b>Management Goal 6</b> During FY 2000, at least 85% of all project reports will be submitted through the new electronic Project Reporting System.</p> <p>FY 1999 .....59% FY 2000 Goal.....85% FY 2000 Result.....92%</p>	<p><b>FY 1999:</b> Goal achieved; target revised for FY 2000. <b>FY 2000:</b> Goal achieved.</p>

NSF supports of K-12 programs that directly impact nearly 12,000 students and over 80,000 teachers. Shown here are students at the El Paso Collaborative for Academic Excellence.



## Annual Performance Goals for NSF's Investment Process

Performance Area: Proposal and Award Processes	FY 2000 Annual Investment Process Performance Goals	Aggregated Results
<b>Use of Merit Review</b>	<p><b>Investment Goal 1</b> At least 90% of NSF funds will be allocated to projects reviewed by appropriate peers external to NSF and selected through a merit-based competitive process.</p> <p>FY 1998 (Baseline) .....95%                      FY 1999 .....95%                      FY 2000 Goal .....90%                      FY 2000 Result.....95%</p> <p>During FY 2000, OMB redefined what constitutes a merit-reviewed project and established a new target goal of 70-90%.</p> <p>Revised FY 2000 Goal.....80% (est.)                      FY 2000 Result.....87%</p>	<p><b>FY 1999:</b> Goal achieved.  <b>FY 2000:</b> Goal achieved.</p>
<b>Implementation of Merit Review Criteria</b>	<p><b>Investment Goal 2</b> NSF performance in implementation of the new merit review criteria is successful when reviewers address the elements of both generic review criteria appropriate to the proposal at hand and when program officers take the information provided into account in their decisions on awards, as judged by external independent experts.</p> <p>Results: About one-third of evaluation reports rated NSF programs as successful in their use of the new merit review criteria. In most cases where NSF was rated not fully successful, reviewers and applicants were not fully addressing the second criterion regarding the broader impacts of the proposed activity.</p>	<p><b>FY 1999:</b> Goal achieved.  <b>FY 2000:</b> Goal not achieved.</p> <p>Full implementation of goal is a priority in FY 2001. A number of measures are being taken to ensure its achievement, e.g., different on-screen pages have been provided in FastLane so reviewers are guided to address each merit review criterion separately; performance data will be collected from the FastLane database; etc.</p>
<b>Customer Service: General</b>	<p><b>Investment Goal 3</b> Identify possible reasons for customer dissatisfaction with NSF's merit review system and with NSF's complaint system.</p> <p>Results: NSF commissioned surveys in order to ascertain possible reasons for customer dissatisfaction.</p>	<p>New in FY 2000.  <b>FY 2000:</b> Goal achieved.</p>
<b>Customer Service: General</b>	<p><b>Investment Goal 4</b> Identify best practices and training necessary for NSF staff to conduct merit review and answer questions about the review criteria and process; identify best practices and training necessary for NSF staff to answer questions from the community and to deal with complaints in a forthright manner.</p> <p>Results: Goal underway but not completed in FY 2000; plans to finalize implementation in FY 2001.</p>	<p>New in FY 2000.  <b>FY 2000:</b> Goal not achieved.</p> <p>In FY 2001, staff will continue to develop models of best practices and staff training; NSF will pilot the best models at division level and provide specific customer service training to NSF staff.</p>

## Annual Performance Goals for NSF's Investment Process

Performance Area: Proposal and Award Processes	FY 2000 Annual Investment Process Performance Goals	Aggregated Results
<b>Customer service: General</b>	<p><b>Investment Goal 5</b> Improve NSF's overall American Customer Satisfaction Index (ACSI) compared to the FY 1999 index of 57 (on a scale of 0 to 100).</p> <p>FY 1999 .....57 FY 2000 Goal .....&gt;57 FY 2000 Result.....58</p>	<p>New in FY 2000. <b>FY 2000:</b> Goal achieved.</p> <p>Ongoing commitment to improve results; see previous Goals 3&amp;4</p>
<b>Customer service: Time to prepare proposals</b>	<p><b>Investment Goal 6</b> 95% of program announcements and solicitations will be available at least three months prior to proposal deadlines or target dates.</p> <p>FY 1998 Baseline .....66% FY 1999 .....75% FY 2000 Goal .....95% FY 2000 Result.....89%</p> <p>Although this goal was not achieved, there is notable improvement from prior year. In FY 2000, 89% of program announcement/solicitations achieved goal; approximately 8% missed the 90-day time limit by fewer than 5 days.</p>	<p><b>FY 1999:</b> Goal not achieved. <b>FY 2000:</b> Goal not achieved.</p> <p>In FY 2001, staff will limit number of special competitions requiring individual announcements; plan further in advance; initiate clearance process at least 6 months prior to anticipated deadlines; clearance procedures will be reviewed.</p>
<b>Customer service: Time to decision</b>	<p><b>Investment Goal 7</b> Maintain the FY 1999 goal to process 70% of proposals within six months of receipt, improving upon the FY 1998 baseline.</p> <p>FY 1998 Baseline .....59% FY 1999 .....58% FY 2000 Goal .....70% FY 2000 Result.....54%</p> <p>In FY 2000, 54% of proposals were processed within 6 months of receipt and an additional 35% were processed between 6 to 9 months of receipt.</p>	<p><b>FY 1999:</b> Goal not achieved. <b>FY 2000:</b> Goal not achieved.</p> <p>In FY 2001, staff will make more effective use of electronic mechanisms in conducting reviews; more closely track processing; eliminate overloads/bottlenecks.</p>
<b>Maintaining Openness in the System</b>	<p><b>Investment Goal 8</b> The percentage of competitive research grants going to new investigators will be at least 30%.</p> <p>FY 1998 Baseline .....27% FY 1999 .....27% FY 2000 Goal .....30% FY 2000 Result.....28%</p>	<p><b>FY 1999:</b> Goal not achieved. <b>FY 2000:</b> Goal not achieved.</p> <p>In FY 2001, NSF staff will pursue outreach efforts to promote awareness of NSF research opportunities; undertake analysis of trends (e.g., whether pool of new investigators is getting smaller, etc.) to determine whether goal needs to be modified.</p>

## Annual Performance Goals for NSF's Investment Process

Performance Area: Integration of Research and Education	FY 2000 Annual Investment Process Performance Goals	Aggregated Results
<p><b>In Proposals</b></p>	<p><b>Investment Goal 9</b> NSF will develop a plan and system to request that Principal Investigators (PIs) address the integration of research and education in their proposals, and develop and implement a system to verify that PIs have done so. (Revised goal.) No baseline.</p> <p>Result: In FY 2000, NSF implemented an electronic program announcement template clearance process (PAT) that is used by NSF staff to generate announcements and solicitations. Use of the PAT ensures that the integration of research and education is emphasized in all announcements and solicitations for PIs to address in their submissions.</p>	<p>New in FY 2000. <b>FY 2000:</b> Goal achieved.</p>
<p><b>In Reviews</b></p>	<p><b>Investment Goal 10</b> NSF will develop and implement a system/mechanism to request and track reviewer comments tied to merit review criterion #2, "What are the broader impacts of the proposed activity?" (Revised goal; no baseline.)</p> <p>Result: In FY 2000, screens in FastLane were redesigned so that reviewers can address each merit-review criterion separately. The performance data will be collected from the FastLane database. This will be fully implemented in FY 2001.</p>	<p>New in FY 2000. <b>FY 2000:</b> Goal achieved.</p>
Performance Area: Diversity	FY 2000 Annual Investment Process Performance Goals	Aggregated Results
<p><b>NSF Applicants</b></p>	<p><b>Investment Goal 11</b> NSF will identify mechanisms to increase the number of women and underrepresented minorities in the proposal applicant pool, and will identify mechanisms to retain that pool. (Revised goal; no baseline.)</p> <p>Result: NSF identified and put into place mechanisms to increase the diversity of NSF applicants.</p>	<p>New in FY 2000. <b>FY 2000:</b> Goal achieved.</p>

## Annual Performance Goals for NSF's Investment Process

Performance Area: Facilities Oversight	FY 2000 Annual Investment Process Performance Goals	Aggregated Results
<b>Construction and Upgrade</b>	<p><b>Investment Goal 12</b> Maintain 1999 goal to keep construction and upgrades within annual expenditure plan, not to exceed 110% of estimates.</p> <p>FY 1999 Result: Majority of facilities were within 110% of annual spending estimates.</p> <p>FY 2000 Result: Of the 11 construction and upgrade projects supported by NSF, all were within annual expenditure plans; most were under budget.</p>	<p><b>FY 1999:</b> Goal achieved. <b>FY 2000:</b> Goal achieved.</p>
	<p><b>Investment Goal 13</b> Maintain 1999 goal to keep construction and upgrades within annual schedule, total time required for major components of the project not to exceed 110% of estimates.</p> <p>FY 1999 Result: Majority of facilities on schedule.</p> <p>FY 2000 Result: Of the 11 construction/upgrade projects supported by NSF, seven were within the annual schedule goal.</p>	<p><b>FY 1999:</b> Goal achieved. <b>FY 2000:</b> Goal not achieved.</p> <p>NSF program managers will work more closely with project managers to ensure compliance in FY 2001.</p>
	<p><b>Investment Goal 14</b> For all construction and upgrade projects initiated after 1996, keep total cost within 110% of estimates made at the initiation of construction.</p>	<p><b>FY 1999 and FY 2000:</b> There were no completed projects, therefore, this goal did not apply.</p>
	<b>Operations</b>	<p><b>Investment Goal 15</b> Maintain 1999 goal to keep operating time lost due to unscheduled downtime to less than 10% of the total scheduled operating time.</p> <p>FY 1999 Result: Reporting database under development.</p> <p>FY 2000 Result: Of the 26 reporting facilities, 22 met the goal of keeping unscheduled downtime to below 10% of the total scheduled operating time.</p>

## 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 oversight and for 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 (*Management Accountability and Control*) and A-127 (*Financial Management Systems*) 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 2000. The MCC also provided reasonable assurance that the NSF systems that are being used to compile information for NSF's annual GPRA Performance Report have been evaluated and provide adequate controls. It was also determined that agency assets were properly safeguarded.

Through an independent assessment conducted during the annual CFO Act audit, NSF internal accounting systems were found to be compliant with the Federal Financial Management Improvement Act of 1996 (FFMIA). During the FY 2000 certification process, the MCC did not identify any material weaknesses as defined by OMB guidance. The MCC evaluated the progress made on one repeat reportable condition in the FY 1999 financial statement audit related to the recording and accountability of property, plant, and equipment maintained by a NSF contractor. The MCC identified that credible progress to correct this reportable condition had been made in FY 2000. An independent assessment made during this year's annual CFO audit confirmed this condition has been resolved. The MCC reported several management challenges identified through the FMFIA assessment process which 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. These challenges include data and systems management activities, program management support to include training and outreach, recruitment and retention of staff, and access security to systems. The MCC will address these issues, most of which require long-term attention.

## 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. This statement can be found in the section, "Other Reporting Requirements." The IG's list of management and performance challenges addresses four primary areas: System and Data Management; Program Management; Staffing and Human Resource Management; and Security and Controls. As noted in the IG's statement, these management challenges have been acknowledged and are being addressed by NSF management.

Following the IG's statement is the Director's response.

### The Director's Statement of Assurance for FY 2000

*Consistent with the provisions of the Reports Consolidation Act of 2000, and with the approval of the Office of Management and Budget, NSF has included the results of the management evaluations required by the Federal Managers' Financial Integrity Act (FMFIA) for the period ending September 30, 2000 into the annual Accountability Report.*

*Based on internal management evaluations, and in conjunction with results of independent financial statement audits, NSF can provide reasonable assurance that the objectives of Section 2 of FMFIA (internal controls) and Section 4 of FMFIA (financial management systems) have been achieved. NSF can also state that it is in substantial compliance with the Federal Financial Management Improvement Act (FFMIA) as well.*

*The NSF Management Controls Committee (MCC), under the chairmanship of the agency's Chief Financial Officer, provides continued senior executive attention to management control issues. The Office of the Inspector General, represented as an advisory member of the MCC, continues to provide useful and constructive suggestions for improving the agency's management controls and financial management policies and practices.*

*I am confident that NSF's significant accomplishments in the achievement of FMFIA objectives will continue and that level of assurance will be provided for FY 2000 and beyond.*



Rita R. Colwell

# 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 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 2000 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 2000 financial statements.

In concurrence with the National Science Board Committee on Audit and Oversight and the NSF Chief Operating Officer, the NSF Inspector General and Chief Financial Officer established the NSF Audit Coordination Committee in 1998 to promote and encourage open communications to discuss audit issues. The Audit Coordination Committee, in coordination with both the Chief Financial Officer and the Inspector General, closely monitor the annual audit. The auditor issues a signed audit report that is presented to the Chair of the National Science Board and the NSF Director.

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

NSF's one previous reportable condition related to NSF's U.S. Antarctic Program's (USAP) Property, Plant and Equipment (PP&E) has been remedied for FY 2000. NSF management engaged the USAP contractor to increase their level of internal controls relative to the PP&E reporting provided to NSF for the annual financial statements. NSF management instituted a supervisory level of review and concurrence with accounting information prepared by contractor staff to identify and correct any errors or improper reporting before information is submitted to NSF. The auditors performed extensive interim testing at the contractor's site and year-end testing at NSF Headquarters and found this condition to be resolved.

One instance of a noncompliance with laws and regulations was reported; however, NSF management disagrees with this assessment. The expending of funds from the Research and Related Activities (RRA) appropriation to supplement potential shortfalls in

the Major Research Equipment (MRE) appropriation for a large international project was identified as a potential noncompliance with federal appropriations law and noted in a report issued by the NSF Inspector General's office in December 2000. NSF management believes that the allocation of expenditures between the RRA and MRE appropriations is within management discretion under the guiding principles of federal appropriations law. NSF management will seek to add more definitive appropriations law language in future MRE appropriations, to clarify that funds from other sources can be used to supplement MRE appropriations.

## Understanding the Financial Statements

NSF's current year financial statements and notes are presented in a comparative format providing financial information for FY 1999 as well as for FY 2000. Comparative financial statements were originally required for FY 2000 by Technical Amendments to OMB Bulletin 97-01, *Form and Content of Agency Financial Statements*, dated November 20, 1998. A subsequent Technical Amendment to OMB Bulletin 97-01, dated September 11, 2000 postponed this requirement for FY 2000. NSF has elected early implementation of comparative financial statements as is permitted and encouraged by the latest Technical Amendment.

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% 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% 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 grants upon which other federal entities rely to assist in the administering of their grants.



## News – December 15, 1999

NSF PR 99-73

**Media contact:** Cheryl Dybas (703) 292-8070

[cdybas@nsf.gov](mailto:cdybas@nsf.gov)

**Program contact:** DeLill Nasser (703) 306-1439

[dnasser@nsf.gov](mailto:dnasser@nsf.gov)

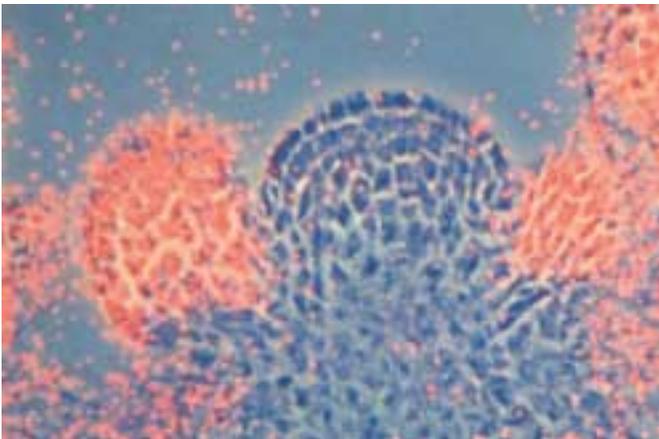
### Scientists Report First Complete DNA Sequence of Plant Chromosomes

Scientists involved in an international effort to sequence the entire genome of *Arabidopsis thaliana* have reported the first complete DNA sequence of a plant chromosome in the December 16, 1999, issue of the journal *Nature*. The results provide new information about chromosome structure, evolution, intracellular signaling and disease resistance in plants. The research conducted by U.S. participants was funded in large part by the National Science Foundation (NSF).

U.S. and European scientists in the *Nature* article report the complete DNA sequence of two of the five chromosomes of *Arabidopsis*. Scientists hope to use this information to understand the function of genes in important plant processes. These studies may ultimately lead to the development of plants that are more nutritious, produce useful chemicals, withstand flood and drought, or can grow on marginal lands.

*Arabidopsis thaliana* has emerged as a powerful tool for research in plant molecular biology and genetics. The short generation time and relatively compact genome of *Arabidopsis* make it an ideal model system for understanding numerous features of plant biology, including ones that are of significant value to agriculture, energy, environment, and health.

Working together, a U.S. consortium led by Cold Spring Harbor Laboratory scientist Richard McCombie, and the European Union Arabidopsis Genome Sequencing Consortium led by Michael Bevan of the John Innes Centre (Norwich, UK), completed the sequence of chromosome 4. A team of scientists at The Institute for Genomic Research in Rockville, Maryland, determined the sequence of chromosome 2. Together, these chromosomes comprise roughly one-third of the *Arabidopsis* genome.



The NSF-funded genome research project to map *Arabidopsis* will yield important information about how flowering plants interact with their environments. This is a close-up of *Arabidopsis* cells.

Martin Yanofsky/University of California at San Diego

**Comparative Discussion:** Analysis of significant changes from FY 1999 to FY 2000 incorporates an increase in *Fund Balance With Treasury; Intragovernmental Accounts Receivable; Accounts Receivable; General Property, Plant and Equipment; Other Intragovernmental Liabilities; Lease Liabilities*; and a reduction in *Cash*.

The increase in FY 2000 *Fund Balance with Treasury* was in correlation to the overall increase in budget authority. The FY 2000 *Intragovernmental Accounts Receivable* increase stems from an amount due on an interagency agreement on a NSF funded award. *Cash* decreased due to a reduction in the Trust Fund balance maintained.

FY 2000 *Accounts Receivable* increased due to the recording of a receivable from a NSF grantee. *General Property, Plant and Equipment* increased in FY 2000 mainly through additions to construction in progress related to polar program operations and a new phone system at NSF Headquarters in Arlington. The increase in *Intragovernmental Liabilities* was primarily due to an interagency On-line Payment and Collection (OPAC) liability. *Lease Liabilities* rose from the capitalization and liability recognition of several new leasing arrangements in FY 2000.

**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.

To arrive at full costing, NSF includes certain benefit costs for NSF retirees' benefits that will be paid by the Office of Personnel Management (OPM) for future periods. Amounts remitted to OPM by and for covered NSF employees do not generally cover the actual costs of the benefits those employees will receive after their careers. NSF calculates the costs paid by OPM on behalf of NSF and reports those costs as part of the cost of NSF operations.

A total of 96.1% of all current year NSF costs incurred were directly related to the support of NSF research and education programs. A small portion of these direct costs is for travel and salaries paid from programmatic funds. 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 3.9% 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 1999 to FY 2000 shows a 15% increase in *Earned Revenues* and about a 4% increase in *Net Cost of Operations*. These increases are reflective of the agency's overall increase in Budget Authority.

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

Ninety-nine percent of all current year 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 1999 to FY 2000 indicates an 11% 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 1999 and FY 2000 relate to the Office of Polar Programs equipment received and the salvage value of the new satellite received from NOAA, respectively.

**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 information presented in the FY 2000 President's Budget; however, this statement was prepared prior to completion of the FY 2002 President's Budget.

**Comparative Discussion:** Analysis of changes in Budgetary Resources from FY 1999 to FY 2000 show a 7% increase in *Total Budgetary Resources* and a 6% increase in *Total Outlays*. Both of these increases are consistent with our increase in budget authority.

**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.

**Comparative Discussion:** Analysis of changes in financing from FY 1999 to FY 2000 revealed a decrease in *Change in Unfilled Customer Orders* due to a strong current year effort to reduce outstanding reimbursable orders; an increase in *Net Costs Capitalized on the Balance Sheet* related to additions to construction in progress and a new phone system; and a decrease in *Loss on Disposition of Assets* since only minor assets were retired this year. Additionally, *Other Financing Sources* were eliminated in the current year; 1999 was the final year for funding of a court ordered dissolution of a NSF cooperative agreement relating to Internet domain names.

**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 1999 to FY 2000 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: Resources & How They Are Used

NSF is primarily funded through five Congressional appropriations which totaled \$3.9 billion in FY 2000—a 5.4% increase from the FY 1999 prior year. Other FY 2000 revenue resources included \$86.0 million in reimbursable authority and appropriation transfers from other federal agencies and \$15.8 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 2000, NSF received \$48.6 million from H-1B visa fees, to support education activities and scholarships for financially disadvantaged students in computer science, engineering, and mathematics.

From its total budgetary resources, NSF obligated \$3.9 billion in FY 2000. As indicated in the Statement of Net Cost, the Foundation supports research activities and education activities. Research activities are funded through the Research and Related Activities appropriation and the Major Research Equipment appropriation. Education activities are funded primarily through the Education and Human Resources appropriation, although given the integrative nature of research and education, NSF research activities often include an education and training component. 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 2001, Congress provided NSF with total appropriations of \$4.4 billion, a 13.6% increase from the prior year. In addition, it is estimated that NSF will receive \$102.7 million from H1-B fees. Areas of emphasis for NSF investments in FY 2001 include Information Technology Research; Biocomplexity in the Environment; Nanoscale Science and Engineering; and plant genome research for economically significant crops. As part of the Federal Cyber Services Training and Education Initiative, NSF will establish a new Scholarships for Service program aimed at developing a cadre of computer systems and network national security specialists for the 21st century. Ongoing support will be provided to numerous activities, including the Children's Research Initiative, advanced technological



## News – July 25, 2000

NSF PR 00-51

Media contact: Tom Garritano (703) 292-8070 [tgarrita@nsf.gov](mailto:tgarrita@nsf.gov)

### Human-Computer Interaction Gets a Helping Hand, Eye and Voice

#### Research moves toward more-natural communication with computers

Computers are one step closer to “understanding” people, thanks to progress in human-computer interaction research at Rutgers University funded by the National Science Foundation (NSF). In a project called STIMULATE, researchers are developing systems that mimic forms of communication that humans use to interact, including eye contact, touch and voice. The experimental hardware and software may find uses in medicine, the military and other fields that could benefit from more natural forms of human-computer interaction across distributed networks.

a Window VR device which offers a rich 3D presentation, and allows the user to view the scene panoramically by rotating the display.



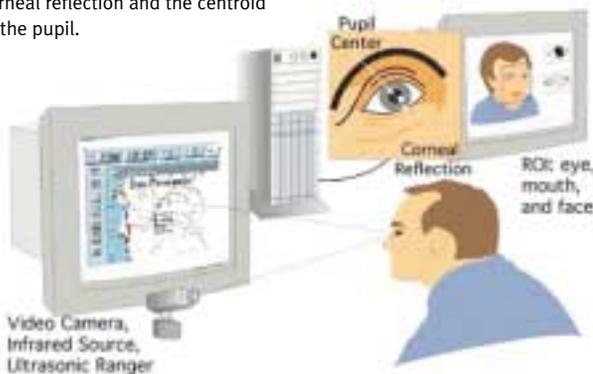
Computer scientists and electrical engineers at Rutgers have designed Multimodal Input Manager (MIM) hardware that simultaneously receives speech, gaze and tactile signals. Then special software called Fusion Agent assimilates the complex inputs so the computer may respond to subtle signals that humans routinely use to communicate with one another.

A pneumatic “force-feedback” glove, patented by Rutgers, weighs less than three ounces and reads gestures by detecting fingertip positions relative to the palm. It lets the user point at the computer screen, overriding signals from a gaze-tracking camera.

The MIM's gimbal-mounted unit sits on the desktop and rotates to detect where the user is looking. After a 10-second initial calibration of the infrared detectors, the user can direct a cursor just by looking at a section of the computer screen.

The software even detects lip movement to steer a microphone array for use in high-noise environments. For groups of users, the array can home in on the vocal source, even if the person speaking moves around the room.

Integrated gaze and face tracking system. A gimbal-mounted camera and IR light source tracks gaze by computing the angle between the corneal reflection and the centroid of the pupil.



MIM users at multiple locations can simultaneously interact with each other in a unified, 3D-work environment. Using the Java programming language, the project also produced new cWorld (for Collaborative World) software that lets teams of users construct those virtual environments.

The MIM has been tested by medical doctors for analyzing images of blood samples, X-rays and MRI tests. A physician can use the tactile, voice-recognition and eye-tracking inputs to rapidly separate distinct image characteristics, then vocally query the database for samples that match. The MIM hardware has also been field-tested by the Army National Guard to interact with remote staff in a disaster relief simulation.

education, Graduate Teaching Fellowships in K-12 Education, and education efforts directed toward science and engineering at historically black colleges and universities and at Tribal colleges. Among major research equipment supported are a new teraflop computer facility and a high altitude research aircraft for environmental research.

## Future Financial Trends and Business Events

NSF is continually evolving to take advantage of the most recent developments in technology, with an eye towards creating a more efficient, streamlined operation as well as providing better service to our diverse and growing customer base. NSF is making strides in enhancing employee work automation that will enable wider information sharing, expedite transaction flow and provide superior decision making information. Some of the efforts currently underway that will further enhance productivity and reduce costs for the Foundation, in both the near and long term are described below:

### Continue improvement in accounting and financial business delivery systems:

NSF will continue to migrate to a client/server platform with the development of the PAT/PIMS system, Electronic Travel System, and Integrated Payroll System. The implementation of these systems is part of our progress to implement the overall NSF e-business strategy. This continues to build upon agency-wide strategic goals to broaden access to new and emerging technologies for business applications.

- ▶ *PIMS/PAT Systems.* The Program Announcement Template (PAT) is a Web-based system that streamlines the preparation of program announcements and solicitations, allowing the user to “walk through” the development of an announcement/solicitation. The purpose of the Program Information Management System (PIMS) is to build a comprehensive relational database of program-related data and the mechanisms for updating, controlling, distributing and publishing that information to NSF web sites and other destinations. Workflow and clearance procedures will be supported and PIMS data will be available for use on Directorate, Division, and Program web pages. Full implementation of PIMS is expected in FY 2001.
- ▶ *Electronic Travel System.* A new Electronic Travel System (ETS) is being designed as a replacement to the current paper voucher process. ETS will provide electronic routing to staff members responsible for initiating travel authorization, approval, and vouchering, and to other offices whose approval or authorization is necessary. The prototype of ETS is currently under development.
- ▶ *Integrated Payroll System.* NSF is currently finalizing development of a new payroll system to replace the current legacy payroll system. The new Integrated Payroll System (IPAY) will be a client/server platform system that integrates the personnel operational system and the Time and Attendance System and interface with NSF’s Financial Accounting System (FAS). IPAY will provide electronic transfers of payroll and financial information to other government agencies and commercial financial institutions to minimize or eliminate manual payroll processes. This system will also have ESS (Employee Self Service)

capability, allowing employees to make certain payroll changes electronically. By reducing data entry requirements, eliminating manual reconciliation, and making data available to employees on-line via their personal computer, IPAY will enhance the entire payroll process. Full implementation of IPAY is expected in early FY 2001.

► *FastLane*. The FastLane system allows NSF to exchange information and facilitate business transactions with the external university research community via the Internet. Doing business with NSF is less expensive because customers have greater access to information, can tailor the way they do business with NSF, and utilize “smart-forms” which access NSF databases to minimize data entry. In addition to improving customer service to grantees, these features are able to reduce the time and effort needed to complete transactions within NSF. NSF plans, through FastLane updates, to continue to move toward a paperless business systems environment in which information is transferred and shared electronically rather than physically.

**Participate in government-wide efforts to improve the administration of all federal grant programs:** NSF will continue to take an active leadership role with the Grants Management Committee of the U.S. CFO Council, with its primary task to implement government-wide improvements in grant delivery services as required by the Federal Financial Assistance Management Improvement Act of 1999 (P.L. 106-107).

**Participate in intra-governmental business solutions.** NSF has developed a plan to incrementally address intra-governmental business transaction reporting for FY 2000 and the future. In FY 2000, NSF is confirming with the appropriate Fiduciary Agencies and attempting confirmations with our other large governmental partners. In looking towards the future, NSF is actively involved in two governmental workgroups, IGOTS (Intra-Governmental Transfer System group) and IGETS (Intra-Governmental Elimination Transaction group), to determine possible solutions and strategies for this far-reaching issue.

**Continued sponsorship of FinanceNet.** FinanceNet ([www.financenet.gov](http://www.financenet.gov)) is the Internet’s Web site for public financial management information. Established in 1994, FinanceNet is operated by NSF under the sponsorship of the U.S. Chief Financial Officers Council. As the virtual clearinghouse for federal financial management information, FinanceNet is a shared government-wide resource that produces various Internet services to facilitate communication and collaboration among government financial managers and related parties and provides a shared, interagency platform for seeking solutions in a virtual government environment for common government-wide problems. FinanceNet has proven to be an important interactive information tool. In FY 2000, there were nearly 175,000 subscribers to FinanceNet’s daily public and private list servers.

FinanceNet continues to expand its role to provide more service to the federal financial community. FinanceNet is now the federal government-wide web source for assets sales, and in the future will be expanded to include a searchable database of disposal assets by

class and category and development of an on-line auction Web site (e.gov) similar to several popular private sector on-line auction houses. FinanceNet also is being considered as a potential data clearinghouse for agencies to reconcile and report intragovernmental transaction information that is required by the U.S. Treasury to compile the annual Consolidated Government-wide Financial Statements.

## 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 States Code section 3515(b). While these statements have been prepared from the books and records of NSF in accordance with the formats prescribed in Office of Management and Budget Bulletin 97-01, *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, unfunded liabilities reported in the statements cannot be liquidated without the enactment of an appropriation, and ongoing operations are subjected to enactment of appropriations.



NSF support of informal science education programs reaches millions of people of all ages. NSF provided support for “Galapagos,” a 3-D film currently being shown at The Smithsonian Museum of Natural History. The film introduces the audience to biodiversity and evolution by sharing with viewers the experience of traveling with a team of researchers to a field site in the exotic Galapagos Islands.

*Photo ©1999 Imax Ltd.*